

**Industrial Forestry and Brazilian Development:**  
**A social, economic and political analysis,**  
**with special emphasis on the fiscal incentives scheme**  
**and the Jequitinhonha Valley in Minas Gerais**

by

Sebastiao Kengen

B.S. (Forestry) - Universidade Federal Rural do Rio de Janeiro (1972)

M.Sc. in Forestry - Michigan State University (1979)

NO PAGE VII TEXT O.K.

A thesis submitted to the Australian National University in  
fulfillment of the requirements for the degree of Doctor of  
Philosophy

Department of Forestry

December 1985



STATEMENT OF ORIGINALITY

This thesis is based upon original research conducted by the author, except where acknowledged.

Sebastiao Kengen

ABSTRACT

Development has been the subject of a great debate which has led to conflicting paradigms, which in turn have generated a wealth of theories. However, some forestry planners have apparently been reluctant, unwilling, unable or dis-interested in keeping up with the advances in the general theories of development. So the forestry sector generally has lagged behind the results of this debate.

This position is reflected in the general perception of the role of the forestry sector in development and consequently, in the way that analyses of forestry development are conducted. These conventional forestry sector analysts have in general relied on the project evaluation techniques through uncritical application of the discounting procedure to identify the best technology and the best designs for capital investments. Despite the relative importance of these works, they fail to recognise that economic, political and social dimensions interact mutually. These analyses, in general, also do not take into account spatial and organisational structures. Hence, considering these interactions and structures enables different and more penetrating evaluations to be made and leads to final conclusions which certainly differ from those usually achieved by the conventional analyses.

The Brazilian process of development as a whole is reviewed, and in particular, the State of Minas Gerais' development

within Brazil's development. Following these reviews the forestry sector is placed within these processes of development. The expansion of the industrial reforestation into the Jequitinhonha Valley in the State of Minas Gerais is analysed as a case study by applying a non-conventional analysis. It is a non-conventional analysis since it is not solely an economic and/or financial analysis. On the contrary, its major concern is analysing the interaction among social, economic and political aspects of these plantations and their effects on the Valley, and showing the region and the sector affected by forces, especially political ones within the economic system. This is done through a more comprehensive evaluation methodology which employs other sources and disciplines outside forestry and the conventional pattern of analysis. The results of this analysis differ in many respects from those achieved by the standard analyses.

This analysis shows that the fiscal incentives scheme for reforestation is only a reflection and a continuation of the general policies dictated by the Brazilian model of development. As such, the expansion of the industrial reforestation is merely a response to this policy and consequently, is also part of the overall model. Within this context, this expansion also generates a series of consequences, such as concentration of wealth, similar to those promoted by the model as a whole. These consequences can be observed through the results of the analysis of the case study.

Examining the claims, expectations and justifications of the fiscal incentives scheme and the expansion of industrial reforestation raises a set of conclusions which are normally ignored or only superficially mentioned in the conventional analysis.



This analysis suggests that the expansion of the industrial reforestation into the Valley was based on incorporation of new lands into the productive process. However, this incorporation per se does not mean that these lands were waste or unused, as shown by other studies. Furthermore, this incorporation of new lands was followed by a considerable concentration in land tenure.

Following the assumptions proposed in the early approach to the role of forestry in development, industrial reforestation has been advocated on the basis of its contribution to industrialization. However, evidence presented in this work does not seem to support this claim.

Creation of jobs has been one of the key justifications. However, evidence again suggest that although there could have been considerable employment in the early stages of this expansion, at present this number has declined. Many plantations are without a defined final use and the maintenance stage per se is not a major generator of jobs.

Another key justification is that the establishment of industrial reforestation can restrain rural emigration or even reverse it. Results of this analysis do not support this claim. Furthermore, the Valley as a whole has been losing population.

Following this migration the Valley has experienced a non-organised and rapid process of urbanization which has led to pressure on its already precarious infrastructure. Local municipalities have no resources to keep up with improvement of the infrastructure at the same rate as urbanization increases. This suggests that there has

been a decline in the overall standard of living of the local population.

This decline is also suggested by the overall structure of causes of death which still shows a large number of deaths caused by infectious and parasitic diseases. These data also show that the number of deaths caused by diseases typical of larger centres has also increased relative to the total number of deaths. This suggests that the Valley, without having its old and basic problems solved, has incorporated new problems.

Finally, conclusions are drawn and the likely implications on forestry in general, Brazil, Minas Gerais and the Jequitinhonha Valley are raised. One of the major implications of this analysis for the forestry sector as whole is that it demonstrates the need of the forestry sector to conduct empirical analyses which go beyond its own boundaries and beyond mere application of project evaluation techniques.

As far as Brazil is concerned one of the major implications is the need for an overall realistic re-appraisal of the fiscal incentives scheme. Since it is funded with public money, it must accrue real benefits to the society and not simply expectations based on theoretical assumptions.

Minas Gerais and the Valley cannot stop the establishment of new plantations, so the implication of this study for them is that they need to lobby and/or present recommendations regarding the utilisation of those plantations already established, and to minimise adverse social impacts.

### ACKNOWLEDGEMENTS

I am grateful to my wife, Yara, for her encouragement, understanding, love, and patience which were fundamental to help me to overcome the many crises which I faced during the course of this work. Indeed, there are no words to express all of my most profound gratitude for her.

I want to express my profuse gratitude to Dr. R. Neil Byron, Dr. John B. Dargavel and Dr. Dan M. Etherington for their invaluable ideas and their patience demonstrated many times during the supervision of this work.

I am indebted to the 'Instituto Brasileiro de Desenvolvimento Florestal (IBDF)' for providing me this opportunity to study at the Department of Forestry of the Australian National University. I am also indebted to the 'Conselho Nacional de Desenvolvimento Cientifico e Tecnologico (CNPq)' for the scholarship awarded to me for pursuit my research project, including the field trip to Brazil. I should also express my thanks to the 'Centro de Desenvolvimento e Planejamento Regional (CEDEPLAR)' of the 'Universidade Federal de Minas Gerais (UFMG)' which allowed me to work there as an Associated Researcher during my field work.

My sincere thanks are also due to the following:

All staff (academic and non-academic) of the Department of Forestry for the kindness always demonstrated during my stay here, but in particular to Professor Eric P. Bachelard, Mrs. Jean Fenton,

Mr. Terry S. Johnson, Mrs. Judy Lejins, Mrs. Paula Reid and Mrs. Liz Robinson for their help on different occasions and for different reasons.

Mr. Joldes M. Ferreira for his useful discussions, prior to this work, regarding the theme of this work and, later, sending me material from Brazil.

Mr. Napoleao M. Silva for his immense help sending me additional material from Brazil and even allowing me to use data from his work in course.

Dr. Paul Nicol for his help in editing.

Mr. Paulo R. Nascimento for his back-up support in Brazil taking care of my personal affairs and allowing me calm to conduct this work.

Mr. Roberto N. Rodrigues for his useful discussions and comments on my work.

Finally, I thank my father 'in memorium' for his example and my mother who has made great personal sacrifices to give me the opportunity for education.

Sebastiao Kengen

## P R E F A C E

Brazil is faced with the paradoxical situation of being an industrialized underdeveloped economy. It grew economically, became modern and industrialized, but poverty, far from being reduced, increased. This work studies a specific aspect of this paradox - the expansion of industrial reforestation.

Brazil has struggled for national development, especially from the 1950's onwards when an intensive drive began with the major objectives being to promote economic growth, modernize and industrialize. It has attracted domestic and foreign investment in order to achieve these objectives. An outstanding example of Brazil's struggle for development through encouraging capital investment in industrialization was the fiscal incentives scheme for reforestation which integrated forestry into the economy and led to vast areas of industrial forest plantations being established throughout Brazil.

The failure of Brazil's development strategy to alleviate poverty led to an extensive theoretical reappraisal of the process of development. However, this was not reflected in the forestry literature or in the analysis of the industrial forest plantations in Brazil.

This raised two questions to which this study is addressed. Was the general Brazilian development experience reflected in the industrial forestry sector? Have the models used to explain forestry development been adequate?

To answer these questions it was necessary to look at the Brazilian process of development in general and at a specific case in detail. The Jequitinhonha Valley in the State of Minas Gerais was selected for a detailed study of the impacts caused by the expansion of these plantations. It was also necessary to draw on many disciplines and sources outside forestry.

This thesis is divided into four major sections, each comprising two chapters. The first reviews some theories of development and shows how these theories affected the forestry sector. The second deals with the overall process of development experienced by Brazil and the State of Minas Gerais. The third section deals with forestry development and the fourth deals with the case study of the Jequitinhonha Valley.

GLOSSARY OF ACRONYMS

- AMEF**                   Associacao Mineira de Empresas Florestais  
(Association of Forest Enterprises of Minas Gerais)
- CEDEPLAR**            Centro de Desenvolvimento e Planejamento Regional  
(Development and Regional Planning Centre)
- COALBRA**            Coque e Alcool da Madeira S.A.  
(Coke and Alcohol from Wood)
- CODEVALE**           Comissao de Desenvolvimento do Vale do Jequitinhonha  
(Commission for the Development of the Jequitinhonha  
Valley)
- DE**                    Departamento de Economia Florestal - IBDF  
(Department of Forestry Economics - IBDF)
- DR**                    Departamento de Reflorestamento - IBDF  
(Reforestation Department - IBDF)
- EMATER-MG**          Empresa Estadual de Assistencia Tecnica e Extensao  
Rural do Estado de Minas Gerais  
(Technical Assistance and Rural Extension Enterprise of  
the State of Minas Gerais)

- EMBRAPA** Empresa Brasileira de Pesquisa Agropecuaria  
(Brazilian Agricultural Research Enterprise)
- EMBRATER** Empresa Brasileira de Assistencia Tecnica e Extensao Rural  
(Brazilian Technical Assistance and Rural Extension Enterprise)
- EMG** Jornal Estado de Minas Gerais  
(State of Minas Gerais Newspaper)
- FAO** Food and Agriculture Organization of the United Nations
- F.CETEC** Fundacao Centro Tecnologico de Minas Gerais  
(Technological Centre of Minas Gerais)
- F.IBGE** Fundacao Instituto Brasileiro de Geografia e Estatistica  
(Brazilian Institute of Geography and Statistics)
- FJP** Fundacao Joao Pinheiro  
Joao Pinheiro Foundation
- IBDF** Instituto Brasileiro de Desenvolvimento Florestal  
(Brazilian Institute for Forestry Development)
- ICM** Imposto sobre Circulacao de Mercadorias  
(Tax on Trading of Goods)



- IGA** Instituto de Geociencias Aplicadas  
(Institute of Applied Geoscience)
- INCRA** Instituto Nacional de Colonizacao e Reforma Agraria  
(National Institute for Colonization and Agrarian Reform)
- INDI** Instituto de Desenvolvimento Industrial  
(Institute for Industrial Development)
- INF** Inventario Florestal Nacional  
(National Forestry Inventory)
- MG** Estado de Minas Gerais  
(State of Minas Gerais)
- OESP** Jornal 'O Estado de Sao Paulo'  
(The State of Sao Paulo Newspaper)
- PIN** Programa de Integracao Nacional  
(National Integration Plan)
- PNPC** Programa Nacional de Papel e Celulose  
(National Program of Pulp and Paper)
- PROALCOOL** Programa Nacional do Alcool  
(Alcohol National Program)

- PROTERRA** Programa de Redistribuicao de Terra e Estimulo a Agricultura  
(Program of Land Redistribution and Stimulus to Agriculture)
- RURALMINAS** Fundacao Rural Mineira - Colonizacao e Desenvolvimento Agrario  
(Rural Minas Foundation - Settlement and Agrarian Development)
- SBS** Sociedade Brasileira de Silvicultura  
(Brazilian Society of Silviculture)
- SEI** Superintendencia de Estatistica e Informacao  
(Superintendency for Statistic and Information)
- SEPLAN-MG** Secretaria de Planejamento e Coordenacao Geral do Estado de Minas Gerais  
(Secretary of Planning and General Coordination of the State of Minas Gerais)
- SUDAM** Superintendencia de Desenvolvimento da Amazonia  
(Superintendency for the Development of the Amazonia)
- SUDENE** Superintendencia de Desenvolvimento do Nordeste  
(Superintendency for the Development of the Northeast)
- UFRRJ** Universidade Federal Rural do Rio de Janeiro  
(Rural Federal University of Rio de Janeiro)

TABLE OF CONTENTS

Statement of Originality	ii
Abstract	iii
Acknowledgments	viii
Preface	x
Glossary of Acronyms	xii
Table of Contents	xvi
List of Tables	xxi
List of Graphs	xxiv
List of Maps	xxv

Part A      THEORETICAL BACKGROUND/REVIEW

Chapter 1	<b>THEORIES OF DEVELOPMENT</b>	
1.1	Introduction	1
1.2	Concepts of Development	3
1.2.1	Western Model	4
1.2.2	ECLA Model	8
1.2.3	Failure of the Model	11
1.2.4	Second Phase of the General Theory of Development	12
1.3	Conventional Theories of Development	16
1.4	ECLA Theory	19
1.5	Radical Theories of Development	24
1.6	Conclusions	30

<b>Chapter 2</b>	<b>FORESTRY IN DEVELOPMENT</b>	
2.1	Introduction	32
2.2	Early Approach to Forestry in Development: Industrialization of the forestry sector	34
2.3	Present Approach to Forestry in Development: Forestry for local needs	46
2.4	Conclusions	50

**Part B**      **BACKGROUND TO BRAZIL AND THE STATE OF MINAS GERAIS**

<b>Chapter 3</b>	<b>THE BRAZILIAN PROCESS OF DEVELOPMENT</b>	
3.1	Introduction	52
3.2	Economic Formation of Brazil: 1500-1950	56
3.3	The Brazilian Process of Development: 1950-1964	70
3.4	The Brazilian Process of Development: 1964-1974	76
3.5	The Brazilian Process of Development: 1974-1980	82
3.6	Conclusions	89
<b>Chapter 4</b>	<b>THE PROCESS OF DEVELOPMENT OF THE STATE OF MINAS GERAIS</b>	
4.1	Introduction	91
4.2	Economic Formation of Minas Gerais: up to 1950	93
4.3	Process of Development: 1950-1964	97
4.4	Process of Development: 1964-1974	98
4.5	Process of Development: 1974-1980	101
4.6	Conclusion	104

Part C      FORESTRY IN BRAZIL AND THE STATE OF MINAS GERAIS

Chapter 5    **FORESTRY DEVELOPMENT IN BRAZIL**

5.1 Introduction	105
5.2 Vegetation Types: A general overview	106
5.2.1 Forest	106
5.2.2 Cerrado (savanna)	106
5.2.3 Caatinga (thornbush)	108
5.3 Historical Exploitation of Forest Resources	111
5.4 The Forestry Sector within the Economy	115
5.5 The Fiscal Incentives Scheme for Establishing Large Scale Industrial Forest Plantations	117
5.5.1 Proposal's Antecedents: A general overview	117
5.5.2 The Fiscal Incentives Scheme and the Economic Model	121
5.5.3 The Fiscal Incentives Scheme and Pertinent Legislation	124
5.5.4 The Response of the Investors to Amendments to the Fiscal Incentives Scheme	132
5.5.5 Justifications for the Fiscal Incentives Scheme	139
5.5.6 The Fiscal Incentives Scheme: A critical review of justifications and analyses	141
5.5.6.1 Justifications	141
5.5.6.2 Academic Analyses	146
5.5.6.3 Common Ground of These Analyses	152
5.5.6.4 Comments on the Analyses	154
5.6 Conclusions	157

Chapter 6	<b>FORESTRY DEVELOPMENT IN THE STATE OF MINAS GERAIS</b>	
	6.1 Introduction	158
	6.2 Vegetation Types: A general overview	159
	6.3 Historical Exploitation of Forest Resources	161
	6.4 The Forestry Sector	166
	6.5 Establishment of Large Scale Industrial Forest Plantations	170
	6.5.1 Before the Fiscal Incentives Scheme	170
	6.5.2 After the Fiscal Incentives Scheme	175
	6.6 Conclusions	180

**PART D      THE CASE STUDY: THE IMPACTS OF LARGE SCALE INDUSTRIAL  
FOREST PLANTATIONS ON THE JEQUITINHONHA VALLEY (MG)**

Chapter 7	<b>THE JEQUITINHONHA VALLEY</b>	
	7.1 Introduction	183
	7.2 Location and Administrative Divisions	184
	7.3 Jequitinhonha Valley's Historical Formation	187
	7.4 Impacts of the Valley's Settlement on Its Vegetation	195
	7.5 Establishment of Forest Plantations	197
	7.5.1 Prior to the Fiscal Incentives Scheme	197
	7.5.2 Post Fiscal Incentives Scheme	200
	7.6 Wood-Based Industry	212
	7.7 Conclusions	216

<b>Chapter 8</b>	<b>THE EXPANSION OF THE REFORESTATION AND ITS IMPACTS ON THE JEQUITINHONHA VALLEY'S SOCIO-ECONOMIC STRUCTURE</b>	
8.1	Introduction	219
8.2	The Debate Around the Impacts Caused by the Expansion of the Reforestation	220
8.2.1	The Proponents School	220
8.2.2	The Critical School	222
8.3	Impacts of the Expansion of the Reforestation	225
8.3.1	Land Use	225
8.3.2	Land Tenure	231
8.3.3	Agricultural Production	239
8.3.4	Economic Development	246
8.3.5	Population Economically Active	249
8.3.6	The Valley's Population	254
8.3.7	Sanitation and Health Conditions	263
8.4	Conclusions	269
<b>Chapter 9</b>	<b>CONCLUSIONS AND IMPLICATIONS</b>	
9.1	Forestry and the Brazilian Model of Development	277
9.2	The Adequacy of Models Used to Analyse Forestry Development	280
9.3	The Results of the Case Study	281
9.4	The Model and Its Implications	286
9.5	Final Remarks	291
	Bibliography	292
	Appendix A	315
	Appendix B	319

LIST OF TABLES

Table 3.1	Brazilian Real Domestic Product and Industrial Production	74
Table 3.2	Changes in the Index of the Real Minimum Wage and Productivity	79
Table 3.3	Income Distribution in Brazil - 1960-1980	87
Table 4.1	Proportion of Each Macroregion in Minas Gerais' GDP	100
Table 4.2	Growth Rate of GDP for Brazil and Minas Gerais (1974-81)	102
Table 4.3:	Income Distribution in Minas Gerais	103
Table 5.1:	Natural Forests in the Southeast and South Regions	109
Table 5.2:	Cerrado in the Southeast and South Regions	110
Table 5.3:	Rate of Change of Forest Cover in the Amazon Basin	114
Table 5.4:	Area Under Forest Plantations by State - 1961	118
Table 5.5:	Comparative Fiscal Incentive Tax Benefits to Corporations and Individuals Investors	125
Table 5.6:	Estimative of Employment Created Yearly	144
Table 6.1:	Composition of Minas Gerais' Forestry Sector - 1980	166
Table 6.2:	Distribution of the Sawmills According to Their Consumption of Log	167
Table 6.3:	Area Actually Planted by Genera According to the IFN	177
Table 6.4:	Proportion of the Total Area Reforested in Minas Gerais up to 1980	177
Table 6.5:	Proportion of the Total Area Planted by Priority Region - 1980	178
Table 7.1:	Distribution of the Areas Occupied with Natural and Planted Forest	198



Table 7.2: Distribution of the Areas Occupied with Natural and Planted Forest	203
Table 7.3: Expansion of the Large Scale Industrial Forest Plantations According to Projects Approved by IBDF	207
Table 7.4: Area Approved With and Without Assignment as Proportion of the Total Approved by Microregion - 1980	208
Table 7.5: Valley's Wood-based Industry as a Proportion of Minas Gerais' Wood-based Industry by Microregion - 1981	213
Table 7.6: Number of Sawmills by Microregions and Their Proportion in the Valley and the State	213
Table 7.7: Total Installed Capacity of the Sawmills by Microregion and Its Proportion to the Valley and to the State	215
Table 7.8: Classes of Sawmills According to Annual Consumption	215
Table 8.1: Land Use	227
Table 8.2: Area of Farmland According to Size of Farms	234
Table 8.3: Number of Farms According to Size	235
Table 8.4: Land Concentration Accordign to Gini Coefficient	236
Table 8.5: Agricultural Production of Selected Crops	241
Table 8.6: Average Productivity of Each Crop per Hectare	242
Table 8.7: Production of Basic Foostuffs by People Living in Farms	244
Table 8.8: Collection of ICM in the Valley	247
Table 8.9: Quota from ICM which Returns to the Municipalities	248
Table 8.10: Population Economically Active in the Primary Sector by Category	250

Table 8.11: Population Economically Active According to Economic Sectors	253
Table 8.12: Distribution of the Population According to Domicile	255
Table 8.13: Average Annual Growth Rate of the Population According to its Domicile	256
Table 8.14 Migration According to Domicile by Microregions	259
Table 8.15: Group of Causes of Death as a Proportion to the Total Number of Deaths	264
Table 8.16: Availability of Water and Sewage Systems - 1980	266

LIST OF GRAPHS

Graph 3.1	Structure of International Trade: Brazil and Australia	86
Graph 5.1	Total Area Approved by IBDF for Reforestation with Fiscal Incentives by Region as Proportion of Total Area Approved for Brazil - 1967-1981	133
Graph 5.2	Area Annually Approved for Reforestation with Fiscal Incentives by Genera for Brazil - 1967-1981	134
Graph 6.1	Total Area Approved by IBDF for Reforestation with Fiscal Incentives for Minas Gerais as Proportion of Total Area Approved for Brazil - 1967-1981	176
Graph 7.1	Total Area Approved by IBDF for Reforestation with Fiscal Incentives by Genera as Proportion of Total Area Approved for the Valley - 1967-1981	205
Graph 7.2	Total Area Approved by IBDF for Reforestation with Fiscal Incentives as Proportion of Total Area Approved for Minas Gerais - 1967-1981	206
Graph 8.1:	Land Concentration According to Gini Coefficient	237

LIST OF MAPS

3.1 Brazil	53
3.2 Brazilian Great Regions	55
4.1 Minas Gerais	92
5.1 Brazil's Development Agencies	122
7.1 The Jequitinhonha Valley	185

## CHAPTER 1

### THEORIES OF DEVELOPMENT

#### 1.1 Introduction

The interest in the issue of development, which had fluctuated since the eighteenth century revived to become a major concern after the Second World War. This revival can be attributed to increased awareness of international inequalities, and experiences of successful economic development, such as the economic recovery throughout Europe. It was centred on economic problems and development was studied primarily as a matter for economic analysis. By the early 1970's, this interest in development had transcended the disciplinary boundaries of economics and had become a concern of other social scientists, especially sociologists. Along with the extension of the boundaries of economic science it also created a controversy regarding the theme of development. However, despite this wider interest and several decades of thinking and action about development, controversy still persists, as we shall see later, over the objectives that should be pursued and the means that should be adopted in order to secure it. Actually, it has been this controversy that has stimulated the debate around the subject of development and consequently, promoted its advance.

Notwithstanding the controversy, at least one point became a matter for general consensus: that development is something more

than just economic growth. In other words, economic growth is a necessary but not a sufficient condition for development. However, despite this consensus, economic growth continues to be a major preoccupation in most countries, especially the Third World, regardless of the implications of their social and political diversity.

The underdeveloped nations adopted policies to promote economic growth with the underlying assumption that all segments of the society would benefit from it. In other words, it was expected that the benefits of economic growth would 'trickle down' to the general population. However, empirical studies in a number of countries, have reached results which suggest quite the opposite conclusion, that only a small proportion of the population takes advantage from economic growth while a large proportion is not affected, or is made even worse-off.

Over three decades from the 1950's development studies became a complex and diverse field of academic research and policy analysis. New theories emerged, each having its particular ideological links ranging from the right or conservative, to the left or radical. The literature expanded rapidly in a growing number of journals and other specialist publications. Many disciplines in social or applied natural sciences became drawn into development studies. Development problems are so multi-faceted and complex that no single discipline can hope to encompass them, let alone offer ideal or comprehensive solutions. Both scholars and practitioners were

forced to transcend the boundaries of their own disciplines and enter a large and interdisciplinary area. The complex and rapidly changing literature contains a variety of terms and jargon drawn from the different disciplinary or philosophical backgrounds.

From the vast literature on development, we have selected for discussion in this chapter only those studies which have most directly influenced the forestry sector, and which have been influential in the Brazilian process of development during the last three decades.

This chapter is divided into six parts. After this introduction comes a broad general review which summarises part of the development thought, and the interactions between the different concepts and philosophical positions. The third section reviews conventional economic development theories which have guided most of Brazilian policy. The fourth section examines an alternative theory put forward by the Economic Commission for Latin America (ECLA) which too has been of great importance in the Brazilian process of development, especially in the 1950's. The fifth section reviews radical theories with special reference to dependency theory which was proposed initially to explain the process of development observed in Brazil and other Latin American countries. The sixth section draws conclusions of direct relevance to this study.

## **1.2 Concepts of Development**

Development is a set of complex concepts and perceptions which vary across the whole spectrum of ideologies. There are many

conflicting theories which lead to a continuous debate. This review will be confined to theories developed since the Second World War because:

- the most significant theoretical contributions have occurred since then; and
- it is these post-war theories of development which have the greatest relevance to this study,

However, it is important to make clear that this does not imply either that we are unaware of the importance of the all pre-war Classical, Keynesian and Neo-classical Schools of economic thought or other social enquiry or that we consider them barren in this regard; they are simply beyond of the scope of this particular enquiry.

### **1.2.1 Western Model**

The world was faced by the First World War, the Great Depression of the 1930's and then the Second World War (1939-1945). The consequences of this series of events and its importance is grasped by Frank who argues that those events:

...weakened the colonial relationship between the metropolis and its colonies or neo-colonies. Because of the wars, the metropolis was unable to export manufactured commodities to Asia, Africa and Latin America, and in some cases it was unable to import raw material as well.



During the intervening Depression of the 1930's trade had diminished substantially between the metropolis and its colonies or neo-colonies. The consequences were that the economic and class structure of the colonies changed to some degree and the policies of at least a sector of the colonial bourgeoisie also changed to support a sudden spurt of industrialization in India, Brazil, Argentina, Mexico and in some parts of Africa. The result also was the development of the liberation movements which resulted in formal de-colonisation and sovereignty in most of Asia and Africa. Latin America, of course, had already become sovereign a hundred and fifty years earlier, and in part thanks to this sovereignty, some countries in this region had been able to create at least the minimum bases which afforded the local bourgeoisie the political and economic strength to take advantage of the Depression and to build up the beginnings of a national industry in Brazil, Argentina and Mexico...(Frank, 1984: 101)

Following the War, Europe experienced an economic recovery under the Marshall Plan that capital provided by American aid rebuilt the infrastructure and factories destroyed by the war, demand and trade boomed and rapid economic growth resulted. Simultaneously there was an increasing awareness of international inequalities. As a response, there was a great revival of interest in the study of development. Basically it was assumed that a similar version of the Marshall Plan could be applied all over the world to promote

development. Corresponding theories flourished which can be categorised into two major groups: 'growth theories' and 'development theories'. The former dealt with how economies actually grew over time, while the latter tried to explain how backward countries of the contemporary world could be moved from their low income levels to higher ones. Such authors as Lewis (1955) and Rostow (1960) are among the most eminent authors dealing with 'growth theories', while Prebisch (1957) and Baran (1962) are among the most eminent dealing with 'development theories'. This revival was so important that it gave rise to 'Development Economics' as a new field of study.

From the 1950's there was a considerable increase in both the overall and per capita Gross National Product in the United States and some European countries and this became synonymous with development. This perception of development as solely an economic phenomenon was greatly reinforced by the post-war economic boom in the West. In this context, the poorer and less developed countries began the great struggle to promote their economic growth. To increase the overall and per capita GNP then became the major aim for underdeveloped countries if they wanted to develop. Underlying all this there was the assumption that the gains from the overall increase in the GNP would either 'trickle down' to the masses in the form of jobs and other economic opportunities, or create the necessary conditions for a wider distribution of the economic and social benefits of growth. Actually, it is fair to suggest that this assumption of a 'trickle down' effect even reached the status of an axiom.

Within this context, all efforts were justified if they led to great and rapid gains in overall GNP. It was implicitly argued that the Western Model should be copied if an underdeveloped country wished to develop. In practice, it was copied with complete disregard for the historical and sociological backgrounds which led to a diversity of cultural traditions, costumes, languages, racial groups and the like. In fact, these differences do not occur only between nations, but they also occur within a nation, India being a good example of that. In other words, even where such efforts were likely to result in some distortions in society, such as destruction of the original culture and increase of inequalities, it was believed that those problems would be corrected later. So, problems of poverty, unemployment and unequal income distribution were of secondary importance to 'getting the growth job done' (Todaro, 1977). A excellent example of such an ideology is presented by Johnson who argued that:

The main fault which can be found with the use of the market mechanism, its undesirable social effects, are [sic] luxuries which underdeveloped countries cannot afford to indulge in if they are really serious about attaining a high rate of economic development. In particular, there is likely to be a conflict between rapid growth and an equitable distribution of income, and a poor country anxious to develop would probably be well advised not to worry too much about the distribution of income (Johnson 1962: 711-712).

Such advice was followed by many countries, including Brazil (See chapter 3).

The revival of interest in development went far beyond academic consideration, particularly in the United Nations (UN) and its affiliated agencies. From the early 1950's, they have provided a forum for the debate of development issues. The debate carried different assumptions within the UN system. On one side, most of the UN agencies followed the conventional Western perception of development discussed above. On the other side, was a perception which emerged from the UN's Economic Commission for Latin America - 'ECLA' (Comissao Economica para a America Latina - CEPAL).

### **1.2.2 ECLA Model**

ECLA advanced new concepts which conflicted with the conventional Western views and which exerted a great influence over Latin American, including Brazilian, thinking on development. New concepts of development were displayed in documents released by ECLA towards the end of the 1940's and in the early 1950's. Among those, two in particular can be considered the most important: 'Economic Survey of Latin America' (United Nations, 1951), and 'The Economic Development of Latin America and Its Principal Problems' (Prebisch, 1962). These and others published around the same time laid the foundations for what came to be known as the 'ECLA-Prebisch Doctrine' or, 'The ECLA Manifesto' (Hirschman, 1972).

The new doctrine was non-conventional because it examined the world in terms of the 'core' of metropolitan, industrialised and powerful states and the 'periphery' of underdeveloped, backward and weak states. It described how economic relations between the 'core' and the 'periphery' tended to propagate the conditions of underdevelopment and to widen the gap between developed and underdeveloped countries. This contrasted with the prevailing views of the Western model which accepted the fundamental premise of market theory relating to the international division of labour, and expected that increased trade promote development in an exporting country according to the principle known as 'comparative advantage'<sup>1</sup>. Prebisch was more emphatic in his criticism of the underlying assumptions which lead to the conclusion of potentially mutually beneficial gains from trade; he compared the 'invisible hand' of the market to that of a wicked stepmother which, instead of correcting inequalities, aggravated them. Thus, the basic economic concept subscribed to in the ECLA's doctrine was innovative, even by present standards. ECLA's doctrine was the embryo from which the 'Dependency Theory' or 'Dependency School' described later, grew.

The non-Western ECLA perception of development can be considered as a breakthrough in efforts to understand the process of development. Yet the Western perception of development continued to prevail through most of the rest of the UN system.

---

1. 'Comparative advantage: a country has a comparative advantage over another if in producing a commodity it can do so at a relatively lower opportunity cost in terms of the foregone alternative commodities that could be produced' (Todaro 1977: 521).

The UN General Assembly declared the 1960's to be the 'First Development Decade' and established that underdeveloped countries should generate policies, such as industrialization with the aim of attaining a six per cent or more growth rate of GNP. It was assumed that those countries which reached this target would be well on their way to development. In turn, in the shorter or longer run the benefits of this economic growth would accrue to the entire population (trickle-down effect). This approach was quite similar to Rostow's<sup>2</sup> doctrine of the 'Stages of Economic Growth' which held that the development of a nation passed through five stages, namely: traditionalism; the creation of pre-conditions to economic growth through making ready for a progressive influence of the most developed countries and consequently, their major integration into the sphere of influence of the latter; the third and most famous stage is the take-off, i.e. the influences referred to in the previous stage break the traditionalism and permit the take-off into the economic growth; the fourth and fifth stages are the maturity and mass consumption, i.e. the present ones of Western Europe and North America (Rostow, 1960). Within this context, the First Development Decade held that those underdeveloped countries which reached or exceeded this six per cent economic growth rate would be in a 'take-off' stage of development.

---

2. See, for example: Rostow (1956 & 1960). For a critique of Rostow's work see, for example: Baran & Hobsbaum (1961); Frank (1971 & 1984).

### 1.2.3 Failure of the Model

By the end of the 1960's, an evaluation of the achievements of a decade under this policy pointed towards a contradiction. Many underdeveloped countries had achieved and even, in some cases, exceeded the overall rate for the growth of GNP assumed to be ideal by the United Nations. However, on the other hand, this growth had not been followed by an improvement of the standard of living of the majority of the society. On the contrary, it remained unchanged or had even deteriorated, while it had improved for just a small segment of the society, although under the earlier assumptions of the Western model this should not have occurred. Indeed:

...the experience of the last two decades teaches us that the distribution of income, assets and influence over institutions determines the character of subsequent growth...considering the pattern of growth in countries such as Brazil, Colombia, Peru and Rhodesia where the richest five percent receive 38, 40, 48 and 60 respectively of total income...the poorest 20 percent who, in the four countries listed above, receive only 3.5, 2.2, 4.0 and 4.0 percent of total income (Shourie, 1973: 342)

The failure of the basic assumptions of the First Development Decade provided disillusionment with the Western model of development which Higgot was to summarise aptly:

Disillusionment with the performance of Third World countries (in more than one sense) has steadily increased since the

heady optimism of the early 1960's, an optimism based on a belief that social scientists (including economists) were capable of planning prosperity for the Third World. These expectations of the problem-solving social scientists were to be short lived as problems endured, and in many cases increased throughout the first United Nations Development Decade (Higgot 1978: 26).

The concept of development exclusively based on the increase of overall and per capita GNP was perceived to be too narrow. Actually, the GNP and its rate of growth do not tell us how the benefits of the economic activity are distributed (Fields, 1980). In response to this realisation, there began early in the 1970's, what can be called a 'Second Phase of the General Theory of Development'.

#### **1.2.4 Second Phase of the General Theory of Development**

This realisation led as a consequence to refocus the attention on other aspects of development, especially the income distribution problem. Within this context, the international development community launched alternatives, such as 'Redistribution with Growth' (World Bank), 'Meeting Basic Needs' (International Labour Office) among others<sup>3</sup> which were based on substantive ideas. Despite their difference in title, all of them had as the basic aim

---

3. For more details about this subject see, for example: Srinivasan (1977); Galtung & Wirak (1977); Streeten & Burki (1978); Streeten (1979); Chenery et al (1974); Fei et al, 1979.



the reduction or elimination of poverty, inequality, and unemployment within the context of a growing economy. As we will discuss in chapter 2, this new approach to development led to new concepts on the role of forestry in development.

Seers was one of the first authors to be concerned with the concept. He subscribed that 'development was a normative term, almost a synonym for improvement' and argued that:

The questions to ask about a country's development are therefore: What has been happening to poverty? What has been happening to unemployment? What has been happening to inequality? If all three of these have declined from high levels, then beyond doubt this has been a period of development for the country concerned. If one or two of these central problems have been growing worse, especially if all three have, it would be strange to call the result "development" even if per capita income doubled (Seers 1969: 7).

In 1970 he went on to argue that development involved increasing the output in all sectors of the economy and distributing it in such a fashion as to enhance the quality of life of the broad masses of the population. In 1972, he went further to argue that development and economic growth were two quite different concepts, and that it was highly misleading to use per capita income or GNP as indicators of development. According to him, development is indicated mainly by the elimination of absolute poverty, reduction of large-scale unemployment, and narrowing the huge inequalities which characterise underdeveloped societies.

Within this concept, development cannot therefore simply be reduced to the Western model or to an one-dimensional process. Todaro for example argues that:

Development must be conceived of as a multidimensional process involving major changes in social structures, popular attitudes, and national institutions, as well as the acceleration of economic growth, the reduction of inequality, and the eradication of absolute poverty ... development, in its essence, must represent the entire gamut of change by which an entire social system, tuned to the diverse basic needs and desires of individuals and social groups within that system, moves away from a condition of life widely perceived as unsatisfactory and toward a situation or condition of life regarded as materially and spiritually "better" (Todaro 1977: 70).

Despite this enlargement of the prior concepts of development, it still failed to identify or interpret the role determined by the world system. In other words, his definition suggests an endogenous process, isolated from the world system.

Two further and related additions were made to the concept of development by the refutation of Rostow's stages of growth concept and by the extension of the ECLA model to consider other ramifications and determinants of spatial inequalities.

The generalized tendency to copy the Western model of development, like a 'blue-print' has emerged throughout the

underdeveloped countries. Implicit in this tendency is the view that the present developed countries were once underdeveloped in the same fashion as the Third World countries are at present. Thus, the developed countries have passed throughout 'stages' which led them to become developed. Nothing could therefore be more logical than to copy the general 'model'. Unfortunately, the real world does not behave in such a deterministic way. This simple model of nations passing through a series of stages was criticized by authors such as Portes (1973) and Ettema (1979). Portes argued:

Development is a relative concept. Most Western nations were never underdeveloped since no advanced model existed as a point of comparison (Portes 1973: 253)

and, Ettema went further to argue:

The economist Kuznets, in 1954, tried to find in European economic history a phase comparable to the present state of underdeveloped countries. His efforts were not successful and his results curb in advance any effort to seek a parallel between the development of the Western countries to that of the underdeveloped ones. Such a comparison also assumes that each country develops in a vacuum, or uninfluenced by the development of other countries. This assumption is of course untenable, regardless of how one interprets the influence of international relations (Ettema 1979: 67-68)

The concept that the normal operation of world trade produced rather than corrected international inequalities was greatly

expanded by Frank and others who pointed to a network of relationships which kept the periphery in a dependent position. The view of this 'Dependency School' and its critics will be elaborated later, but first the conventional theories of development will be reviewed.

### 1.3 Conventional Theories of Development

Conventional theories of development are those which derive from, or are conducted within, orthodox or classical and neo-classical economics.

The Western model has perceived differences in development to be expressions of different stages in an evolutionary sequence:

Development was the replacement of one 'genre de vie' by another and was conditioned by society's success in conquering obstacles posed by Nature (Ettema 1979: 66)

So, the Western society became a model, especially the United States society and as such:

...a concept of development came into being whereby development was, grosso modo, the degree of proximity to the standard Western model and underdevelopment was measured in terms of distance from it...(Galtung & Wirak 1977: 12).

In other words, the world was stratified into developed and underdeveloped countries. As such, the prestige of nations is evaluated by criteria closely associated with correlates of

industrialization (Lagos-Matus 1963). Within this context, nothing was more natural than for the underdeveloped countries to try to adopt policies advocating industrialization in order to become also developed.

This has led many underdeveloped countries, including Brazil to implement policies which can contribute to catch up or narrow the gap between them and the Western countries and consequently, develop. This approach has been diffused throughout the underdeveloped countries and, in large or small scale, they have been convinced that contingencies of Western historical experience are in fact necessary conditions to be emulated by all those moving towards development. In short, this industrialization helps to break the barrier of traditionalism, encourages modernisation and consequently, is the right way to develop.

One of the key assumptions in modernisation writings is 'participation'. Authors, such as Braibanti and Spengler (1961), Lerner (1958), Peshking and Cohen (1967), and Inkele (1969) observe that the modern style is the 'participant style', i.e. consumption of modern goods and exposure to mass media among other things since this is what happens in the Western countries. In other words to be 'modern' is to follow the Western style of living and cultural tastes as well as consumption of goods.

The overall model has been the focus of strong criticism. For example, it has been argued that the 'participant style' defined by the modernist theorists contributes much more to the economic welfare of developed countries by absorbing their industrial production surplus, than to those societies which increase their

participant style of consumption (Horowitz, 1972).

Another focus of criticism is regarding the idea that to copy the 'Western model' will not eventually imply dependence. Shils (1965) argues:

the assumption upon which much of the modernization theory is based is that 'modern' means being Western without the onus of dependence on the West (Shils 1965: 10).

Other criticisms have been of the Westernization emphasis implicit within this modernization ideal. Indeed, the dichotomous tradition of modernization theorists is the product of an essentially ethnocentric world-view. Throughout the literature we find the words 'modernity' and 'tradition' which serve to evaluate the progress of nations by their proximity to the institutions and values of the Western, especially Anglo-American societies (Tipps, 1973). Everything which is not modern is labeled traditional. This label has led to the creation of a stereotype that traditional societies are backward and essentially static (Pettman, 1979).

These observations suggest that the conceptual apparatus underlying these modernization ideals is incomplete and does not provide a blueprint of universal application and validity. More viable alternatives should be available. The results of approximately three decades of modernization already has shown that the concrete features of the so-called developed countries cannot be reproduced exactly in the future. In other words, contemporary development cannot be a mere repetition of paths given by the present

'developed' nations. Indeed, the value-enactment mode of analysis of development resolutely avoids the study of the international structure of development and underdevelopment of which the domestic structure of underdevelopment is only a part (Tipps 1973).

Going further we can argue that given the very great differences in human and other resources among nations, this 'logical' view of the process of development and underdevelopment becomes too narrow. So, an alternative paradigm should be considered. However, before reviewing the radical theories of development let us move to the second major body of theory elaborated by the end of the 1940's and in the 1950's in the Economic Commission for Latin America (ECLA)<sup>4</sup> under the direction of the Argentine economist Raul Prebisch. This theory is known as 'ECLA Doctrine', or because of Prebisch's strong influence in this theory, it has become also known as the 'ECLA/Prebisch Doctrine'. This doctrine has had a key role throughout Latin America countries. The Brazilian process of development (see chapter 3) was influenced by it. Therefore, discussion of its premises becomes an imperative.

#### **1.4 ECLA Theory**

Compared with conceptions prevailing in the academic world of that time (1950's) on international trade and development ECLA's studies were original and even now seem innovative. There is no

---

4. It is identified in the Latin America literature by the acronym 'CEPAL' which means 'Comissao Economica para a America Latina'

doubt that ECLA's studies have made a special contribution to the study of relations between 'core' (developed countries) and 'periphery' (underdeveloped countries) and, consequently in the understanding of development and underdevelopment (Palma, 1978).

Latin America, like any other part of the underdeveloped world, has traditionally supplied raw materials and foodstuffs to the industrial nations, and imported from these same countries manufactured products. Thus Latin America has been integrated into the expanding world economy and a mechanism exists between 'core' and 'periphery' which, given its importance, cannot be discarded as conventional theories have done.

ECLA argued that, since markets were far from perfect, the system of international trade operated against the interest of Latin America (Roxborough, 1979). This was in complete opposition to the principle of comparative advantage advocated by the classical theory of international trade cited in Section 1.2. More recent expositions of comparative advantage theory attempt to incorporate the ECLA criticisms, with "adjustments for market imperfections" for example.

Two basic arguments constituted ECLA's case. The first focusses on the role of demand. It asserts that income elasticity of demand for raw materials and foodstuffs is less than one (i.e. the increase in consumption of them is less than proportional to increase in income), while for manufactured goods it is greater than one (the percentage increase in consumption is more than proportional to percentage increase in income). In other words, for a given increase in national income, demand for manufactured goods will rise more than



demand for food and basic commodities. As a result, the terms of trade for primary products vis a vis manufactures will decline. That is, in the long run this difference between the two elasticities of demand will generate an imbalance. So, more and more raw materials and foodstuffs will be necessary for the exchange of the same quantity of manufactured goods. As a consequence of this imbalance, there will be a natural disadvantage to the Latin American countries instead of a natural advantage as argued in conventional economics.

ECLA's second argument dealt with discrepancies in the wage levels between the 'core' and the 'periphery' since the gains from the increase in productivity in both are not equally distributed between them. In the 'core' gains from the increase in productivity result in wage gains. This can be attributed to such factors as union pressures and so on. In the periphery those productivity gains do not result in wage gains; in general, wages hardly rise above subsistence level. This can be attributed to such factors as a surplus of labour force, lack of strong unions, or even the lack of unions at all. Hence, prices of the products from the periphery tend not to increase by the same proportion as those of the manufactured goods produced in the core. This fact, as well as the imbalance referred to above, creates in the periphery a necessity to increase its sales in order to be able to buy the same, or even a lesser quantity of manufactured goods.

ECLA's theory was developed to explain conditions in Latin America. Although, it is dangerous to extrapolate, most of the underdeveloped nations produce and export primary products. As such, they face the same problem of deteriorating terms of trade.

In the 1950's a process of industrialization was already underway in some Latin American countries, such as Argentina and Brazil (see chapter 3 for more details about the Brazilian process). It had its roots in the constraints upon importations imposed by the Great Depression and the Second World War. Given ECLA's thesis regarding the disadvantages of international trade, ECLA advocated industrialization in order to diminish the dependence on imports, and consequently to promote Latin American development. This became known as the 'Import-Substitution Industrialization' (ISI) model.

Structural changes were necessary to shift from the 'primary-export model' to the ISI model. However, with the consolidation of the ISI model over the years there has been a trend of not only producing manufactured goods to substitute for imports but also to export them. This has been achieved with some success in Brazil but problems have also arisen as we will review in chapter 3.

Just as the 'First Decade of Development' failed to promote real development, so the ISI model promoted industrialization but not development in its broader sense. Many factors contributed to this, such as inadequate technology, capital intensive industries instead of labour intensive, market size and production of luxury goods. Allied to these factors matters of international prices and the ownership of the means of production were constraints which perhaps were more powerful than the former ones.

In addition to these constraints is the further, and more important, creation of a situation of a 'new' dependence, i.e. the

establishment of an industry within the geographical boundaries of the country does not mean local ownership of the industry. Hence, the 'old' dependence of the periphery on the core based on the export of raw materials and foodstuffs and the import of manufactured goods remains but with merely a 'new look'. However, more important than the locational aspect is in whose interests the decisions are made. This point is well grasped by Shourie who argues:

...given the extremely unequal distribution of incomes and assets, industries are set up to produce goods which the rich want, while import policies aim either at importing the material needed for producing these goods or at importing the goods themselves...this point can be documented by examining the kinds of consumer industries that have been established ...and the pattern of growth in countries such as Brazil...(Shourie 1973: 342)

Although industrialization did occur, all of these aspects suggest the following: first, problems regarding the balance of payments due to the export of primary commodities and to the import of manufactured goods have not been solved by the implementation of the ISI model. On the contrary, they might have increased. Second, given the capital-intensive characteristics of most of the industries established, they might not have generated a great number of jobs. Third, industrialization has tended to widen rather than narrow income differentials, with the result that only some segments of the population really benefited by the whole process:

It was increasingly clear that the mass of the population was not participating in the benefits of economic growth. If anything, they were getting poorer and poorer (Roxborough 1979: 35)

Fourth, the economy remained vulnerable to cyclical movements as when the country exported primary goods, in fact export cycles may even have become more pronounced. Fifth, these "infant industries" were established behind protective trade barriers (quotas, tariffs and restrictions). Such protection may have reduced the need for efficiency and competitiveness and resulted in misallocation of limited domestic resources. Furthermore, a dependence was established regarding what, where and how many of the manufactured goods to export since the share of the international market is decided at the headquarters' level (in the 'core'). So, the dependence of the 'periphery' on the 'core' remained or, even increased.

Thus, by the mid-1960's the 'ISI' model started to be challenged since it was realised that it had not been very effective in promoting development in its broader sense. In other words, the ISI model became exhausted.

### **1.5 Radical Theories of Development**

From what we have discussed in the previous sections the difficulty of dealing with the subject of 'development' becomes clear. Theories have been elaborated as well as displaced. However, despite such confusion we can notice some advance: a broadening as

well as deepening of the concept of development. It is in this context that the radical social scientists appeared to make a breakthrough in understanding the interactions between development and underdevelopment, and consequently enlarged the concept of development.

From the late 1960's and early 1970's, more attention has been focussed in challenging the overall process of development. This led to a series of debates and controversies as the additional complexities of the process began to be recognised. The radical social scientists (Marxists and Neo-Marxists) challenged the conventional development theory. They criticised development economics for its ahistorical characteristics and insufficient attention to the interactions which occur internally (e.g. in the political arena) as well as externally, i.e. in the world system (Mouzelis, 1980).

In the mid-1960's, an important new theory, the 'Theory of Dependency'<sup>5</sup>, was propounded to explain development and underdevelopment. Its roots can be found in the work of ECLA discussed above. Some authors see it more as a school of thought than a theory since it encompasses different trends (Palma, 1978). In contrast to conventional development economics, this school did

---

5. For more details regarding the early major tendencies, works and issues about the 'Theory of Dependency' see, for example: Chilcote (1974).

not originate in the United States of America or Western Europe, but in underdeveloped countries, especially Latin American countries<sup>6</sup>.

The theory was first propounded by Andre Gunder Frank who wrote on the relationship between capitalism and underdevelopment in Latin America. He describes development and underdevelopment as the opposite faces of the same coin<sup>7</sup>. The basic assumption of Dependency Theory was that development and underdevelopment were not two different stages in the history of mankind but integral parts of the same 'world-economy'. Hence, underdevelopment is not a 'backward' stage prior to capitalism, a primordial state, a function of traditional society, but a variant of the latter and a necessary consequence of its evolution by the integration of such societies into the capitalist world economy. The pre-emptive effects that the international environment has for national late comers and the more or less typical dimensions of that influence constitute the central emphasis of this school of thought.

From within the country comes the support to this dependence through a class which Frank called 'comprador bourgeoisie' whose interests were allied with the centre. The former provided an internal political constituency to maintain the structure and

---

6. For a broader review of the Dependency Theory, see, for example: Palma (1978); Seers (ed.), 1981; Munos (ed.), 1981. For a critique see, for example: Oxaal et al. (ed.), 1975; Lall (1975).

7. Some authors, such as Todaro (1977) argue that in some sense, 'Dependence Theory' is the counterpart of earlier imperialism (Lenin, 1939) seen from the standpoint of the subordinate nations.

promoting acceptance of long-term goals which were compatible with the centre. In other words, a relationship evolved between them which induced a non-autonomous industrialization limited by their interests (Dos Santos, 1970). This industrialization helped to maintain and expand the economic dependency of underdeveloped nations. Furthermore, internally, it led to the emergence of the comprador bourgeoisie which flourished, and the acceleration of social inequality. In turn, this contributed to maintain the superior dependent relationship. So,

...it is hardly surprising that industries do not get established for meeting the needs of the poorest...(Shourie 1977: 342)

However, the dependency was not restricted to the international level, but it was reflected within the country between its different regions, a good example being Brazil.

Sunkel defined the concept of dependency in the following way:

Foreign factors are seen not as external but as intrinsic to the system, with manifold and sometimes hidden or subtle political, financial, economic, technical and cultural effects inside the underdeveloped country ... thus, the concept of 'dependencia' links the post-war evolution of capitalism internationally to the discriminatory nature of the local process of development, as we know it. Access to the means and benefits of development is selective; rather than spreading them, the process tends to ensure

a self reinforcing accumulation of privilege for special groups as well as the continued existence of a marginal class (Sunke1 1972: 519).

On the other side there were those who have doubted the usefulness of Dependency Theory in explaining underdevelopment. One of the most critical was Lall (1978) who concluded that the concept of dependence was impossible to define and could not be shown to be causally related to a continuance of underdevelopment. He claimed that dependency theorists usually gave an arbitrarily selective definition which picked certain features of a much broader phenomenon of international capitalist development and that this only serves to misdirect analysis and research. Lall stressed that his argument must not be taken to denigrate the real contributions and the intellectual sophistication of the dependency theorists. Lall further noted that there are many indications that the earlier patterns of dependency analysis are being dropped, to be replaced by more appropriate and rigorous political economic research. However, this advance should not hold us back from questioning the older concepts which are still gaining widespread acceptance in the literature.

Another point of Dependency Theory frequently criticised concerns its empirical weakness to validate its propositions. Without them, assertions derived from an abstract framework are always suspect, say the critics. Some empirical research has been conducted which in some cases has supported some propositions while others have been rendered more questionable (Portes, 1976). Portes



argued that the Dependency theory was useful in clarifying the historical origins of a situation of underdevelopment, but it has not been equally helpful for understanding those processes which could lead away from it<sup>8</sup>.

For some authors, such as Foster-Carter, the Dependency School is viewed as a new paradigm which he summarised in the following way:

it stresses the interconnectedness of development and underdevelopment, of 'traditional' and 'modern', and indeed of everything in general (the concepts of 'totality' and 'dependence'); it sees many conflicts and clashes of interest in the underdeveloped countries; it stresses historical factors, specifically the active creation 'development of underdevelopment'; it speaks of 'imperialism' and 'capitalism', of 'social formation', 'mode of production' and 'class', in the language of Marx; it sees development as a revolutionary break rather than a continuing evolution from the present; and it advocates socialism (Foster-Carter 1976: 174-175).

Despite the pitfalls of the Dependency School, it gave a new perspective on development, showing the links between international relations and intra-national structures. While many conventional development theorists see development just as economic

---

8. For a reply to this criticism see, for example: Frank (1977 & 1984).

growth, whose benefits automatically trickle down, they cannot explain the continuing lack of development. Its critics have argued the usefulness of the Dependency theory to explain underdevelopment, but is the conventional development theory better? We do not think so given its approach is generally ahistorical and apolitical, and regardless of all sorts of interrelationships between socio-economic and political aspects. Both Dependency theory and the conventional development theory may be useful in both explaining and understanding the development and underdevelopment mechanism, in various specific instances and at certain times.

## **1.6 Conclusions**

From what we have discussed, we can see that the speed with which theories have been elaborated to deal with development and underdevelopment, especially in the last three decades, has been almost as great as the speed with which they have been challenged. However, this prolonged concern with development has not brought the world closer to a definitive consensus as to what constitutes development nor how it is to be attained. It is striking that different conceptions and approaches continue to coexist unaffected by demonstrations, in an extensive critical and polemical literature, despite their mutual incompatibility or their incongruity with experience.

Throughout the world there still persists a tendency to perceive economic growth as a synonym for development, although it has been demonstrated already that it may be a necessary, but not a sufficient condition for development.

Thus, we can conclude that the process of development is multi-dimensional, so that its dynamics make useless any proposed 'blue-print' or 'panacea' to promote development on a worldwide scale. To understand the reality becomes a necessary condition. However, to transform, a strong commitment by the government in power is necessary. Without this, any real development will not proceed, even if foreign aid is given, and development in its broader sense will be restricted to an endless rhetoric, or, as Wolfe (1976) concluded, the discussion has consisted of a 'dialogue of the deaf'.

In this necessarily brief and partial review of the development theories most relevant to the case study, we have not attempted to, indeed could not, argue definitively that only one of the co-existing contradictory and competing theories of development is a priori superior to all others. Nor will we attempt to do so in the case study. We seek only to find which theories and schools provide the greatest insights into the socio-economic development of Brazil, its forestry sector, and the study area.

Following this brief review of some theories of development, let us move to the next chapter where we shall review how the theories of development presented here have been perceived by forestry circles and how, on the basis of them forestry professionals have understood the role of forestry in development.

## CHAPTER 2

### FORESTRY IN DEVELOPMENT

#### 2.1 Introduction

Throughout forestry literature there has been a long tradition of planning forest development according to economic calculations which follow the general neo-classical micro-economic theory. Problems studied in forest economics have included the choice of species, rotation age, cultivation costs, and the like. These problems have been also characterized by economic one-sidedness as to goals. They have generally treated the subject solely on a monetary basis and have not taken account of the interactions which exists with social and political aspects. They have generally assumed that the region in which the forestry project being analysed was in isolation from the rest of the world, as if it did not affect the world system and was not affected by it. To the extent that the rest of the world is considered at all, it is usually only as a large external market, into which forest output will be sold at an exogenously determined world price.

The revival of interest in development during the post-war period, reviewed in the previous chapter, was embraced in forestry circles. The question of how the forestry sector could contribute to development became a matter of concern. The theme of development was debated at World Forestry Congresses (WFC), at international

conferences especially held for the purpose<sup>1</sup> and academic studies<sup>2</sup>. Following the pattern dictated by changes in the general concept of development, the approach regarding the role of forestry in development can be divided into two major phases, the early 'industrialization approach' and the present 'forestry for local needs approach'. However, it is important to remark that this division does not mean that there was a replacement of one approach by another, or that these are the only two approaches. Rather this created a second direction to follow and the two approaches may be blended. Forestry for local needs is not the perfect panacea, nor was industrialization, for every country.

Following this general Introduction, this chapter contains three more sections. Sections 2.2 and 2.3 contain detailed discussions of the 'industrialization approach' and the 'forestry for local needs approach', respectively. Finally, section 2.4 draws some conclusions from the two previous sections to set the theoretical context for the case study.

1. 'Meeting of Working Party of the International Union of Forest Research Organization - IUFRO held at the headquarters of the UK Forestry Commission in Edinburgh between 30/9 and 03/10/1975' which proceedings were edited by Grayson (1976); and the 'International Conference held at the Australian National University in 1978 to consider problems related to forestry in national development' which proceedings were edited by Shepherd & Richter (1979).
2. See, for example: Nautiyal (1967) and Flores-Rodas (1980).

## 2.2 Early Approach to Forestry in Development: Industrialization of the forestry sector

From chapter 1, we saw that during the 1950's and the 1960's economic growth was taken as a synonym for development and that it was believed that one of the major ways to promote development was through industrialization. In this context, the concept of forestry in development based on industrialization of the forestry sector, as an 'engine for growth', emerged.

The early approach advocated the industrialization of the forestry sector. It was argued that forestry had strong forward and backward linkages through industrial use, with the remainder of the economy. Therefore, investment on forestry would promote multiplier effects which would 'trickle down' through these linkages to make the entire population better off. Underlying this assumption was the concept of development prevalent at that time, that economic growth via industrialization would lead to widespread benefits. In other words economic growth was an end that could be dissociated from the social and political aspects which were assumed to follow automatically.

This increasing awareness and change in attitudes of forestry circles regarding the role of forestry in development can be traced through a review of the WFC's <sup>3</sup>. In the first three WFC's,

---

3. A brief review from the 1st to the 6th WFC was presented by FAO (Forestry Department) in an article entitled 'The Present and the Future of World Forestry Congresses' published in the Proceedings of the 7th WFC held in Argentina in 1972, Vol 1, pp. 1216-1224.

held in 1926, 1936 and 1949, the traditional forestry themes, such as silviculture, forest surveys, forest economics, forest policy, management and regeneration and the like were of major concern. This was quite in accord with a certain lack of interest in development before the 1950's, referred to in Chapter 1. The increased awareness of how the underdeveloped countries could be developed, and the perception of economic growth as the answer, became the central forum of debates in the 1950's (see chapter 1 for more detailed review).

This awareness penetrated the forestry circles and led them to consider the contribution of the forestry sector to the process of economic growth. This started to be felt in the 4th WFC held in India in 1954. Its general theme was: 'The Role and Place of Forested Areas in the General Land Economy and Economic Development of a Country'. For the 5th WFC held in the USA in 1960 the theme was 'The Multiple Use of Forest Lands'. This theme suggests a break of continuity in the concern regarding the role of forestry in economic development to reflect the increase conservation concern in developed countries at that time. However, despite this apparent break one can observe in the conclusions of this Congress the same sort of arguments, such as a likely shortage of wood in the future and the role of the underdeveloped countries in supplying this shortage, as later advocated in the industrialization approach to forestry in development. For example, it was concluded that:

Needs [for industrial wood] would continue to grow, and governments must more readily take this into account in their forward planning. Otherwise, housing plans,

literacy campaigns, and mass distribution of food and goods through packaging would be severely handicapped or enormously expensive ... In Latin America, the aim was to make its particularly enormous forest wealth yield immediate returns. Industrialization often must precede management for which trained staff, properly remunerated, were badly needed. A degree of accelerated harvesting of forest was warranted to finance future development programs (Proceedings of the 5th WFC, vol. 1: 2).

Overall the 5th WFC concluded:

It is recommended to Governments, to FAO, and foresters everywhere that during the next years special attention should be given to:

1. Systematic studies to develop methods for evaluating intangible forest values in quantitative terms;
2. Research and experiment with quick-growing species or genetically superior stock for planting programs in temperate and tropical countries;
3. A gradual spreading of pulp and other forest industries in the under-developed regions;
4. Training of forestry technicians and administrative staff; and
5. The systematic encouragement or adoption at the national level of quantitative plans for forest production and development geared to prospective requirements for forest products (Ibid)



These recommendations took its definitive shape through the work of Westoby who, in 1962, wrote an article entitled 'Forest Industries in the Attack on Economic Underdevelopment' which became a classical exposition of the early industrialization approach. As we will review later, many other authors who wrote about the same subject have done so around the same arguments put forward by Westoby. This view is supported by Douglas who asserts:

...the case for the industrialization approach to forestry in LDC's was made in its most complete form by Westoby (1962), in a long article... (Douglas 1983: 71).

Westoby's perception of the role of forests, the industrialization of the forestry sector and their contribution to underdeveloped countries is illustrated in his statement:

Forests are a most important asset of a country's wealth - an asset that even very poor countries possess or could possess - for they provide a renewable raw material for a whole range of industries which have acquired great importance in many industrially advanced countries. This asset is very often neglected in less developed economies, or exploited only as a raw material for export (Westoby 1962: 168).

He defined the basic propositions of his study as being:

- i. Forest industries furnish a very wide range of products, both consumption goods and intermediate goods, flowing into many sectors of the economy. In other words, forestry industries have strong forward

and backward linkages with the remainder of the economy.

- ii. The demand for these products is income elastic. In other words, demand rises sharply with economic growth.
- iii. The industries vary considerably in their raw material and other factor requirements and in most of them alternative technologies can be successfully employed.
- iv. They are based on a renewable resource and this resource is intimately linked to agriculture.

This perception of the role of forestry in development guided the general debate of the 6th WFC held in Spain in 1966 which had as its central theme 'The Role of Forestry in the Changing World Economy'. Within this context, its objective was:

To examine the progress of forest techniques and to analyse the impact which the evolution of the social and economic aspects of the world have on the orientation of forestry activities (6th WFC Proceedings, vol 1: 111).

Despite the mention of 'social aspects' it was still true that economics prevailed over the social aspects, i.e. the underlying assumption was that the benefits from economic growth 'trickle-down' through society as argued in Westoby's 1962 work.

The early, industrialization approach was evident in the specific objective of the Congress, and were pinpointed in the Congress' conclusions when these emphasized the necessity of governments recognizing the unusually important role that forests and forest industries, if properly developed, could play in promoting

agricultural, industrial, social and economic progress. The conclusions went further to recommend to the governments of the developed countries that the necessary skills, technology and capital should be transferred to the underdeveloped ones. International agencies were encouraged to intensify and expand their programs of technical and financial assistance. In both cases the basic aim was to promote the development of the forest and forest industries sector in the underdeveloped countries<sup>4</sup>.

The recommendations presented at the end of the Congress were greatly influenced in two ways. First, was the 'demonstration effect' of the contribution that the forestry sector had made in the process of development of some developed countries. It was thought that the model might be copied by the underdeveloped ones. Second, was the findings of a background document presented at this Congress by FAO entitled 'Wood: World Trends and Prospects'<sup>5</sup>. This document outlined prospects for a bigger and expanding timber economy and timber industries in all regions of the world while simultaneously noting that many underdeveloped countries, especially the tropical ones, had large forest resources. Hence, it was only natural to suggest that the developed countries and international agencies should help the underdeveloped countries by promoting the exploitation of their forest resources which would promote economic growth and consequently, development. Indeed, this perception was

---

4. For more details, see the 'report' and 'recommendations' in the Proceedings of 6th WFC, vol. 1, pp. 404-407.  
5. Proceedings of the 6th WFC, vol. 1, pp. 443-448.

well in accordance with the conventional theories of development discussed in Chapter 1.

The recommendation referred to above led FAO and other international agencies to concentrate their efforts in order to help the underdeveloped countries to explore and to exploit their forests. This task was not difficult given the great willingness of the governments of these countries to promote economic development. Within this context, in many cases, they themselves requested these international agencies to help to exploit their forest resources.

For example, early in the 1950's an ECLA/FAO Mission visited Brazil as part of an overall study of the possibilities of development of the pulp and paper industry in Latin America. Its general objectives were to determine the future demand for pulp and paper in Latin America and compare that to the actual production of the existing plants. Finally, the mission was to investigate if natural resources were technically and economically suitable for the development of the necessary production in the future. Underlying the general purpose of this joint mission were the findings of a previous FAO meeting held in Canada in 1949 which examined problems in the international production of pulp and paper. The meeting in Canada concluded that traditional producers could not satisfy an increasing demand. This apparently would create opportunities for non traditional producers, such as Latin American countries.

The final report released in 1953 by the ECLA/FAO mission concluded that to supply the entire demand for pulp and paper in

Latin America, more than fifty big plants could be established by 1965. Their establishment should be throughout the region taking into account markets and availability of raw materials. As far as Brazil was concerned, in the short run the use of its plantations of Eucalyptus and Pinus in the southeast and south regions (e.g. State of Sao Paulo) was suggested. In the long run, the use of the forest resources from the Amazonia was suggested (Bastos, 1959)<sup>6</sup>. The Brazilian government in the 1950's also requested the FAO to send a mission which among other things completed the first surveys of the Amazonia forest and helped in the establishment of a centre in the Amazonia to train workers of sawmills of the region (INP, 1959).

Other authors, such as Gregory (1965), Sartorius & Henle (1968), Keay (1971), MacGregor (1976), Von Maydell (1976), and even FAO (1969, 1974) wrote later about the theme of forestry in development. All of them believed that forest industries had a great potential to promote economic growth in underdeveloped countries. A review of the literature on this subject reveals little development of the arguments and contentions in Westoby's 1962 work, despite the strong doubt and criticism of the general concept of development implicit in his work and by extension, his work itself. However, even in the 1980's similar arguments are advocated<sup>7</sup>, as for example:

---

6. For more details regarding those missions referred to above, see, for example: Aubreville (1959); INP (1959); Bastos (1959) and Guerra (1959).

7. See, for example: Gregersen (1973); Von Maydel (1977) and Ladeira (n/d).

Import (of pulp) requirements will continue to increase but the export potential of the traditional supply regions is not likely to grow accordingly. This will open up markets for new producers, notably Latin America, which has suitable resources for this product (McGaughey & Gregersen. 1983: 46).

We can notice in this argument that the same assumption of a future shortage of wood-based products which will consequently be supplied by the production of underdeveloped countries is advanced. However, the same expectation was assumed in the past and the evidence did not support it, as one can observe in the following quotation:

In general, over recent years there had been considerable commendable progress in all the various aspects of forestry and forest industries development throughout the world. But considering primarily wood production, the progress in the main had been, as with agriculture, in the already highly developed areas of North America, Europe, and in the USSR. In the so called underdeveloped parts of the world, production had not risen as was hoped. Indeed, the failure of output and consumption to rise in these areas, as should be warranted by population expansion, better living standards, and greater industrial needs, was the great

disappointment of the last decade  
(Proceedings of 5th WFC, vol. 1: 1).<sup>8</sup>

The frequent claim of the necessity for underdeveloped countries to promote industrialization of the forestry sector as a way to supply a likely future shortage of this or that wood-based product, seems inappropriate.

Generalising from an historical basis in a developed country to an underdeveloped one is not a particular characteristic of the forestry sector, but rather, is common to the conventional theory of development. As noted in the previous chapter, the present developed countries were not underdeveloped, thus to extrapolate from their experiences does not help to solve the underdeveloped countries' problems. The argument does not imply anything at all about whether similar effects can or will arise in the underdeveloped country. Therefore, the use of historical data from developed countries seems to be inappropriate.

Likewise, the assumption of the early approach that the forestry sector had strong forward and backward linkages with the remainder of the economy, was essentially based on Westoby's historical basis from developed countries. However, Nautiyal (1967) subsequently proved that forest industries had quite weak backward linkages, contrary to the generally accepted assertions of the early approach.

---

8. In the original this is not underlined, I have done so to emphasize those points.

The view of the dynamics of development, as expressed in the early approach, was simplistic and deterministic, whereby the adoption of a policy based on certain economic criteria would promote economic growth which would 'trickle-down' to the entire society, and consequently generate development. In one sense, it was important to know when the forest resources should be mobilized. However, it is essential to complement this with how they should be mobilized. Many underdeveloped countries managed their forest resources subject to commercial exploitation in order to supply the necessary wood demand either for their internal or external markets or both. This shows that they knew when they should mobilize their forest resources. Many have also recognised the need to supplement, complement, and sometimes replace, their natural forest endowment by creating man-made forest. However, the question of how all of this was to be managed did not receive much attention. It seems that it was done in order to promote immediate profits and/or to supply the raw material demanded by the core countries. Evidence shows that such management greatly contributed to the penetration of the international capital into the primary sector of the underdeveloped country economies. It seems that such management was directed more by the international capital and to aid its development than by the government of these countries themselves<sup>9</sup>.

In this regard, the international organizations, in particular FAO, helped, even involuntarily, to provide international

---

9. See, for example: Westoby (1975); Westoby (1978); Arnold (1979); De'Ath (1980) and Poore (1983).



capital with the necessary information on the forest resources available for exploitation in the underdeveloped countries (Westoby, 1975). These examples from Brazil referred to above indicate the role played by international agencies in the promotion of forestry development and forestry industries. They could be either to produce wood for consumption in the core or were capital intensive (notably pulp and paper). In both cases, despite some benefits which accrued to the region, and by extension to the local people in the generation of jobs and income, the relationship was either asymmetrical or exploitative.

Given the emphasis of this early approach on promoting economic growth via industrialization fuelwood and charcoal production for consumption by rural people did not receive much attention since fuelwood and charcoal did not have a decisive role in promoting economic growth. Moreover, under the perspective of modernization ideals referred to in Chapter 1, production and consumption of fuelwood would mean 'traditional' and as such, they were the opposite to 'modern' and consequently, of development. In the works of Westoby (1962), Nautiyal (1967) and the vast majority of writing on the role of forestry in development, such production was considered of secondary importance. This could be expected since development was perceived as solely economic growth.

As discussed earlier economic growth as an end in itself was challenged in the early 1970's and social benefits started to be stressed more. However, despite this, the change in the general concept of development was not immediately grasped by some segments

of the forestry circles. Even in the mid-70's and at present the same arguments put forward in the early industrialization approach continue to be used<sup>10</sup>. This suggests a certain reluctance of the forestry circles in accepting the strong doubt and criticism of the general concept of development implicit in the early approach and by extension the approach itself. As such,

The contribution of the forests to mankind was for a long time analysed under polarized light which made their material products and the related economic factors stand out more clearly. Naturally, development was then pursued in this direction. Today, the plane of polarization has rotated and the forest's role in man's environment, and thus the more social benefits, are stressed (Steenberg 1972: 450).

### **2.3 Present Approach to Forestry in Development: Forestry for local needs**

Following the realisation that economic growth was a necessary but not sufficient condition to promote a broader development, 'basic human needs', 'poverty-focused rural development', 'growth with redistribution' among other labels evolved and became the central idea in the general concept of development in the 1970's. Despite a certain reluctance mentioned earlier forestry

<sup>10</sup>. See, for example the works referred to in footnote 7 plus: King (1980); Riihinen (1981) and McGaughey & Gregersen (1983).

circle shifted towards a recognition of the need to link forestry development to rural development. The first signals of a new approach to forestry emerged during the 7th WFC held in Argentina in 1972. However, the signals were mixed, on one hand:

The Congress has noted with concern that the gap between developed and developing nations continues to widen. Some of the largest forest resources of the world lie in countries where economic and social development is lagging. Over and above consideration of social justice, the fact that these resources have a world significance requires greatly intensified efforts by and aid to less developed countries for the development and proper management of their forest resources, so that these resources may simultaneously serve to raise the living standards of their own people and contribute to the world's expanding need for forest products (Proceedings of the 7th WFC, vol. 1: 14).

While on the other hand:

Products of the forest enter into every sphere of man's activities, and thus make a decisive contribution to economic growth ... forests counter erosion, protect agriculture, reduce floods, assure clean water. They reduce pollution, provide amenity and recreation, shelter wildlife and constitute a main defence against environmental deterioration (Proceedings, Ibid., vol. 1: 14).

Despite a trend towards more emphasis on the social aspects of forestry development (starting with its central theme: 'The Forest and Socio-Economic Development'), the arguments and assumptions put forward in the early approach still strongly influenced the conclusions of the Congress. The real move towards the present approach occurred in the 8th WFC held in Indonesia in 1978. This becomes evident from its central theme: 'Forests are for People'. One of its major aims was to examine in depth how forestry might best serve human beings, individually and collectively.

The tendency to emphasize the social aspect was strengthened at the 9th WFC held in Mexico in 1985 with its central theme as 'Forestry Resources in the Integral Development of Society'.

This emphasis on social aspects of forestry in development led international organizations, such as FAO and World Bank, to change their line of aid towards linking up forestry development projects with rural development. The World Bank (1978) described this as being a move from an emphasis on 'industry-oriented' projects to 'people-oriented' projects. FAO introduced the concept of 'Forestry for Local Community Development' while a related term, 'Social Forestry', has been used by others. In all cases the major aim was to introduce forestry activities that contribute to local benefits, as income and employment or in kind into rural areas and assist directly low-income groups. However, the World Bank pointed out that large scale industrial forest plantations will continue to

receive some attention from the bank<sup>11</sup>. For Latin America, the Inter-American Development Bank (IDB) still sees industrial forestry and forest industries as having an important role in development<sup>12</sup>.

The basic argument regarding the role of forestry in development according to the present approach was put in a straightforward way by Westoby in his address to the 8th WFC in 1978. He asserted that:

The role of forestry in development must be to support the traditional sector, and in effect must be carried out by rural people themselves (Westoby 1978: 114).

This suggests that the forestry development has to become a part of rural development and not in isolation from it. Actually, this view makes sense since forestry activities have a direct and fundamental relation to rural people. It occupies land and is capable of providing products which can play a vital role in the energy/nutrition cycle of the rural dweller. Within this context, fuelwood and charcoal production and consumption which used to be considered of secondary importance in the early approach as referred to above, became one of the top priorities. This priority has taken a greater dimension since the international oil crisis and its adverse effects on the underdeveloped countries, and in particular on

---

11. For more details, see: World Bank (1978).

12. At least, that is suggested by the proceedings of a Conference titled 'Financing Forest-based Development in Latin America' convened in 1982 by the Inter-American Development Bank (IDB), see: McGaughey & Gregersen (eds.), 1983.

their rural people. Throughout the world wood has been used as fuel by urban and rural populations. Apart from domestic use, it is also the principal source of energy for many rural industries<sup>13</sup>.

## 2.4 Conclusions

From this review, we can observe that the changes in the approach to forestry in development has been a consequence of the changes in the general concept of development. However, this review suggests that the forestry circles have not kept up with the vigorous debate about the theme of development. As such, the forestry sector has lagged behind in the advance of the theme.

Despite this considerable change in approach or in some cases, relative emphasis, (i.e. from industry-oriented to people-oriented) and the emergence of social concerns in the central themes of the WFC referred to above, industrial forestry sector still continues to play an important role.

Similarly to the general theories of development, it is apparent that there is plenty of room for expansion of the debate regarding all the roles of forestry in development. However, this expansion can only occur if foresters become more aware of the necessity to conceive forestry more broadly, i.e. including the social and political implications of forestry besides the economic side. Paraphrasing Westoby (1975): 'foresters should understand that

---

13. For more detail see, for example: Spears and Yudelman (1979); Gamser (1980) and Guess (1981).

their profession is to serve people not trees'.

In this context, analysis and evaluation of forestry development projects play an important role. Therefore, they should be comprehensive. As such they cannot be restricted to just the financial and economic aspects for, after all, society transcends them. They should be implemented in a historical perspective, considering the interactions among economics, social and political aspects, and taking into account that the sector and the region are not in a vacuum but within a dynamic system.

## CHAPTER 3

### THE BRAZILIAN PROCESS OF DEVELOPMENT

#### 3.1 Introduction

The two previous chapters provided the necessary theoretical background to examine our hypotheses that the analysis of the contribution of the forestry sector to development cannot be solely based on economic grounds and nor can the region and the sector be taken in isolation. To further advance our hypothesis, we will focus in this part (part B) on the overall process of development in both Brazil (Chapter 3) and, more specifically, in the State of Minas Gerais (in which the Jequitinhonha Valley is located) in Chapter 4.

Brazil is located in South America. It lies between parallels  $5^{\circ} 16' 19''$  latitude North and  $33^{\circ} 45' 09''$  latitude South and meridians  $34^{\circ} 45' 54''$  and  $73^{\circ} 59' 32''$  West. It covers a total area of 8,511,965 km<sup>2</sup> (it is the 5th largest country in the world). Brazil is a Federative Republic which comprises 23 States, 3 Federal Territories and the Federal District where its capital - Brasilia - is located (see Map 1). The States and Territories, with the exception of one territory and the Federal District, are divided in Municipalities.



SOURCE: WORLD BANK 1984

MAP 3.1



The States and Territories are also grouped into five great regions according to their common physical, human and economic characteristics (see Map 2). In 1980, Brazil had a total population of 119,002,706 inhabitants of which 67.6% lived in urban areas and 32.4% lived in rural areas (F. IBGE, 1980).

A complete review of the Brazilian process of development would be both an exhaustive task and beyond the scope of this thesis<sup>1</sup>. So, in this chapter only an overview of the overall process will be presented.

We have divided the history of development into four major periods which are in some sense associated with either an economic cycle and/or with political and ideological systems. The first period is quite long as it covers the economic formation of Brazil from its 'discovery' until 1950.

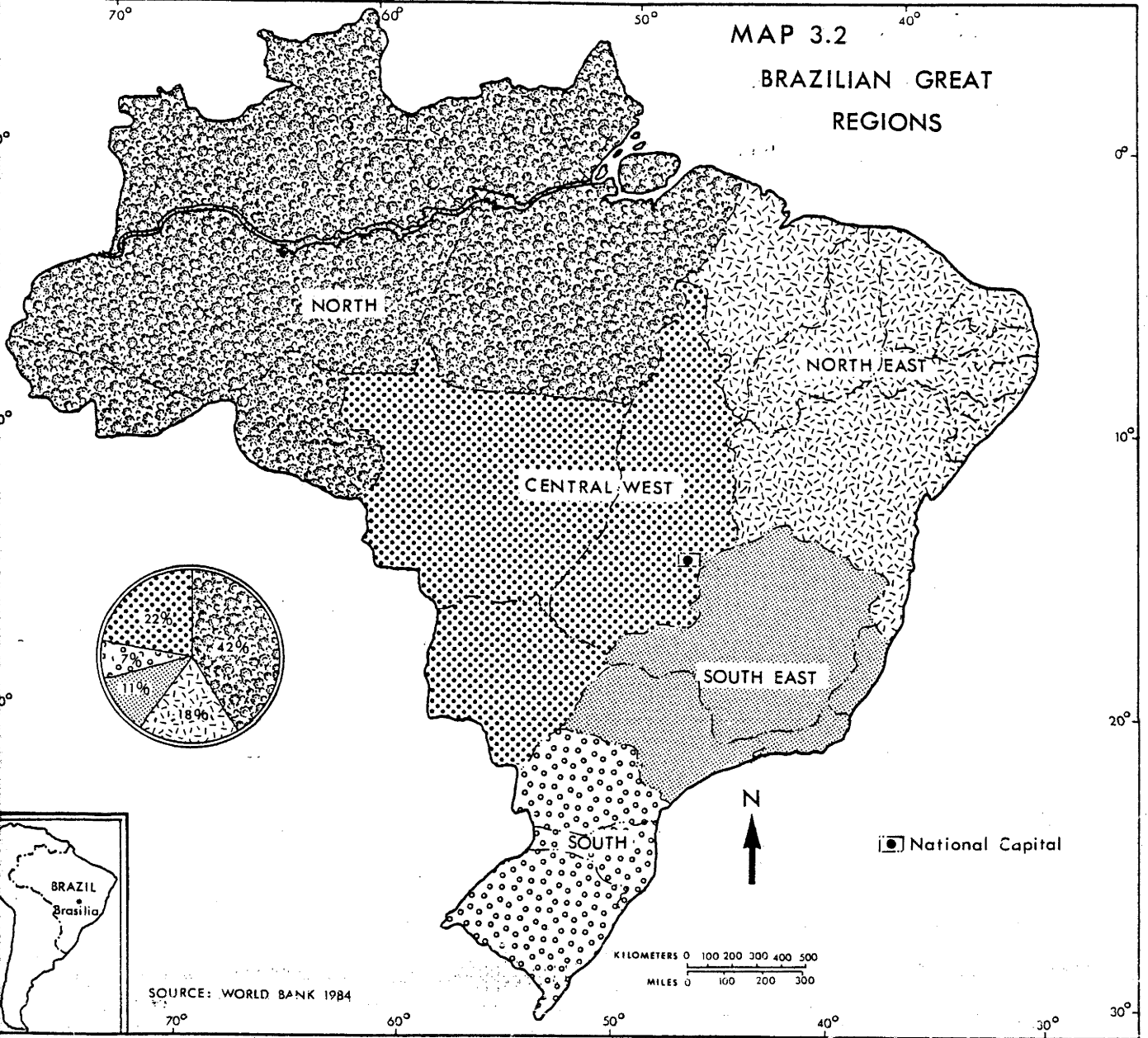
The second period covers from 1950 to 1964. It marks the real impetus in the shift away from a predominantly agricultural economy to an industrial economy which had already started in the 1930's. It is characterized by gradual economic expansion, mainly on the basis of foreign investment.

The third period covers from 1964 to 1974. The beginning of this period was marked by the coup d'etat in which the military seized power. The emphasis of this period was on promoting economic growth at any cost. To do so, policies were launched in order to create the required climate to attract investment.

---

1. For an extensive bibliography on different aspects of the Brazilian economy, see: 'Bibliografia Basica sobre a Economia Brasileira'. In: Pereira 1982: 167-169.

MAP 3.2  
BRAZILIAN GREAT  
REGIONS



The fourth period is from 1974 onwards. The regime institutionalised by the 'Revolution of 1964' continued. However, hard times commenced, dictated by the international economy as a consequence of the 1973 international oil crisis.

### 3.2 Economic Formation of Brazil: 1500-1950

Brazil was 'discovered' in 1500 by the Portuguese. The occupation and settlement of Brazil and the other American lands constituted a chapter in the commercial expansion of Europe<sup>2</sup>.

Some authors (e.g. Furtado) attribute the beginning of the Brazilian occupation to the political pressure on Portugal by other European countries, especially France, England and Holland. For others (e.g. Caio Prado Jr.) it was the desire to establish a plantation colony which could supply highly valuable tropical or mineral commodities such as sugar, cotton and gold for the European market that drove Portugal to begin the Brazilian colonization. While both are true to some extent, the way the colony was organised suggests that a greater weight was given by Portugal to the second reason. In this first stage of the colonization the colony's economy was entirely subordinate, to function solely for the production and export of these commodities.

Early Brazilian economic history was characterized by a series of production cycles during which the country became the

---

2. For the circumstances of the Spanish and Portuguese settlement in the so-called New World (The Americas), see, for example: Frank (1978).

world's leading producer, e.g. sugar and gold, but then lost that position. There was an exception, coffee production, in which Brazil is still the world's leading producer, although Brazilian exports are no longer based exclusively on coffee exportation. Thus, as any other country whose economy is totally based on production and export of primary products, the Brazilian economy experienced phases of both prosperity and decline. The effects of these phases on the regions were disastrous as will be shown later. One of the factors which greatly contributed to this 'boom-bust' pattern was the lack of re-investment of the profits in other economic activities in the region. On the contrary, the profits were used to import almost everything, from even the most basic goods, such as clothes, to luxury goods.

There are no precise beginning and ending dates for these production and trade cycles. However, a reasonable approximation of time periods for these cycles was attempted by Robock (1975), namely:

Brazilwood	cycle	1500 to 1550
Sugar	"	1550 to 1700
Gold	"	1700 to 1775
Rubber and Coffee	"	1850 to 1930

The Brazilwood<sup>3</sup> cycle was a consequence of mere exploitation of the first resource easily available in Brazil. Given its value in the European market it was object of intensive

---

3. The name of Brazil come from the brazilwood tree (Caesapinea echinata), so named because of the red colour of its wood which resembled 'brasas' (burning coals) in a 'braseiro' (brazier) (Beattie 1975: 15).

exploitation. This gradually led to the exhaustion of easily accessible stands and inland incursions commenced in search of it<sup>4</sup>.

On the other hand, the high profits earned from the trade in brazilwood in Europe, led other foreign nations, such as France, Holland and England, to come to the Brazilian coast to take this commodity too. This challenged the Portuguese claims on the monopoly to trade it. It thus became evident to the Portuguese crown that Brazil must be settled or else Portugal would lose it. To warrant such settlement, there needed to be an economic activity besides solely exploitation of natural resources. It was necessary for the rationale of colonialism to shift from exclusive reliance on trade expansionism to an agricultural enterprise which could justify the expenses of the defence of the land (Furtado, 1982a). Portugal needed to adopt a quite different policy from that which guided the Portuguese presence in Africa and East Indies. This argument was developed by Furtado, who argues:

... from a mere despoilment and extractive enterprise - identical to that which at the same time was being undertaken in the coast of Africa and in the East Indies - America came to constitute an integral part of the European reproductive economy with technique and capital applied to generate on a permanent basis, a flow of goods

---

4. For more details regarding this initial exploitation of Brazilwood see, for example: Burns (1970).

oriented to the European market ...  
(Furtado 1982a: 8)<sup>5</sup>.

In this context, planting of sugar cane and production of sugar emerged as the major agricultural enterprise. The success of the sugar industry can be attributed to a great demand in the European market and to Portuguese technology which had been producing sugar since the fifteenth century in the Madeira Island and other Atlantic Islands. The price of sugar which had fallen at the beginning of the sixteenth century, gradually rose after its first decade (Frank, 1978). Hence, these reasons were more than sufficient to justify the interest of the Portuguese crown in establishing new plantations and to increase sugar production. So, after 1530 the first plantations of sugar cane were established in the Brazilian northeast, but it was in the second half of the century that the enterprise was really consolidated (Furtado, 1982a). Good results, in financial terms, awakened an increasing interest in expanding the agricultural enterprise based on sugar production, and large monocultural estates specialized in sugar cane plantations and sugar production expanded and flourished<sup>6</sup>.

Plantations were established and evolved based on slave labour. First, the Portuguese tried to use the Brazilian Indians, but as the results were negative, slaves were imported from Africa. This was intensified from the second half of the sixteenth century and the slave trade remained important during following cycles.

---

5. This and all translations from works in Portuguese used through this study were performed by Kengen.

6. This pattern is still present in contemporary Brazil.

These particular characteristics in which the sugar production evolved in Brazil, and similarly later in the Caribbean led authors, such as Frank, to argue that it created a new mode of production which he called 'the plantation system'. Frank stated:

...the scale of production, investment in slave labour, capital equipment, and transportation facilities had increased so markedly that sugar plantation enterprises underwent a qualitative transformation - if not in late sixteenth century in Brazil, then in the Caribbean sugar plantations of the seventeenth-nineteenth centuries (and even the twentieth century) which developed out of the earlier ones - into a new mode of production: the plantation system ... (Frank 1978: 50).

The plantation system led to dramatic expansion of the Brazilian northeast region:

By the end of the sixteenth century the 'per capita' income of the free population was higher than the one prevailing in Europe at the same period (Hewlett 1981: 39).

However, this wealth was concentrated in the hands of the big farmers and the payments made to other groups, mainly to buy clothes and food for the slaves, did not reach more than 3% of the total income (Hewlett, 1981). The rest was used to import, especially luxury goods. In other words, this prosperity was based on a comparative advantage on the international market. As such, it was not based with technological progress and capital accumulation, and much of the prosperity accumulated outside of Brazil.



Hence, this prosperity survived only while this comparative advantage on the international market lasted. In the second half of the sixteenth century the new production of sugar from the Caribbean region brought the price of sugar back down to the 1540 level and Brazil was forced to sharply decrease its production. The prosperity of the previous years started to fall. This decline led the Brazilian northeast to gradually acquire its contemporary image of stagnation and poverty. Later, international prices of sugar increased and its production in the region was partially resumed. However, it was no longer able to flourish as previously.

This led the Portuguese crown to realise that it could no longer expect much more from tropical agriculture - another 'miracle' like sugar was unlikely to be repeated. This notion was reinforced by increasingly intensive competition in terms of tropical agricultural commodities. French, English and Dutch colonies had started their production, which was traded in Europe by their respective colonizers. As Portugal was already experiencing a perceptible decline in wealth and power by that time the only apparent solution, as far as Brazilian settlement was concerned, was to discover noble metals, especially gold<sup>7</sup>.

As a response to this, by the end of the seventeenth century the search for gold was intensified and the first discoveries were made. However, production on a commercial basis began between

---

7. This represents a return to the dilemma which followed Brazil's 'discovery' as referred to in the beginning of this chapter (Furtado, 1982a).

1810 and 1820. Production occurred in a region farther south and inland from the sugar plantations. Presently, this region is the State of Minas Gerais. So, the decline of sugar production and an ascent of gold production contributed to a shift of the economic, political, and cultural centre from the Northeast to the Southeast. This was symbolized by the move of the Brazilian capital, at that time from Salvador to Rio de Janeiro. The developments in this period contributed to a move inland, which in turn contributed to the start of an era of unification of separated regions into a single country. Prior to that these regions were, each one in its own way, linked directly to the metropolis (Portugal) without major linkages between them (Furtado, 1982a).

Simultaneously, human and material resources were insufficient to attend to the demands for foodstuffs, building materials and other goods created by the gold rush. In response, capital, adventurers and labourers from Europe were attracted and also a large contingent of slaves was brought from Africa to Brazil. Furthermore, there was a quite considerable migration (including slaves) from the northeast. As in the previous cycle, the work force was based on slavery. Simonsen (1962) estimated an importation during the sixteenth and seventeenth centuries of about 350,000 slaves. However, from 1700 to 1850 more than 1,000,000 came to Brazil. The slave labour in Brazil was of such a dimension that

it led to a generalized belief that without slaves the settlers could not survive<sup>8</sup>.

Following almost the same pattern as the previous cycle, the gold cycle did not create any permanent economic activity in the mining regions. The alluvial characteristic of the gold discovered in Brazil - which made exploration easier without requiring investments in a more sophisticated technology - and expectations of new discoveries contributed to this lack of interest.

However, gold production in Brazil, played a great role in the commercial revolution and in the early ascendancy of British industry in the eighteenth century, since it was used to pay for the imports into Portugal and Brazil from Britain (Fisher, 1971). The Brazilian production of gold was quite remarkable; between 1700 and 1770 its total production was equal to the entire amount of gold produced by the Spanish American colonies between 1492 and 1800, and it represented nearly one half of the rest of the world's output of gold during the sixteenth, seventeenth, and eighteenth centuries (Frank, 1978). The climax of its production was reached between 1750 and 1760 (Furtado, 1982a).

The entrepreneurs were not willing to invest in a more complex system to extract the gold, but there was a quite constant need to replace the slave labour force to keep up with the demands of gold production. So, when the alluvion neared exhaustion and

---

8. For more details regarding the slave labour in Brazilian economic formation, see, for example: Simonsen (1962); Prado Jr. (1974); Furtado (1982a); Freire (1978).

consequently, production declined the enterprises also started to lose capital. As a consequence, the whole system gradually atrophied, losing its vigor. This process accelerated from 1760 onwards. Some attempts were made to replace gold mining by other economic activities, but these were not successful and in most of the cases a shift to subsistence agriculture occurred. This will be the object of our review in Chapters 4 and 7 below.

Two facts in the first half of the nineteenth century marked a decisive stage in Brazil's development and initiated a new phase in every sphere, social, political and economic. First was the transfer, in 1808, of the Portuguese royal family to Brazil due to the invasion of Portugal by Napoleon's troops. Consequently there was a transfer of the monarchical centre of gravity from Lisbon to Rio de Janeiro. Secondly, although Brazil's political emancipation from Portugal occurred in 1822, this was not followed by an economic emancipation from foreign powers. Treaties signed between Portugal and England had great influence on Brazil, years after its independence. Portugal tried to convince England that Brazilian independence constituted aggression towards Portugal. In this way England had an obligation by force of treaties to act in favour of its ally, by military intervention. However, by this time it was more important for England to assure ties with the new government and to take some privileges than to act in favour of Portugal which was no longer as important as it once was.

The policy followed produced very good dividends for Britain, in form of special privileges as a result of treaty

arrangements with the new government. These special privileges created many anomalies, such as the importation of textiles from England to make all clothes even those worn by the slaves in the plantations or mines. These imports contributed substantially to the delay of Brazilian industrialization. So, the economy continued to be concentrated in the production and export of primary goods.

Following independence Brazil faced a state of stagnation. A rudimentary administrative system, a national bank and some other governmental initiatives were the net achievement of this period. New techniques of the industrial revolution scarcely penetrated the country. When they penetrated they resulted in production of goods and services of consumption, which did not affect the structure of the productive system. So, in this context, the sole option available to Brazil was a re-engagement in the expanding international trade. Due to its lack of industrial support the solution relied on production of export crops. However, commodities such as sugar, cotton and tobacco did not allow greater possibilities for expansion, given their current large production elsewhere throughout the world.

However, by the middle of the eighteenth century a new product suitable for Brazilian ecological conditions started to emerge with great possibilities as a solution to the Brazilian dilemma. This product was coffee. It had been introduced into Brazil early in the eighteenth century and cultivated throughout the country, but only for domestic consumption. However, by the end of that century the international price increased due to problems in Haiti, which at that time was the biggest producer.

Thus, coffee started gradually to increase in importance in the Brazilian economy. By the time of the Brazilian independence in 1822, coffee already contributed 18% of the total value of Brazilian exports, and was in third place following sugar and cotton. However, 20 years later its share of the total value of Brazilian exports reached 40% and it was the major export item (Furtado, 1982a: 113).

In some sense, the expansion of coffee production was based on a similar pattern to the sugar cycle - the plantation system - large monocultural estates, concentration of income, a slave labour force and so on. The coffee economy benefited from slave labour diverted from mining activities that had declined. However, in 1888 slavery was abolished in Brazil and the coffee economy was faced with the new reality of waged labour. This marked a transition phase for the whole Brazilian economy, and immigration of Europeans and Japanese was encouraged with incentives, to replace the slave labour force.

The change from a slave labour force to a wage labour force did not affect the production of coffee which continued to expand. The large labour force reserve within the country and a strong migratory influx allowed the coffee economy to expand without a corresponding real increase in wages. In other words, there was no pressure on the entrepreneurs to transfer their gains in productivity to the workers, but rather the entrepreneurs could appropriate these gains.

Along with the labour force surplus there was also a land surplus which allowed the expansion of coffee plantations without the

need for improving techniques. Entrepreneurs were not concerned with the use of techniques to prevent soil exhaustion. On the contrary, they tried to organise production employing the smallest amount of capital per unit of area. Thus, the rise in productivity was basically a result of larger inputs of both labour and land - the two cheap and abundant inputs. There was no stimulus for entrepreneurs to increase their capital productivity per man or per hectare.

Given the importance of coffee in the Brazilian economy, its estate owners began to play an important role in almost all decisions taken by the government, especially shaping policies to fit their agricultural and commercial interests (Furtado, 1982a).

Despite this concentration of income and power in the hands of a small segment of society, e.g. estate owners, the labour force represented a quite sizeable market for some consumer goods, which stimulated some industrialization. So the process of industrialization had started, however slightly, by the end of the Empire in 1889. Industrial growth became significant and continued for the following decades. Cotton and textile production in particular increased more than tenfold between 1885 and 1905 and almost doubled again in the following decade. Other light industries, such as clothing, shoes, and food products also developed rapidly during this early stage of Brazilian industrialization (Robock, 1975).

Later, a school of thought started to emerge in favour of a more intensive process of industrialization. It claimed that there was a need of complement Brazilian political independence with

economic independence. However, this school did not have the necessary decisive power which still remained with the rural oligarchy. Despite this, the school managed to mobilize some segments of the population to exert pressure on government, which resulted in increased tariff protection and some governmental financial assistance for new industries.

Meanwhile, coffee continued to play an important role in the Brazilian political, social and economic scenes, and its expansion determined, at the same time, Brazilian industrialization<sup>9</sup>.

However, like any other primary commodity, coffee was strongly susceptible to international market conditions. Its price fell sharply during the international economic crisis of 1929 and the 'Great Depression' which followed. As it was the cornerstone of the Brazilian economy, this had disastrous effects on the entire economy. Coffee gradually declined in importance and never regained the same importance in the economy.

An important domestic political event, the 'Revolution of 1930' occurred concurrently with the depression. This laid the basis for much of what subsequently shaped the contemporary Brazilian state. A shift began to take place, away from the dominance of agriculture towards the industrial sector of the economy. The large farmers started to lose political power to an emerging urban oligarchy. However, the structure of landholding in which a few

---

9. For more details regarding the expansion of the Brazilian coffee economy and the origins of the Brazilian industry, see: Silva (1981).



landowners produced for the export market was not challenged, i.e. there was no wide-ranging land reform. Despite its relative loss of power, the rural oligarchy still retained sufficient power, at least, to obstruct a major social reform (LAB, 1983).

The Second World War, with the obvious difficulty for trading brought a new stimulus to the Brazilian process of industrialization. Industry tended to concentrate in the Centre-South, especially in the State of Sao Paulo. A great internal migration occurred. The Northeast region became the great supplier of migrants and the Centre-South region, especially the State of Sao Paulo and the Distrito Federal, then in Rio de Janeiro, became the major absorbers of migrants.

The natural constraints on imports during the Second World War gave Brazil a surplus of foreign exchange credits in the post-war period. This allowed Brazil to import capital goods to re-equip industry and led to a great economic and industrial expansion. In the post-war period (1946-1950) industrial production grew by 8.9% a year and the real domestic product by 7.3% (Pereira, 1983: 43). Brazilian society began to experience great transformations, such as an intensification of rural-urban migration which consequently accelerated the process of urbanization. For example, in 1940 only 31% of the population lived in urban areas, but by 1950 this had grown to 36%, and by 1960 to 45% (Martine & Camargo, 1982: 33). In this context of great transformations, both social and economic, Brazil entered the 1950's.

Despite the moves towards an industrial economy and urbanised society Brazil still remained an essentially agricultural country, following a development pattern of what ECLA classified as a 'Primary-Export Model'. Lessa (1983) classified these early efforts by the Brazilian government towards industrialization as 'non-intentional' since they were more a response to an international situation than an industrial policy in itself. Brazilian industrialization since the 1930's was basically conditioned to respond to external stimuli, and an increase in domestic demand (Lessa, 1983). The first deliberate approach to a development policy of intensified industrialization did not start until the 1950's.

### **3.3 The Brazilian Process of Development: 1950-1964**

Starting from the context just described, the Brazilian government policies were formulated pursuing economic development. However, this expansion of the economy, increased imports and buying public utility companies (e.g. railroads) from English shareholders<sup>10</sup> soon exhausted Brazil's reserves of foreign currency. Despite such problems, growth rates in the period 1951-1955, were still 5.7% for real domestic product and 8.1% for industrial production (Pereira 1983: 43). However, Brazil continued to be essentially an agricultural country and a major exporter of primary goods.

---

10. England did not want to pay its debt to Brazil in any other way. This debt was a consequence of purchases of Brazilian commodities such as iron by the British Government during the Second World War.

By 1955, the Brazilian development was faced with three major threats: accelerating inflation, unfavourable terms of trade, and the lack of an adequate infrastructure in energy and transport. After 1956 and in the early 1960's Brazil experienced a new phase in its economic policy - an ambitious policy to promote 'Fifty Years of Development in Five' (Lessa, 1983). To do so, there was a total mobilization of all forces in favour of an industrial economy. So, the 'Import Substitution Industrialization - ISI' policy started its aggressive second phase (the first phase was that of the 1930's). This policy was sanctioned by the literature on Latin American development, especially in the ECLA's works. Indeed, as shown in Chapter 1, ECLA's economic thought greatly influenced Brazilian developmental policy in the 1950's<sup>11</sup>.

This period (1956-1961) saw the consolidation of Brazilian industrialization. Brazil's domestic product grew at an average annual rate of 6.0% while industrial production reached an average annual growth rate of 11.0% (Pereira 1983: 43). The government played a crucial role in this process through policies of massive public investments to eliminate some of the 'bottle-necks' in the Brazilian economy. Investments were made in:

- (i) infrastructure, especially energy and transport;
- (ii) basic industries, such as chemicals and steel; and
- (iii) regional development schemes to promote development of 'backwards' regions, e.g. 'SUDENE - Superintendencia de

---

11. For more details about the 'ISI' policy in Brazil see, for example: Weisskoff (1980) and Tavares (1983).

Desenvolvimento do Nordeste' (Superintendency for the Development of the Northeast') and 'SUDAM - Superintendencia de Desenvolvimento da Amazonia' (Superintendency for the Development of the Amazon).

- (iv) Along with these investments, the government initiated a set of policies creating incentives, such as tax concessions to attract private investment, both domestic and foreign (Lessa, 1983).

However, despite the high rate of economic growth, the diversification of industrial production, and the efforts of the government to reduce regional imbalances, economic development was uneven in sectoral and regional aspects (Tavares, 1983). Development was concentrated in the secondary sector of the economy, while the tertiary sector benefited slightly. The estate owners, that had been losing power since the 1930's still retained enough power to avoid major agrarian reform. The structure of the primary sector was virtually unchanged, and its growth in the period can be attributed more to an expansion of the agricultural frontier than to any increase in productivity. No major reform of the primary sector was considered and Brazil's anachronistic and unjust agrarian structure remained. In view of the large farmers any major reform would have required a much more radical type of government (Hewlett, 1981; LAB, 1982; Tavares, 1983).

The uneven regional development continued a trend evident since the early 1930's in the State of Sao Paulo and the former Distrito Federal (then in the city of Rio de Janeiro). Actually,

this uneven regional development and its consequences were just a continuation of a process which had started earlier, as shown in Section 3.2. The coffee economy had contributed to this concentration since it evolved in the Centre-South region, and it was the coffee economy which provided capital and markets for industry (Silva, 1981). The uneven nature of regional development can be seen when regional distribution of per capita income is compared to the national average. In 1950, the per capita income in the Northeast was only 48.5% of the national average while in the Centre-South it was 140.3% (i.e. 40.3% above of the national average). In 1960, these figures were 50.6% and 133.5% for the Northeast and Centre-South, respectively (Pereira 1983: 68). This modest increase in the Northeast can be attributed to the work of SUDENE and other governmental agencies.

The rapid economic growth of Brazil's economy in the period from 1956 to 1960 was followed by a development hiatus which started in 1961 and lasted until 1967. Although the Brazilian economy was much more industrialized, the total increase in industrial employment was 29% in the decade 1950/60, while the Brazilian population had grown by 37.2% in the same period (Lessa, 1983: 88). The industrial sector was not able to absorb the total labour force available. Given the increasing urbanization of Brazil referred to above, there was no other option for many of those who had migrated from rural areas but to live on the periphery of the urban centres. Thus

together with the structural changes in its economy, Brazil also experienced social and political transformations<sup>12</sup>.

In 1961 a new government took office and found Brazil's economy facing a set of serious problems similar to those of 1955. Brazil needed imports of capital goods to support the vigorous process of industrialization in the previous decade, but the terms-of-trade for its traditional exports such as coffee had declined and these traditional exports were stagnating. In response to this situation, rapid economic growth and industrialization ceased to be top priorities. Thus, in the period 1962-1965 the average annual growth rate of the Brazilian real domestic product fell to just 1.9% while the annual growth rate of industrial production fell to 2.4%. Table 3.1 presents a comparison of the rates of growth in this period with the earlier achievements.

Table 3.1: Brazilian Real Domestic Product and Industrial Production  
(average annual growth rate % by periods)

Periods	Real Domestic Product	Industrial Production
1940-1945	4.7	6.2
1946-1950	7.3	8.9
1951-1955	5.7	8.1
1956-1961	6.0	11.0
1962-1965	1.9	2.4

Source: Pereira 1983: 43.

<sup>12</sup>. For more detailed analysis of Post-War Brazilian development to 1960's, see, for example: Lessa (1983).

In terms of both real domestic product and industrial production, Brazil's average annual growth rate was even less than during the Second World War. There is no clear and decisive explanation for this great decline in the average annual growth rate in the early 1960's. One school of thought has argued that such stagnation was a short-run phenomenon as a consequence of both the political turmoil and unfavourable external conditions in terms-of-trade. Another contends that it was a natural response to the exhaustion of the 'import-substitution industrialization' (ISI) model adopted by Brazil since the 1930's. In other words, this model had worked quite well while it was replacing equipment that could not be imported, but could not expand due to a reduced size of the domestic market due to a continuous concentration of income.

In short, the Brazilian economy faced another of its crises. By 1963, the growth rate of the economy had slowed to 1.5% and inflation increased to 80% (LAB 1982: 36). Along with the economic crisis a political crisis also evolved polarizing around the extremes, i.e. popular masses and conservatives. In this context, the coalition of conservative forces (landowners, capitalists, bankers and so on) with the military consolidated (LAB 1982). Late 1963 and early 1964 saw the political conflict intensify until finally, on 31st March, 1964 the coup d'etat took place. It became known as the 'Revolution of 1964'. The democratic interlude which

had started in 1945 was over (Skidmore, 1967)<sup>13</sup>. It marks not just a political happening, but it also marks the beginning of rationalization of the economy to promote further growth under a particular ideological perspective.

### 3.4 The Brazilian Process of Development: 1964 - 1974

After the coup d'etat, the development hiatus remained to be tackled<sup>14</sup>. To restore economic growth, combat inflation and solve the balance of payments situation became the major concerns of the new government. Of these combating inflation became the top priority since it was perceived as a pre-condition for restoring economic growth. The emphasis was entirely on economic issues while social reforms were given low priority.

Thus, a stabilisation plan was launched based on the orthodox Keynesian approach of restriction of demand; it became known as the 'government plan for economic action'. Its main points were a contractionary fiscal policy followed by forced wage restraints (wages increased less than the cost of living) with subsidiary roles for monetary policy and price controls.

---

13. For a detailed analysis of how the Brazilian political system operated just prior to the 'Revolution of 1964' and its origins, see, for example: Skidmore (1967); For a radical view of the periods before and after the 'Revolution of 1964', see: LAB (1982); For a comprehensive analysis of the 'Revolution of 1964', see: Dreifuss (1981).

14. For more details about Brazil in the 1960's, see, for example: Roett (ed.). 1972.



As far as the balance of payments was concerned, the strategy adopted emphasized export promotion, a more realistic foreign exchange policy (i.e. a devaluation to discourage imports, and encourage exports and foreign capital inflows) and renewed encouragement for foreign private investment. This encouragement was given by, among other things, repealing the prohibitive restrictions on overseas profit remittances adopted by the previous government. This measure had the twofold purpose of contributing to the balance of payments and restoring economic growth. Other measures, such as tax concessions, were also adopted. These actions suggest an emphasis on economic growth as an end in itself, i.e. economic growth as the necessary and sufficient condition for promoting development<sup>15</sup>.

Given the nature of the plan, i.e. based on conventional economics, the question of distribution of income was not at issue. It was either ignored, or if considered at all it was assumed that then, the benefits of the economic growth would trickle-down to the society. Although it could cause side effects, such as an unequal distribution of income, later these inequalities would be overcome. Actually, these inequalities were rationalised as direct result of market disequilibria, characteristic of the process of economic development. As such, they would disappear in the future, using other policy instruments, when the market conditions were suitable.

---

15. For a more detailed analysis of the Brazilian politics underlying its development model, see, for example: Stepan (ed.) (1973); Fiechter (1975); Flynn (1978).

In 1967 there was a change of government, which also meant a change in the economic policy leadership. The targets of raising the annual growth rate to 7% and reducing inflation to 10% annually by the end of 1966 (according to goals of the stabilization program of 1964) had not been achieved (Robock, 1975). Control of inflation was no longer the top priority. It was even argued by the new Minister of Finance that more recession to control inflation would be both costly and counterproductive (Morley, 1982). Hence, an inflation rate of even 15% would be acceptable. However, the apparent contrast between this policy and the previous one can lead us to erroneously assume that a major shift had occurred in the overall economic policy. On the contrary, the previous policy was continued and even extended.

A complete commitment to the promotion of economic growth at any cost evolved. This determination led to a pattern of increasing inequality in the distribution of wealth, with the poorest members of Brazil's society paying the heaviest price for growth, a price which they had already paid during the period of the stabilization (anti-inflation) programme. At this point it seems very appropriate to recall Johnson's statement, in which he argued that to be concerned with income distribution was a 'luxury' that an underdeveloped country could not take into account if it really wanted to pursue economic growth. We can further state that the worsening pattern of distribution and the increasingly evident social and political costs were not then just random effects dissociated from overall economic strategy, but rather, they were the direct results of an overall, coherent and deliberately chosen economic

model; a form of capitalist development for Brazil adopted by the previous government and followed, despite some changes by the new government (Flynn, 1978, LAB, 1982, Pereira, 1983).

Within this context, and supported by a favourable international economic situation, Brazil started to experience high rates of economic growth. This was in such a way that later it became known as 'Brazilian economic miracle'. Its internal logic relied on a triple alliance encompassing government, national and international private enterprises which had evolved<sup>16</sup>. A policy to keep wages down created a favourable environment to increase the profit of the entrepreneurs and to promote capitalist expansion. The heaviest sacrifice of the growth policy was imposed on the poor. The policies promoted a transfer of the workers' income to capitalists, a fact suggested by the data presented in the following table which clearly show the decline in the real minimum wage while average national income and productivity continued to increase in the same period.

Table 3.2: Changes in the Index of the Real Minimum Wage and Productivity

Year	Real Minimum Wage	GDP/capita
1957	100.0	100.0
1960	81.8	114.2
1964	75.4	123.7
1967	58.7	126.9
1974	44.4	219.7

---

Source: Pereira 1982: 82

---

16. For an analysis of this triple alliance, see, for example: Evans (1982).

The Brazilian model of development became one of the world's best known examples of inequitable growth, and as such has been widely and harshly criticized, but has also been praised<sup>17</sup>. An example of the latter is Morley (1982) who challenged this general consensus. Morley agrees that income inequality increased after 1960, but argues that at the same time there was an improved standard of living for all Brazilians. He suggested that the poor received much larger income gains than is usually assumed. He based his conclusion on the assertion that these gains are masked by the way that the distribution statistics are calculated. He argued:

... inequality is the wrong basis on which to attack this growth strategy. Indeed its drawbacks are not primarily economic - they are political ... the Brazilian military in 1964 dismantled the country's democracy and then proceeded to implement a set of policies that made rapid growth possible ... (Morley 1982: 292).

Though we agree with this assertion, one cannot forget that politics and economics mutually interact, i.e. they are not isolated concerns. The policy which led to the 'miracle' was a response to the economic aims of the various groups that supported the coup, as part of the triple alliance referred to above. The favourable external circumstances for exporting and borrowing must also be taken into account.

---

17. For non-critical analysis of the Brazilian model of development, see, for example: Fiechter (1975); Robock (1975); Morley (1982); On the critical side, see, for example: Furtado (1982b).

Similarly to what happened during the early economic cycles, the 'miracle' created a false impression that the standard of living of most Brazilians had increased. This impression was hardly surprising given that the economy experienced an average annual growth rate of 10%, the inflation rate declined and the external accounts were strong and the living standards of some prominent segments of society did increase (World Bank, 1984). Taking advantage of this situation, the government undertook a large propaganda campaign which emphasized that modernization was the key to the fulfillment of Brazil's potential to become a major power<sup>18</sup>. This campaign stimulated public euphoria and increased the false impression that the whole society was experiencing a higher standard of living. However, once the conditions which maintained the 'miracle' disappeared, this apparent increase in the standard of living of some segments of the Brazilian society also disappeared. This remarkable growth of the Brazilian economy, its modernization and consequent apparent improvement of living standards for most of its society, ultimately were not able to create a more just society in Brazil. In other words, the 'miracle', like the economic cycles referred to in 3.2 above, was not able to sustain itself.

The 'miracle' started to disappear as favourable external conditions started to decline, especially after the shock to the

---

18. This view and the propaganda itself were based on the doctrine put forward by the Superior War College (ESG). For a full account of the ESG's doctrine and its important role in this process, and even in the overall model of development see, for example: Stepan (1973) and Flynn (1978). For an analysis of Brazil in the world and its chances to become a major power see, for example: Selcher (ed.) (1981).

world economy caused by the oil crisis in 1973. Thus, the year 1974 marked the beginning of a new period.

### 3.5 The Brazilian Process of Development: 1974-1980

Hard times commenced and the world economy slowed in this new era dictated by the international economy as a consequence of the oil crisis. Brazil, like many other countries, relied on cheap oil. The wake of the sharp and sudden petroleum price increase in 1973 brought severe consequences to the Brazilian economy. Brazil, probably more than any other country, epitomized the implications of the oil crisis. The growth rate of the Brazilian Gross Domestic Product (GDP) fell from 14% in 1973, through 9.8% in 1974 to reach 5.6% in 1975 (LAB, 1982: 55). This situation required adoption of new policies in order to cope with the new times. The 'euphoria' of the time of the 'miracle' started to vanish and new reality arose. However, as reviewed in more detail later, the government and its technocracy were slow, or even reluctant, to admit what was occurring<sup>19</sup>. The rapid increase of the Brazilian total foreign debt is a good illustration in support of this argument. Underlying this policy was the idea that Brazilian economic growth could not be stopped - the solution to the problem was to borrow money.

The government seemed reluctant to accept that the sharp increase in oil prices had affected the world economy, and that

---

<sup>19</sup>. For more details see, for example: Covre (1983).

consequently the economy could no longer expand as in the 'miracle' period. This reluctance was demonstrated by an attempt to maintain the high rate of economic growth, especially through foreign borrowing which strained the balance of payments (Serra, 1983; World Bank, 1984).

In pursuing its growth strategy the Brazilian government announced the II National Development Plan - 'II PND' for the period 1974-1979 which presented the following major goals:

- a. GDP to grow at an average annual rate of 10%, industry 12%, and agriculture 7% plus a 250% increase in the volume of exports over the plan period.
- b. The substitution of imports to be in the sectors of capital goods and basic materials, such as steel, chemicals, non-ferrous metals and non-metallic minerals.
- c. Programmes to be introduced for major increases in the export of raw-materials, such as iron, aluminium, pulp and steel<sup>20</sup>
- d. Domestic oil production and hydroelectric energy to be increased, railroad transportation to be promoted, the tele-communication and rural electrification system to be expanded, increase irrigation to be increased and warehouses to be constructed for agricultural products.

---

20. Two programs are of particular interest given their contribution to promoting an expansion of large scale industrial forest plantations. The first was to produce pulpwood to cater for an expanding production of pulp which was the goal of the program. The second was to produce charcoal to be used as the reducing agent in steel production.

To achieve such ambitious goals the government adopted an expansionist policy. The public sector acted through a large variety of subsidized credit programs, tax incentives, tariff preferences and other policies, together with its own direct investments, and progressively substituted for the market as the principal allocator of investments in the economy. The extensive foreign borrowing which was necessary to do this, was facilitated by the liquidity of the international financial market. Consequently, Brazil's debt expanded rapidly from US\$ 5.3 billion in 1972, through US\$ 12 billion in 1974, to US\$ 45 billion in 1980 (LAB 1982: 55). This expansionist policy, based on extensive foreign borrowing, magnified Brazil's potential vulnerability to further external shocks and furthermore subordinated Brazilian economic policy to the international financial system<sup>21</sup>.

Simultaneously, the government attempted to carry on an orthodox anti-inflationary policy, i.e. via credit and finance restrictions which was clearly a restrictive policy. That is, there was an attempt to carry on two contradictory policies. In this context, many of the goals of the II PND became completely unrealistic, and inevitably the Plan lost its momentum from 1976. Meanwhile the world economy continued to decline into its worse economic recession since the Great Depression of the early 1930's.

Despite its pitfalls, the II PND succeeded in some respects, such as the reduction in imports of intermediary goods which was achieved by promotion of their production domestically.

---

21. For more details about the Brazilian foreign debt and its consequences to Brazil, see, for example: Furtado (1982c).



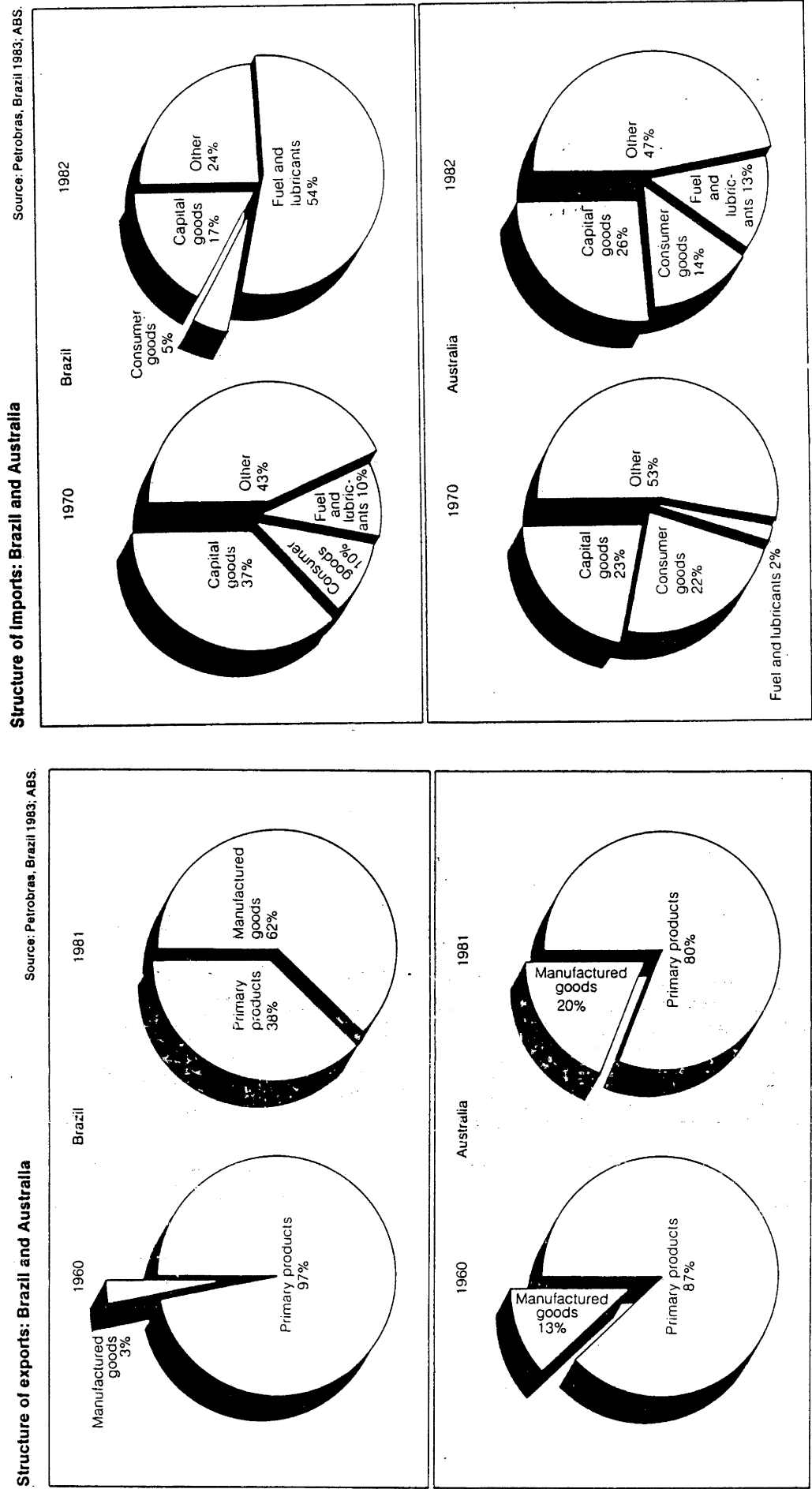
Indeed, it largely succeeded in promoting an average annual growth rate of GDP of over 7% during the rest of the decade - 1973-1980 (Serra, 1983; Coutinho and Belluzzo, 1983; The World Bank, 1984).

Graph 3.1 shows a comparison between Australia's and Brazil's structures of trade between 1960 and 1982. The most striking features are the enormous increase in the share of manufactured goods in Brazil's exports (62% in 1981 compared with 3% in 1960). In the same period, Australia's exports of manufactures had only grown from 13% to 20%. Similarly Brazilian imports of capital goods fell from 37% to 17% of total imports, between 1970 and 1982, while in Australia, the proportion rose from 23% to 26%. Thus in many ways, the Brazilian policies did achieve what they set out to, but the questions remain about the efficiency or equity of those policies.

Nevertheless, Brazil's potential vulnerability to further external shocks became evident when, from 1978 to 1980 there was a new wave of oil price increases followed by higher international interest rates. The great increase in fuel and lubricant imports is also shown in Graph 3.1. Hence, oil imports, high interest rates, high debt service payments - around 80% of the total Brazilian exports - along with accelerating inflation, considerably reduced the government's potential to manoeuvre. Little could be done and the economy receded (Furtado, 1982c).

Indeed, this crisis facing Brazil is just one more in its process of development. However, the outcome will depend, in the short term, on the recovery of the international economy and, in the longer term, on achieving a development path which combines rapid

Graph 3.1: Structure of International Trade - Brazil and Australia



Source: Reproduced from Australia Trade Development Council 1983: 18-19.

growth of employment opportunities with somewhat more modest growth of output than that experienced in the 1970's<sup>22</sup> (Pereira, 1983; World Bank, 1984). Pereira (1983) argues that it is not only necessary to overcome the crisis, but it will also need to overcome the traditional Brazilian accumulation pattern which benefits those who are already rich as the expense of the poor. He further argued that if this pattern does not change there is a great risk of a deterioration of the entire social system that will led to unforecast results.

The importance of Pereira's claim can be better understood when one observes the tendency to income concentration, as can be seen in the following table, that has characterized the overall Brazilian process of development. In other words, Brazil's economic development over the whole period did not substantially alter the trend towards concentration of income evident throughout Brazilian history.

Table 3.3: Income Distribution in Brazil - 1960-1980

Segments of the Total Population	% of National Income Received		
	1960	1970	1980
20% poorest	3.9	3.4	2.8
50% poorest	17.4	14.9	12.6
10% richest	39.6	46.7	50.9
5% richest	28.5	34.1	37.9
1% richest	11.9	14.7	16.9

Source: Pereira 1982: 79.

<sup>22</sup>. For a more complete analysis of the Brazilian economic crisis, see, for example: Pereira (1983); Belluzzo & Coutinho (eds.) (1983); Furtado (1983); World Bank (1984).

One of the signals of the disenchantment with the results of Brazil's economic growth was demonstrated through the 1974 elections which eventually became a plebiscite against the government. The government continued to have a majority in the Congress, but no longer held the two-third majority required for any constitutional amendment (LAB, 1982). This also reflected major changes in Brazil's social structure. However, these changes were concentrated in big urban centres, such as Rio de Janeiro, Sao Paulo and other State capitals, where the opposition party experienced massive victories, in contrast with a massive victory of the government party in the countryside due to the patronage system that is very common there.

The government recognised this sign of the great transformations taking place in society and its response was the beginning of the country's gradual return to a democratic regime. It realised that it was necessary to broaden political participation of Brazilian society into the country's economic, social and political affairs. However, this shift did not mean any major reform, such as a radical land reform, to correct the social and economic inequality that has been a 'trade-mark' of the overall process of development throughout Brazil's history. Nevertheless, a process of re-democratization evolved.

### 3.6 Conclusions

The Brazilian economic formation was characterized by a mercantile capitalist economy which was dominated by the production of primary products - agricultural and mining - for export. The period lasted for about four centuries, i.e. from the sixteenth century to early 1930's. From the 1930's onwards, Brazil gradually started its industrialization. The ISI model played an important role in the evolution of this industrial economy. The 'ISI' model can be broadly divided into two phases, the first from the 1930's to the mid-1950's and then from the mid-1950's onwards.

It was in this second phase of the ISI model, that the major penetration of the multinationals occurred, and the Brazilian economy became more tied to the international capitalist circuit. Simultaneously, the triple alliance - state, foreign and domestic capitals - began to emerge and became stronger. The present day Brazilian process of development evolved in this context and was consolidated from 1964 onwards. The crises which began in 1974 still continue.

Thus Brazil, at present, presents a complex situation of being industrialized and no longer solely a primary-export economy, but still is underdeveloped. This complexity places Brazil in a situation which is not merely an intermediary one between development and underdevelopment, but rather a position of being an industrialized underdeveloped economy (Pereira, 1982). It also displays a tendency to exacerbate the trade-off between growth and

social equity. The progress, with technological change, has been promoting continuous transformations of the economic, social and political structures, yet it has not been able to create a more just and equitable society.

Following this historical review of the overall Brazilian process of development in its economic social and political dimensions, the next chapter will review the overall process of development of the State of Minas Gerais, to see how the process of development in that State fits into the Brazilian process.

## CHAPTER 4

### THE PROCESS OF DEVELOPMENT OF THE STATE OF MINAS GERAIS

#### 4.1 Introduction

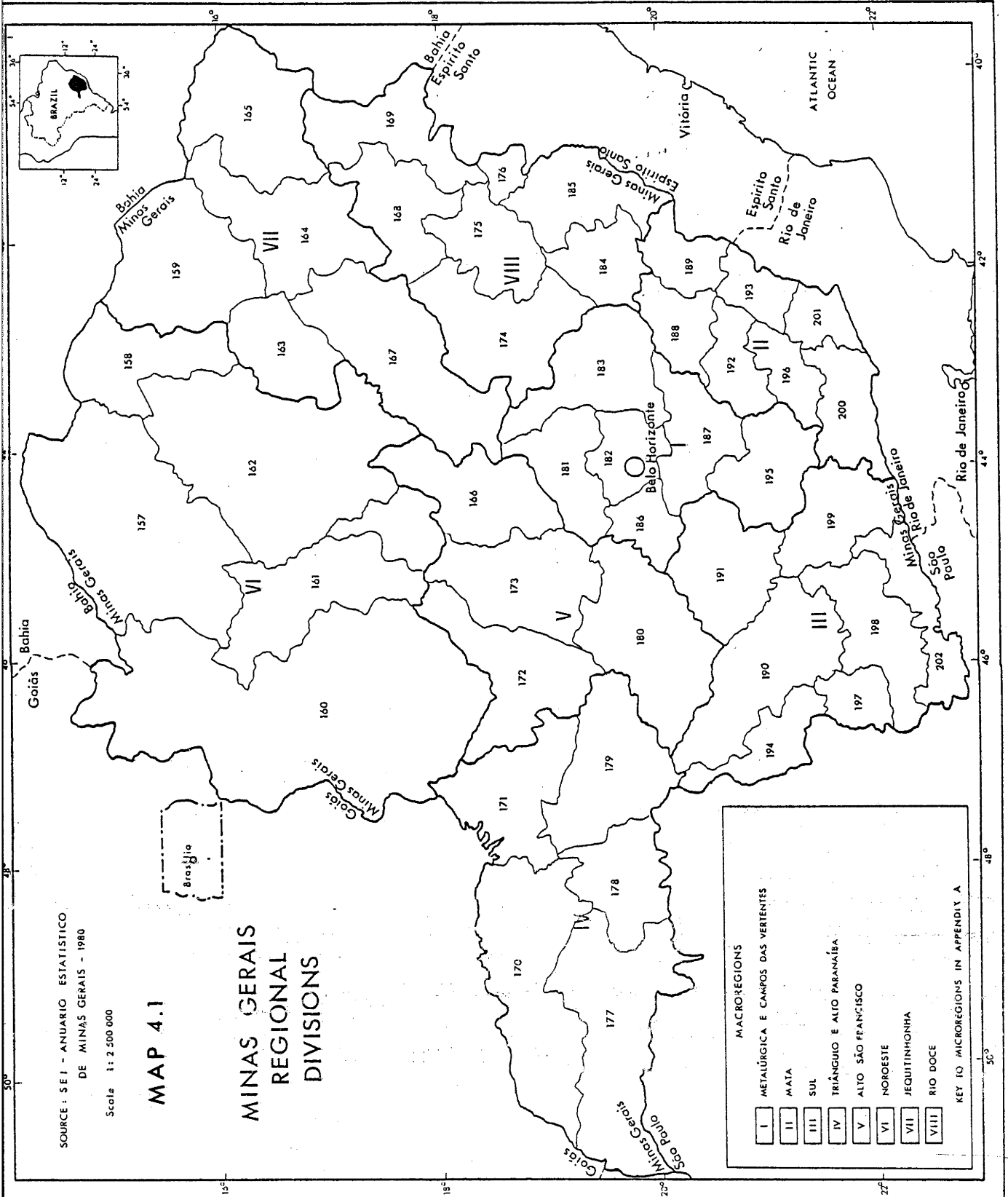
In the previous chapter we reviewed the process of Brazilian development. In this chapter we review the process of development in the State of Minas Gerais and consider how it relates to the Brazilian process of development.

The State of Minas Gerais is located in Brazil's Southeast region. It lies between parallels  $14^{\circ} 13' 57''$  and  $22^{\circ} 55' 22''$  latitude South and  $39^{\circ} 51' 23''$  and  $51^{\circ} 02' 45''$  longitude West. It covers an area of  $587,172 \text{ km}^2$  or about 6.9% of the total area of Brazil. It comprises 722 municipalities which are grouped according to their common characteristics into 8 macroregions (see Map 4.1). In 1980, it had a population of 13.4 million of which 67% lived in urban areas (SEI, 1982).

As shown in the previous chapter, Brazil's development evolved as part of a process which resulted from the expansion of the world economy and consequently, it became more integrated into this system. A similar process applied at the national level and conditioned Brazilian regional development. Hence, the process of development experienced by the State of Minas Gerais evolved in the context dictated by the Brazilian process of development and consequently, it became more integrated into it.

Map 4.1





This chapter will examine the development of the State of Minas Gerais using the same periods, as in Chapter 3 and consequently, the same structure.

#### **4.2 Economic Formation of Minas Gerais: up to 1950**

The historical economic formation of the State of Minas Gerais is rooted in the gold cycle of the eighteenth century. Accompanying the gold rush, other economic activities such as agriculture (including cattle raising) and small manufacturing (especially domestic textile industries) were established and evolved to supply the market created by the rush.

By the end of the eighteenth century the gold cycle had declined. The impact of this decline on the economy of Minas Gerais has been a matter of controversy. One school of thought basically argues that Minas Gerais' economy became decadent and stagnant. Another school of thought argues that the economic activities which were established during the gold cycle tended towards diversification, rather than decadence and stagnation. Irrespective of which thesis is more accurate, it is a fact that the dynamism of the economy was not enough to promote its expansion towards a more capitalist society (Paula, 1984). Like most of Brazil, Minas Gerais reached the 1930's without any major industrialization<sup>1</sup>.

---

1. For more details regarding industrialization in Minas Gerais prior to 1930, see, for example: Pimenta (ed.) 1983; Paula (1983 & 1984); Martins (1983).

However, despite this the importance of Minas Gerais within Brazilian politics was remarkable. This aspect is well presented by Wirth who argues:

Minas Gerais played a central role in national politics after the Empire collapsed in 1889 ... no President except for the ill-fated Washington Luis attempted to rule the nation without Minas Gerais ... the State's main asset was not economic power, or fiscal resources, or military strength, but political unity. However, limited results in terms of economic development were taken from such. By the 1890's the State of Sao Paulo pulled ahead of Minas Gerais and the gap between both became wider. By 1920, Sao Paulo's gross agricultural and industrial output was double that of Minas Gerais. A neo-colonial relationship developed, i.e. Minas Gerais sent out people and raw material while Sao Paulo sent back manufactures and processed food (Wirth 1977: 1, 164 & 165).

Despite the economic subordination of Minas Gerais to Sao Paulo, their alliance enabled the Brazilian system of government to work effectively:

when the interests of Minas Gerais, the leading political power, and Sao Paulo the economic giant, coalesced in the informal alliance known as 'cafe com leite' (coffee with milk) that functioned from 1898 to 1929 (Wirth 1977: 165).

However, despite this alliance with Sao Paulo which helped Minas Gerais play an important role within the Brazilian federation<sup>2</sup>, its economic weakness vis-a-vis Sao Paulo was a condition for concern among some segments of the Minas Gerais society. In turn, this led the state government to initiate policies aimed at finding a way out. One of the solutions found was to create an industrial district near Belo Horizonte (capital of Minas Gerais) and a hydro-electric plant to supply the necessary energy to the companies which would be established there. That is, this policy was directed at creating some basic infrastructure. This industrial district was opened in 1946. By 1947, 10 companies had been established and employed a total of 1,000 workers (Diniz 1981: 54). This measure was the base for further state initiatives.

Parallel to this policy (although more as a consequence of the importance of iron ore during the Second World War and pressure from the USA and England) an important mining project was initiated in Minas Gerais. A company was created to explore and export iron to both USA and England under the terms of the 'Washington Agreement' signed between Brazil, USA and England in 1942<sup>3</sup> (Diniz, 1981).

Later, some segments of society, supported by the military, started to question from a nationalistic perspective the benefits of

2. For a complete analysis of the place of Minas Gerais within the Brazilian federation until the 1930's, see, for example: Wirth (1977).
3. Under this agreement the USA guaranteed concessional loans to the enterprise, through the EXIMBANK, and England was obliged to buy from the British Itabira Company and transfer to the Brazilian government the iron mines located in the municipality of Itabira (Minas Gerais).

the agreement to Brazil, including of course, benefits to Minas Gerais. They claimed it was necessary for Brazil to utilize its iron ore for its own metal industries and produces its own pig-iron and steel. Underlying this position was a national-development ideology. Taking advantage of this, Minas Gerais' politicians and other segments of society pressured the Federal Government to establish a large steel industry in the State. The argument was supported by such facts as the location of the iron ore in Minas Gerais and the existence of a modest pig-iron industry based on charcoal as a reducing agent, already in operation there. However, the lobby and these arguments were not strong enough to justify the selection of Minas Gerais as the centre for this industry and in 1946 the 'Companhia Siderurgica Nacional' (National Steel Company) was established in the State of Rio de Janeiro. Thus one might conclude that Minas Gerais no longer had the same political power as prior to the 1930's, hence:

this loss represented not just a loss in the relative position of Minas Gerais, but it also contributed to restraining its expansion in the following years (Diniz 1981: 61).

Although there was some economic expansion in Minas Gerais in the early 1940's, it was not enough to promote a major economic development. The State of Sao Paulo consolidated its position as the principal industrial centre in Brazil which only emphasized relative backwardness of Minas Gerais. To face this situation the State Government launched a plan known as 'Plano de Recuperacao Economica e Fomento da Producao' (Plan for Economic Recovery and Stimulation of

Production). This was the first attempt at planning of the Minas Gerais economy.

As a result of elections in the early 1950's there was a change of government. Although the former government had not been able to execute the whole plan, it had left to the new government a clear picture of the State's economic situation, its major problems and a set of policy tools. The new government took advantage of this to establish its government plan based on two themes: energy and transportation. Within this general context Minas Gerais entered the 1950's<sup>4</sup>.

#### **4.3 Process of Development: 1950-1964**

In the previous chapter we saw that the 1950's marked the expansion of the industrialization of Brazil. The influx of foreign capital that entered Brazil, was basically oriented to producing durable consumption goods (e.g. cars) rather than capital goods. Given this emphasis, there was a natural tendency for industries to be established closer to the markets and facilities offered by the biggest urban and industrial centres. Sao Paulo met those conditions and this reinforced the earlier concentration of these investments. Despite this the infrastructure of Minas Gerais was improved in the 1950's and there was industrial development, especially in the pig-iron, steel and cement industries.

---

4. For an expanded analysis of the process of development experienced by Minas Gerais from 1930 to 1950, see, for example: Diniz (1981), especially chapters I, II and IV.

Although Minas Gerais achieved some development, it still remained in its relatively backward situation, marginal to the whole process of Brazil's industrial development. Minas Gerais' share in the national income fell from 11.5% in 1949 to 9.7% in 1960 while its share of industrial production decreased from 7.5% in 1939, to 6.6% in 1949, to 5.8% in 1959. Meanwhile, Sao Paulo's share of industrial production increased from 41% in 1939, to 49% in 1949, to 56% in 1959 (Diniz 1984: 262).

By early in the 1960's, Minas Gerais had a reasonable infrastructure, especially in energy and transportation, as a result of the plan put forward ten years before and was prepared to expand its industrialization and to diversify its industrial structure. However, as discussed in the previous Chapter, Brazil was facing another of its crises at the economic, social and political levels and Minas Gerais was faced once more with having its expectations of expansion and diversification of its industrial sector postponed and frustrated.

This crisis became steadily worse until finally the military takeover occurred, in 1964. This not only signaled a new era for Brazil, as discussed in Chapter 3, but by extension, to Minas Gerais.

#### **4.4 Process of Development: 1964-1974**

The stabilization plan launched by the post-1964 government to cope with the Brazilian economic situation led Brazil and - by

extension Minas Gerais - to an economic recession. This crisis lasted until 1966/67 when the so-called 'Brazilian economic miracle' started. However, Minas Gerais did not return to substantial economic growth until the 1970's.

By this time, Minas Gerais had available an improved physical infrastructure, a well-established institutional structure (e.g. Minas Gerais Development Bank - 'BDMG' and Institute for Industrial Development - 'INDI') and political support. It also had some additional advantages, such as its mineral resources and its geographical position near the two major centres (Rio de Janeiro and Sao Paulo) as well as being located between these two centres and the capital - Brasilia.

The economy of Minas Gerais expanded and flourished - its relative backwardness had turned into a 'miracle' closely following the national model. This is illustrated for example, by the total industrial investment in the period 1970-74 of approximately about US\$ 10 billion (1975 value) (Diniz 1984: 267). As at the national level, this industrial expansion was supported by the triple alliance of predominantly State (64%) followed by foreign capital (20%) and lastly the national capital (16%) (Diniz 1981: 243)<sup>5</sup>.

The other side of the 'miracle' shows that Minas Gerais contributed to an increase of foreign debt, inflation, concentration

---

5. For a detailed analysis regarding this triple alliance and the role of the state of Minas Gerais in it, see, for example: Brito (1984); Diniz (1981 & 1984); Nabuco (1984); Oliveira & Paixao Jr. (1983).



of income and to a situation of dependence. Similarly to what happened at the national level, Minas Gerais' economic development was socially and regionally unbalanced. Some segments of society did not receive any major advantage from the economic growth and were not assimilated into it. Indeed, the whole process led to a subordination of social concerns to the economic.

Minas Gerais is, in fact, a mosaic of different regions. Like Brazil, it is heterogeneous; economic development has not progressed equally over time in all of the macroregions in which the State is divided. This can be seen according to the proportion of each macroregion in the State's GDP which is presented in the following table<sup>6</sup>.

Table 4.1: Proportion of Each Macroregion in Minas Gerais' GDP

	Unit: %	
Macroregion	1970	1975
I - Metalurgica e Campos das Vertentes	44.6	50.4
II - Mata	10.9	9.1
III - Sul	17.3	13.9
IV - Triangulo e Alto Paranaiba	9.2	10.0
V - Alto Sao Francisco	4.3	3.7
VI - Noroeste	4.8	4.6
VII - Jequitinhonha	2.1	1.9
VIII - Rio Doce	6.8	6.4
State	100.0	100.0

Source: SEI 1983: 159

6. The table only presents data for 1970 and 1975 because the GDP at macroregion level for 1980 has not been released yet.

The data above shows that the macroregion I was the only one to significantly increase while macroregion (IV) increased only slightly. This suggests that the regional economic development has been not just uneven, but it also suggests that it has tended to concentrate in the macroregion I.

As happened nationally, the over-riding concern was to promote great economic growth, and any social problems which might arise were neglected or left to be remedied later. For example, while the product grew at an annual average rate of 13% in the period 1959-74, jobs grew at an annual average of 3%, the share of the salary of the people directly linked to production in relation to total industrial product fell from 20.5% in 1959, to 16.6% in 1970, and to 11.7% in 1974 (Diniz 1981: 245)<sup>7</sup>. These figures suggest a quite different picture from that advocated by the trickle down theory regarding the distribution of benefits from economic growth.

In a broad view this was the context of the economy of Minas Gerais in 1974, which marked the beginning of the end of the 'Brazilian economic miracle' and the beginning of a new era that is the object of our analysis in the following section.

#### **4.5 Process of Development: 1974-1980**

Chapter 3 showed that the Brazilian economy when confronted with the international oil crisis began to experience a decline in

---

7. For a detailed analysis regarding the economic growth, by sector, of Minas Gerais economy during the period 1960-1977 see: SEPLAN/MG (1978).

its average rate of growth. Despite this, economic growth was still high and the government maintained an expansionist policy in order to avoid a major decline and attempted to continue the high rates observed during the period of the 'miracle'. Minas Gerais acted in a similar fashion. The economy of Minas Gerais grew faster than the national average rate, during the period 1972-76 it experienced an average annual growth rate of 15%. Along with this remarkable growth rate, in the period 1970-77 Minas Gerais received 25% of the total industrial investment in Brazil (Diniz 1981: 243 & 271).

However, such high rates could no longer continue after 1977 and the growth rate of the economy started to decline, although still achieving the quite high rate of 9.4%. From 1978 economic growth declined, consistent with the national economic crisis which became worse. In fact, the economy of Minas Gerais fell behind the Brazilian economy, as shown in Table 4.2.

Table 4.2: Growth Rate of GDP for Brazil and Minas Gerais (1974-81)

Year	Brazil	Minas Gerais
1974	9.5	17.5
1975	5.6	13.2
1976	9.7	16.1
1977	5.4	9.4
1978	4.8	4.6
1979	6.8	5.8
1980	7.9	5.0
1981	-3.0	-1.1

Source: Diniz 1984: 272

Following same pattern observed for Brazil, economic growth in Minas Gerais was accompanied by concentration of income, as shown in Table 4.3. The similarity between Table 4.3 and Table 3.4 for Brazil, is noteworthy, as the extent of concentration of income and the trends are remarkably close.

Table 4.3: Income Distribution in Minas Gerais

Population Economically Active	% of State's Income		
	1960	1970	1980
20% poorest	6.3	4.0	3.8
30% "	13.8	13.7	12.0
40% middle	39.8	37.6	37.5
10% richest	40.1	44.7	46.7
5% "	30.0	33.8	34.0
1% "	14.1	15.9	15.1

Source: SEI 1983: 77

In summary, the economic development of Minas Gerais was the result of the Brazil's process of development in the same period and led to almost the same results and to the same problems. So, given the distortions of the overall process of development:

Minas Gerais, in the 1980's, represents a market relatively poorer than it used to be twenty years ago. A great belt of poverty rather than a great consumption market (Lemos 1984: 151)

#### 4.6 Conclusion

The economy of Minas Gerais, as part of the Brazilian economy, is largely dependent on what occurs at the national level. In turn the Brazilian economy is part of the world economy and hence reacts to international factors and events. Within this context, like the rest of Brazil, Minas Gerais is, in the 1980's, facing a crisis with as yet unknown consequences at social, economic and political levels. There is no doubt that Minas Gerais like Brazil experienced great economic growth which led both to become more capitalist economies. However, in both cases the social price paid for such economic growth has been high, e.g. concentration of income the poor became poorer while the rich have become richer.

The decline experienced by the economy of Minas Gerais from 1978 onwards has been consistent with the decline experienced by the whole Brazilian economy. As such, its reversal will depend on the Brazilian national capacity to overcome the overall crisis. Thus much will depend on the behaviour of Brazilian economy which, ultimately, will depend on the behaviour of the whole international economic system.

This overview of Minas Gerais' development completes part B of this thesis. The next part (part C) of the thesis is specifically about forestry. It is also divided into two chapters, the first analyses forestry in Brazil as whole, while the second discusses forestry in the State of Minas Gerais in particular.

CHAPTER 5  
FORESTRY DEVELOPMENT IN BRAZIL

### 5.1 Introduction

Forestry as an activity organised on a professional basis is relatively new in Brazil. Until the 1960's agronomists, some specializing in silviculture performed the forester's tasks. Without disparaging the work of some pioneers<sup>1</sup>, it can be said that Brazilian forestry did not become properly established until after the graduation of the first Brazilian-trained foresters in 1964 and the introduction of the fiscal incentives scheme for large scale industrial forest plantations in 1966.

Five sections follow. Section 5.2 describes the major vegetation types with emphasis on forest resources. Section 5.3 reviews of the history of exploitation. Section 5.4 reviews the wood-based industry within the context of the Brazilian economy. Section 5.5 details the fiscal incentives scheme for afforestation/reforestation<sup>2</sup>. Finally, section 5.6 presents some conclusions.

- 
1. For a list of these early works, see, for example: Fraga (1950). For those interested in an historical review of the work by the 'pioneers' of the Brazilian forestry sector, we strongly suggest consulting the whole collection of 'Anuario Brasileiro de Economia Florestal' (Nos. 1-19).
  2. Section 5.5 is longer and more detailed than the previous sections, because our major concern is to explain the full context of the fiscal incentives scheme, given its importance to our case study.

## 5.2 Vegetation Types: A general overview

A detailed analysis of Brazilian vegetation types would be beyond the scope of this thesis. This section provides a general overview of the major vegetation types important to forest resources<sup>3</sup>. There are three major types, (i) 'Forest', (ii) 'Cerrado' (savanna) and (iii) 'Caatinga' (thornbush) which represent a phytogeographic climax. The 'Campos' (grassland) is excluded.

### 5.2.1 Forest

Given the diversity of climate and soils Brazilian forests are very diverse ranging from tropical rainforest to sub-tropical forest and Araucaria forest. Two examples are described. Tropical rainforest is the largest type, almost all of it in the Amazon basin. It covers more than 3,000,000 km<sup>2</sup> or over 30% of Brazil. A very large number of species are represented in the tall dense, humid forest of evergreen foliage, well stratified and with emerging trees. The tropical rainforest used to cover most of the land along the coast from the Northeast to the Southeast.

Araucaria forest occurs mainly in the south (States of Rio Grande do Sul, Santa Catarina and Parana) with isolated occurrences at high altitudes (over 500 meters) in the States of Sao Paulo, Rio

---

3. For more details about the Brazilian forest resources in general see, for example: Aubreville (1959); Magnanini (1959); Hueck (1978) and Samek & Pracna (1980).

de Janeiro and Minas Gerais. The climatic conditons in which Araucaria forest occurs are a high and uniform rainfall throughout the year, moderate temperatures and a cold winter. As far as forestry and the wood economy are concerned, this forest type, Brazilian Pine<sup>4</sup>, has been one of the most important in Brazil (Hueck, 1978; Samek and Pracna, 1980). A government agency - 'Instituto Nacional do Pinho' (Pine National Institute) was created early in the 1940's to oversee the exploitation, production, trade and exportation of wood in general, but especially of the Brazilian Pine<sup>5</sup>. The area of Araucaria forest has been considerably reduced by intensive exploitation. Reforestation with Brazilian pine represented about 5% of the area under Pinus spp<sup>6</sup>.

Magnanini (1959) estimated that the total area covered with forests, at the time of Brazil's discovery (1500), was about 5,228 million km<sup>2</sup> which corresponded to 61.4% of its territory. He estimated that by 1958-59 this area had declined to 3,523 million km<sup>2</sup> or 41.4%. Most of this removal occurred close to the coast since it was in this area that most settlement occurred during the respective

---

4. Scientific name: Araucaria angustifolia (Bertoloni) O. Ktze. or Araucaria brasiliana A. Rich.

5. It was an agency within the Ministry of Agriculture. This agency lasted until 1967 when it was incorporated into the newly created 'Brazilian Institute for Forestry Development - IBDF'.

6. Approved area for reforestation with fiscal incentives between 1967-1981, for Brazil: Pinus spp - 1,409,287 ha; Araucaria (Brazilian pine) - 74,957 ha (Source: IBDF/Dept. de Reflorestamento).



economic cycles (sugar, gold, coffee and the like)<sup>7</sup>. The total area of forests, in the 1980's, for the whole country is not available. Data available from a National Forest Inventory (IFN), which is being undertaken by IBDF, cover only the Southeast and South regions. Given this pitfall, estimates of the changes in the area of forest shown in Table 5.1 are restricted to these two regions<sup>8</sup>.

### 5.2.2 Cerrado (savanna)

Cerrado (savanna) is a plant community composed of tall, tufted grasses, and usually trees or shrubs are also present. In some areas trees and shrubs are dominant while others are almost pure grassland. The gradation between areas can be attributed to nutrient deficiency and/or a result of anthropogenic factors. Accordingly the

- 
7. In the early stages of the Brazilian colonization the need for labour led the Portuguese settlers to penetrate the Amazon forest to capture indians. These incursions led to knowledge of the forest and the exploitation of some forest products, such as cacao, cinnamom, clove and aromatic resins (Furtado, 1982a). But, a great expansion towards the Amazon basin occurred from the 1970's onwards when the Brazilian government started to direct policies stimulating the expansion of the agricultural frontier.
  8. Because the basic works which we have used (Magnanini and IFN) have been done at different times, for different purposes, by different people and using different material, one might question the validity of such a comparison. However, our intention is to provide the reader with a clue regarding overall forest removals. In particular, firstly, Magnanini based his estimates on works of other scientists who had studied the Brazilian vegetation, maps and some aero-photogrametric surveys which were available at the time of his study while the INF used the most advanced technology available, such as satellite images. Second, some difference exist between Magnanini's classification of a forest resource and the IFN's classification. These observations are not to diminish the merit of Magnanini's work, but merely to indicate possible discrepancies.

Table 5.1: Natural Forests in the Southeast and South Regions<sup>9</sup>

Unit: 1,000 km<sup>2</sup>

Regions/States	Period					
	1500		1958-59		1982	
	Area	%	Area	%	Area	%
<b>Southeast</b>						
- Sao Paulo	210	85.0	25	10.1	18.8	7.6
- Minas Gerais	262	45.0	58	10.0	53.5	9.2
- Rio de Janeiro	41	93.3	7	17.3	8.3	19.1
- Espirito Santo	36	90.0	12	30.0	6.3	13.7
<b>South</b>						
- Rio Grande do Sul	113	40.1	27	9.6	15.9	5.6
- Santa Catarina	80	84.2	29	30.5	28.8	30.2
- Parana	171	85.1	60	29.9	30.5	15.4

Sources: Magnanini 1959: 300-302 & IBDF/DE 1983: 21-24

### 5.2.2 Cerrado (savanna)

Cerrado (savanna) is a plant community composed of tall, tufted grasses, and usually trees or shrubs are also present. In some areas trees and shrubs are dominant while others are almost pure grassland. The gradation between areas can be attributed to nutrient deficiency and/or a result of anthropogenic factors. Accordingly the cerrado is often sub-divided into cerradao and grassland cerrado. Magnanini (1959) estimated that the cerrado, at the time of Brazil's

9. We have grouped under this title 'natural forests' the different forest types, such as 'Araucaria Forest', 'Sub-tropical Forest', 'Transition Forest' and the like to allow the comparison between Magnanini's and the IFN's results since the former has presented his figures without classifying the different forest types.

discovery, covered a total area of about 1,727 thousand km<sup>2</sup> which corresponded to 20.3% of the total area. By 1958-59 these figures were 1,446 thousand km<sup>2</sup> and 17% (Magnanini, 1959). Estimates of the reduction in the area of cerrado are shown in Table 5.2. Despite the establishment of large industrial forest plantations, the cerrado is still the major supplier of wood for charcoal production, especially in the State of Minas Gerais. This observation will be elaborated subsequently in this and the next chapter.

Table 5.2: Cerrado in the Southeast and Southern Regions<sup>10</sup>

Unit: 1,000 km<sup>2</sup>

Regions/States	Period					
	1500		1958-59		1982	
	Area	%	Area	%	Area	%
<b>Southeast</b>						
- Sao Paulo	25	10.1	13	5.3	1.8	0.7
- Minas Gerais	262	45.0	175	30.1	71.8	11.8
- Rio de Janeiro	--	--	--	--	--	--
- Espirito Santo	--	--	--	--	--	--
<b>South</b>						
- Rio Grande do Sul	--	--	--	--	--	--
- Santa Catarina	--	--	--	--	3.1	3.2
- Parana	10	5	2	1	3.6	1.8

Sources: Magnanini 1959: 300-302 & IBDF/DE 1983: 21-24.

Note: (--) data not available in the sources.

10. Similarly to forests data already released by the IFN for cerrado only cover the Southeast and South regions.

### 5.2.3 Caatinga (thornbush)

Caatinga (thornbush) is a plant community dominated by thorny trees or shrubs called thorn scrub. It is a xerophytic vegetation typical of dry environments. Density (stems/ha) depends on factors such as rainfall and soil (Riley & Young, 1966). Magnanini (1959) estimated that at the time of the discovery of Brazil it covered a total area of 660,000 km<sup>2</sup> which corresponded to about 7.8 % of the total territory. By 1958-59, it had been reduced to 404,000 km<sup>2</sup> and 4.8%, respectively. This type is concentrated in the Northeast region and the figures for this region have not been released yet by the IFN. The caatinga covers the inland at the Northeast region and extends into the northeast of Minas Gerais, including part of the Jequitinhonha Valley. Forestry has not been significant vis a vis agriculture and animal husbandry in the caatinga (Hueck, 1978). However, more recently there has been a trend for industrial forest plantations to expand towards these areas as discussed in more detail in section 5.5. It is likely that the area of caatinga will decrease with the expansion of reforestation.

### 5.3 Historical Exploitation of Forest Resources

In Chapter 3 we saw that the economic formation of Brazil was marked by a series of economic cycles each associated with a particular commodity. Increases in the production of plantation crops, such as sugar cane and coffee, were more the result of expansion through clearing forest<sup>11</sup> than a technological improvement.

A similar pattern of disregard for the forest resources was present in other countries of the so-called 'New World'. In the U.S.A. and Australia, for example, the pioneer cleared away forest for agriculture and to supply his wood requirements;

---

11. For more details see, for example: Barbosa (1950); Freire (1950); Fraga (1950); and Furtado (1982a).

... to the practical colonist, trees existed merely to serve his purpose or else be disposed of as quickly as possible ... (Calder 1980: 9).

However, this exploitation of the forest resources was necessary to meet the settler's basic needs for shelter and food. It is also true that for the pioneer settler the forest resources seemed to be endless<sup>12</sup>.

Delson and Dickenson (1984) without refuting this generalized view, argue that in Brazil:

the process of development as it affected the land was not entirely negative nor entirely without rational planning ... there is also evidence of an early awareness of the adverse effects of some economic activities, and efforts, even if tentative and motivated by economic rather than conservationist impulses, to protect the environment and resources (p. 273-275).

They cite examples, such as attempts by the Portuguese Crown to restrict the use of 'tapinmoa' to shipbuilding because of its scarcity and suggest that the awareness of the adverse effects of over-exploitation of forest resources, or even of particular species, was above all motivated by economic impulses.

Despite these attempts to preserve, or at least to avoid over-exploitation of, the forest resources, the mercantilism prevailed. Forest continued to be cleared to provide land for

---

12. For more details regarding the exploitation of the forest resources during the process of settlement see, for example: for the USA: Pinkett (1970); for Australia: Calder (1980); Houghton (1980) and Carron (1985).

agricultural expansion. The climax of this occurred during the nineteenth century with the expansion of coffee production under the plantation system. In this case again deforestation had much to do with the increasing integration of the Brazilian economy into the world economy. The impact of this integration on the forest resources is well put Tucker & Richards who argue:

One major result of global political and economic integration must have been the steady destruction of the world's woodlands and forests, especially in the regions which were being newly integrated into that economy (Tucker & Richards 1983: xii).

This contrasts strongly with a generalized tendency of many technical foresters to perceive deforestation as caused, for example, by shifting cultivators or by the increase in population.

Brazil's search for economic progress and the utilization of its resources has been characterized by the paradox between a tendency to exploitation and attempts to conserve. In a territory which is still endowed with virgin land and diverse resources it is a difficult paradox to resolve. An example is the policy adopted by the post-1964 governments of expansion of Brazil's agricultural frontier, especially for cattle raising towards North and Centre-West regions in the Amazon basin. This expansion is illustrated in Table 5.3.

Table 5.3: Rate of Change of Forest Cover in the Amazon Basin<sup>13</sup>

Period	Area Cleared (1,000 ha)	Annual Rate of Change (%) <sup>14</sup>
1975-78	4,857.6	39.0
1978-80	4,629.5	26.0
1975-80	9,487.1	33.0

Source: IBDF/DE 1983: 16

This process of deforestation was encouraged by governmental policies of fiscal incentives for development in the Amazon basin and of settling colonists along roads built in the region. The fiscal incentives scheme encouraged many entrepreneurs to establish large farms, especially for cattle raising.

In response to deforestation, an internal conservation lobby emerged. It has exerted pressure on the government to adopt measures on its programs, plans and projects which minimize the ecological damage, and promote a rational use, i.e. avoiding the exhaustion of the country's resources.

13. The Amazon basin considered here is the so-called 'Legal Amazon' which covers the States and the Federal Territories of the Northern region (Acre, Amapa, Amazonas, Para, Rondonia, Roraima) and also encompasses part of the states of Maranhao, Goias and Mato Grosso. This division was by the Federal Government to delimit the concession of fiscal incentives to promote regional development of the Amazon basin.

14. Personal calculation utilizing the following formula:  
 $V_n = V_0 (1 + i)^n$ , where:  $V_n$  = area cleared in the end of the period;  $V_0$  = area cleared in the beginning of the period;  $n$  = number of years and,  $i$  = rate.

#### 5.4 The Forestry Sector within the Economy

The emphasis of the Brazilian development model, discussed in Chapter 3, has been on moving from an agricultural economy to a more industrial economy. This process was expanded in the 1950's and from 1964 onwards its present form evolved.

The forestry sector share in the total Brazilian GDP fell from 3.3% in 1949 to 2.6% in 1974. The average annual rate of this decline was gradual from 1949 to 1970, around 0.7% yearly and more accentuated from 1970 to 1974, around 1.8% yearly. In absolute terms the forestry sector grew more rapidly from 1970 onwards than in the previous period, however its growth was not enough to follow the high growth rates experienced by the overall Brazilian economy in the same period (referred to in Chapter 3). The only industry in the forestry sector to increase relatively was the pulp and paper industry, however it was not enough alone to increase the proportion of forestry in overall GDP (Prado, 1977a).

Prado (1977a) further divided the forestry sector into two components, agricultural and industrial. This division showed that the agricultural sub-sector decreased more than the industrial sub-sector. In 1949 the contribution of the agricultural component of the forestry sector to the Brazilian GDP was 1.7% while the industrial component was 1.6%. In 1974 it was of 1.1% and 1.6%, respectively. This is not surprising given the overall Brazilian model of development and its emphases, in particular in the period 1967-74 - the 'Brazilian economic miracle' - when the emphasis was on



industries, such as consumption goods, transportation equipment, chemical and non-metal mineral products<sup>15</sup>.

The government launched two programs of particular interest to the forestry sector, in 1974, within the context of the Second National Plan (see Chapter 3). One was the National Program of Pulp and Paper and the other was the National Metallurgy Based on Charcoal Program. From 1976 onwards with the deceleration of the Second National Development Plan these programs were also gradually phased down. However, despite this the forestry sector, in 1980, increased its contribution in the total GDP to about 4%. It also represented 4.5% of total Brazilian exports<sup>16</sup>. Importantly it supplied the charcoal used as a reducing agent in the production of 3.9 million tonne of pig-iron which corresponded to 40% of national output (Galvao & Lupatelli, 1982)<sup>17</sup>.

- 
15. See chapter 3 for more details about the overall Brazilian process of development including the period 1967-74.
  16. For more details regarding Brazilian exports of wood, timber and forest products see: the complete set of *Anuario Brasileiro de Economia Florestal*, Nos. 1-19, published by the INP. In 1967 with the creation of the IBDF the INP ceased its activities and consequently, the yearbook was no longer published. However, the statistics presented in the yearbook can provide the reader with an historical series of Brazilian exports of wood, timber and forest products since the 1950's. For more recent details regarding the forestry sector within the Brazilian trade balance see: Prado, 1977b; Ribeiro & Machado, 1981; Santos et al., 1982 & 1983. These last two publications also present Brazilian imports.
  17. For a more detailed analysis of the Brazilian forestry sector within the Brazilian economy see: Muthoo (1977); Prado (1977a); Mendes et al. (1978). In 1978 the Planning Coordination Unit (COPLAN) of the IBDF carried out the diagnosis of the Brazilian forestry subsector which was published under the collection: 'Desenvolvimento e Planejamento Florestal', serie: 'Estudos Perspectivos para o Período 1979-1985'. This diagnosis encompasses five volumes and was by many authors, all experts from COPLAN. For more recent material see: IBDF (1982b & 1985).

Both programs and more recently the production of industrial energy from wood, have been based on large scale industrial plantations established since 1967 as a response to fiscal incentives. During the last two decades the Brazilian forestry sector has evolved around, or been a function of, these plantations.

## **5.5 The Fiscal Incentives Scheme for Establishing Large Scale Industrial Forest Plantations**

### **5.5.1 Proposal's Antecedents: A general overview**

Demands for concessions or governmental incentives for establishment of industrial forest plantations have been a constant theme of meetings between the private and public sectors of the forestry sector. Indeed, both shared a similar perception that concessions or governmental incentives were necessary to stimulate the sector. This is shown in the review below of meetings and working groups on the sector, all of which had representatives from both the public and private sectors.

The conclusions of a national forestry conference in 1957, stressed the need for the government to develop policies to grant finance, at a subsidized interest rate through 'Banco do Brasil', to those interested in creating forest plantations (INP, 1958).

In 1958, after analysing the sector a working group argued that the estimated rate of planting (10 - 12,000 hectares a year) was too low to restore the natural forests being exploited. It concluded

that the government should create a Forestry Fund, managed by the Banco do Brasil, to lend money to those interested in establishing forest plantations. To make the loan attractive its interest rate should not exceed 2% and the government should cover the difference between it and the market rate. To support the Forestry Fund, an additional fraction of the income tax was to be paid by people and firms with a total income over Cr\$ 200,000.00 (Cruzeiros of 1958). The fund was justified on the basis of the need to create a financial system which could cope with the alleged peculiarities of forestry. It was also proposed to allow tax deductions for capital used to develop forest plantations (INP, 1959b).

During the Second World Conference on Eucalyptus held in Brazil in 1961, the low rate of forest plantation establishment was again blamed on the lack of a special financial scheme. However, despite the lack of any special incentive, plantations were being established, almost exclusively with Eucalypts. These were concentrated in the States of Sao Paulo, Minas Gerais, Rio Grande do Sul, Santa Catarina and Parana (Table 5.4).

Table 5.4: Area Under Forest Plantations by State - 1961

State	Area (ha)	Annual Planting Rate (ha)
Sao Paulo	447,000	24,900
Minas Gerais	60,000	9,900
Rio Grande do Sul, Santa Catarina and Parana	34,000	2,200
Others	19,000	
Total	560,000	37,000

Source: INP 1961: 83-84.

In 1962, a Working Group from the Ministry of Agriculture prepared a study of forestry as a basis for drafting a new Forestry Law. It estimated the total area planted with forests at 500,000 hectares and the annual rate of planting about 20,000 hectares or only 0.6% of the total forest area harvested per year (INP 1963: 87). It noted that this situation required action on the part of the government to help reverse, or at least slow, the destruction of the forest resources, especially in the south of Brazil. Again this group claimed that the area reforested and the planting rate were low due to the lack of a special financial scheme which could cope with the peculiarities of forest plantations. Therefore, it suggested that:

- i. a special financial scheme should be created through private banks as well as the Banco do Brasil,
- ii. incentives and legal protection should be provided to existing firms, or those established in the following five years, whose major aim was to establish forest plantations on a large scale,
- iii. the revenue from exploitation of man-made forests should be exempt from income tax, and
- iv. forest plantations should be exempted from paying land taxes (INP 1963: 106-107).

The major arguments repeated in support of all of these demands for concessions and government incentives were that:

- a. the Brazilian forest resources had been over-exploited historically;
- b. the availability of forest resources close to the major consumption centres had declined at an increasing rate, consequently their wood-based

- industries needed to import wood from long distances, in some cases more than 5,000 km<sup>18</sup>;
- c. to cope with an increasing demand for wood and wood-based products at domestic and international levels required a reliable source of raw material and not just natural forests; and
  - d. an increasing international demand would lead to a shortage of wood-based products, including timber, and price rises, allowing Brazil to expand its share of the international market, consequently benefiting Brazil's trade balance.

From the discussion in Chapter 2 we can observe that these arguments were based on the industrialization approach to forestry in development, incorporating those arguments put forward by FAO, especially with respect to the international balance of trade. It is also clear that attempts were made for a long time to convince the government to grant special concessions to promote the establishment of large scale industrial forest plantations.

Finally, in 1966 the forestry proponents succeeded in getting the government concessions in the form of the fiscal incentives scheme which offered tax incentives to individuals and corporations. The arguments cited to support the introduction of the scheme were basically as above. However, more important than the particular arguments was the fact that the fiscal incentives scheme occurred within the context of the Brazilian economic development model being followed at that time. In other words, the Brazilian economic development model provided a 'fertile land' for this sort of

---

18. i.e. from the Amazon basin to the Southern region.

policy. Furthermore the beginning of the fiscal incentives scheme for reforestation coincided with the start of many other similar schemes in other sectors and the so-called 'Brazilian economic miracle'<sup>19</sup>.

### 5.5.2 The Fiscal Incentives Scheme and the Economic Model

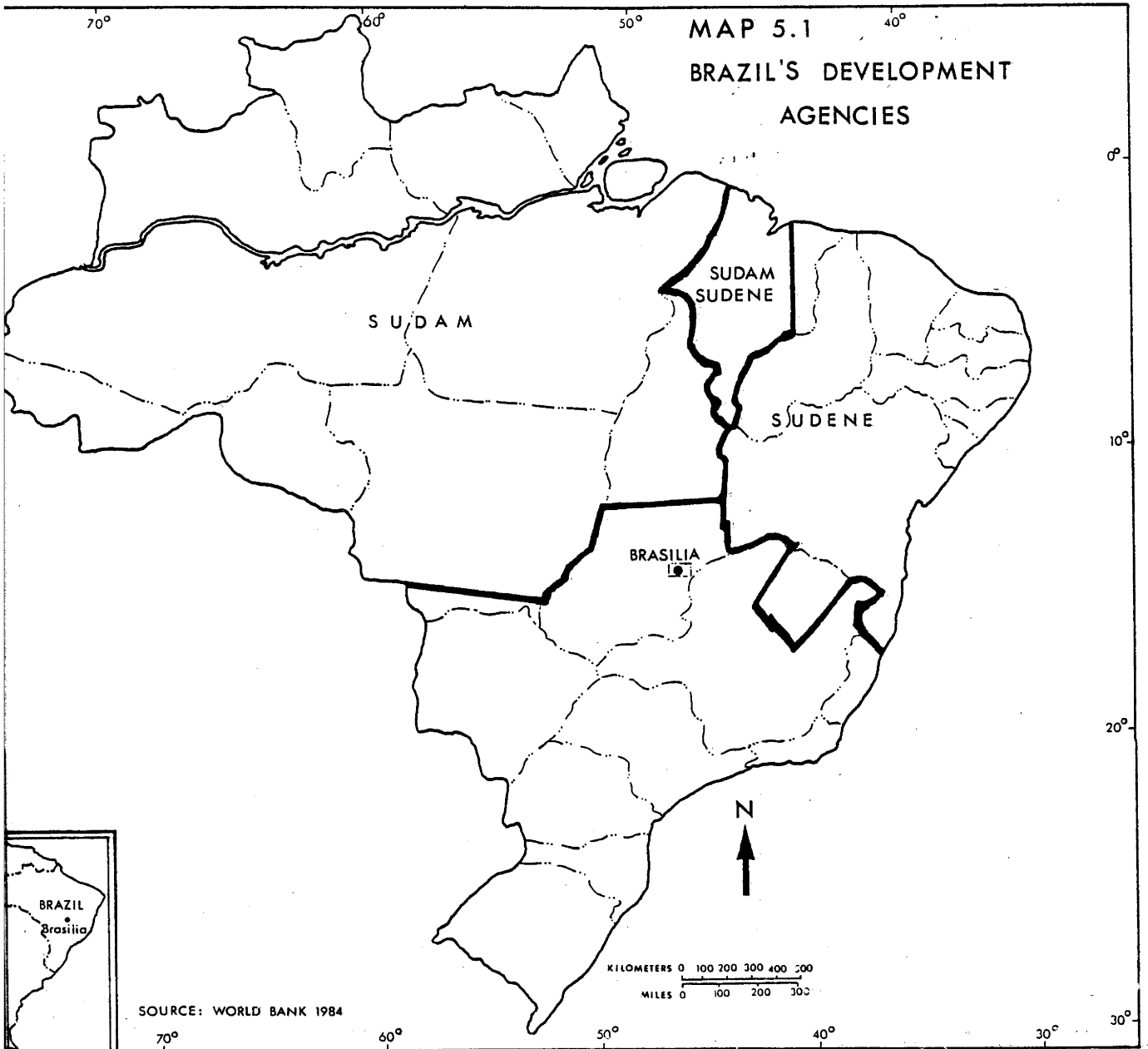
To clarify this argument, let us recall some points from chapter 3. The Brazilian economic model, especially after 1964, assumed ambitious economic growth which involved increasing industrial growth. To realize this growth the government looked to attract and funnel large sums of foreign and domestic capital into key growth export sectors of the economy. Extremely generous terms and conditions were offered to both foreign and domestic investors through a fiscal incentives system for programs of regional development with emphasis on the Northeast and the Amazon regions<sup>20</sup> and, for the development of specific economic sectors, such as forestry<sup>21</sup>, fishery and tourism.

---

19. See chapter 3 for a complete discussion of the Brazilian economic model since 1964, including the 'Brazilian economic miracle'.

20. The concession of fiscal incentives in these regions are administered by 'Superintendency for the Development of the Northeast - SUDENE' and 'Superintendency for the Development of the Amazon - SUDAN', respectively. These jurisdictions are larger than the North and Northeast Regions (see Map 5.1). Any enterprise that could in any way contribute to regional development of the respective region may qualify.

21. Concession of fiscal incentives for the forestry sector is restricted to establishment of large scale industrial forest and fruit tree plantations. It does not encompass all activity within the forestry sector. It is administered by IBDF.



The major aim of the fiscal incentives scheme for establishment of large industrial forest plantations were stated by the former IBDF president:

... to induce the private sector to expand its activities into a sector (forestry) which requires a long period for the investment to mature and so to assure to supply raw material - at low cost - to industries whose expansion would strongly contribute to the economic growth of the country which, at that time, was the top priority ... (Reis 1983: 9).

This statement vindicates our claim that the fiscal incentives scheme for reforestation is part of the overall Brazilian development model of the post-64 era. One can also note a strong similarity with the same assumptions of the early industrialization approach to forestry in development discussed in Chapter 2.

Fiscal incentives can offer a relatively straightforward mean of promoting economic development when compared to other long-term or complex measures that are more difficult to implement. On the other hand, the adoption of incentives without prior analysis can be undesirable (Beattie, 1975). However, the government was apparently not interested in waiting for a long theoretical study and demonstration, and opted for incentives.

In 1966 at the beginning of the fiscal incentives scheme for reforestation, several governmental agencies shared responsibility for the forestry sector. This fragmented



administrative structure seemed inadequate for the expected boom in the forestry sector due to the scheme. Hence, by the Decree-Law No. 289 of 28 February, 1967 the 'Instituto Brasileiro de Desenvolvimento Florestal - IBDF' (Brazilian Institute for Forestry Development) was created and the old agencies, such as the INP were closed and all of their responsibilities and operations put under IBDF's mandate (IBDF, 1967). Within this context, any reforestation project to be granted fiscal incentives must be approved by the IBDF. A document known as the 'Carta de Brasilia' (Brasilia's Charter) elaborated the basic guidelines for the IBDF and gave reforestation high priority. One of the first tasks of the IBDF was to formulate a national ten year program for forest plantations with the goal of establishing two million hectares by about 1978 (IBDF, 1968).

Having positioned the fiscal incentives scheme within the context of the overall Brazilian economic model, let us now review the scheme itself and how it works.

### **5.5.3 The Fiscal Incentives Scheme and Pertinent Legislation**

Since the initial Law 5,106 of 2nd September, 1966 and the Decree-Law 1134 of 16 November, 1970 (which have constituted the two pillars of the scheme) many other laws have been enacted to bring additional improvements, especially to match the reality dictated by the economic crisis that Brazil has been facing. The complete legislation is complex but only aspects of the legislation which are

relevant to this thesis need be reviewed here<sup>22</sup>.

The Law 5,106<sup>23</sup> granted fiscal incentives for both corporations and individual. However, the form in which the concession was granted differed for each one. For corporations the benefits were granted in the form of tax credits, i.e. they could deduct from their income tax due the money actually spent in reforestation up to 50% of that income tax due. Individuals could deduct from their gross taxable income the money invested in reforestation up to 50% of that income (Law 5,106). Beattie has summarized the difference in the following table.

Table 5.5: Comparative Fiscal Incentive Tax Benefits to Corporations and Individuals Investors

Item	Corporate Investor	Individual Investor
Gross Income	\$ 10,000	\$ 10,000
Income Tax Due Before Investment in Incentive Program (10%)	\$ 1,000	\$ 1,000
Maximum Investment Allowed in Incentive Program <sup>1</sup>	\$ 500	\$ 5,000
Taxable Income After Investment in Incentive Program	\$ 10,000	\$ 5,000
Tax Due After Investment	\$ 500	\$ 500
Tax Savings	\$ 500	\$ 500
Ratio of Tax Savings to Investment	100%	10%

Source: Beattie 1975: 34

Note: 1. For a corporate investor, this maximum is 50% of the income tax due while for an individual investor, it is 50% of his gross taxable income.

22. For a full account of the whole legislation, see: IBDF/DR (1983).

23. This Law is no longer in effect. It has been substituted by other legislation as elaborated below.

This table shows how the fiscal incentives scheme was explicitly designed to benefit corporations (as the tax savings could be equal to the total plantation investment) and was much less generous to individual forestry investors.

The legislation also required that only those who have legal property or a contract to lease the land for the total rotation (which, for example in the case of Eucalyptus is 21 years considering three cuts at intervals of seven years) are entitled to receive the fiscal incentives benefits for reforestation.

The scheme for reforestation assumes reforestation is undertaken by large rural enterprises employing modern technology and a wage labour force. The tendency to promote these characteristics can be seen in the evolution of the pertinent legislation.

One of the first alterations was Decree-Law 1134 of 16 November, 1970 which allowed only corporations to have tax concessions of up to 50% of their income tax due, for reforestation projects. Among its provisions, it allowed a corporation to deposit its tax credits with the Banco do Brasil in a frozen account and to draw on these funds as they proceeded with approved projects. This was the opposite to what was required by the Law 5106, which had required that the project had been undertaken before a list of the expenses incurred could be submitted, for fiscal incentives. The new Law did not require a corporation to plan and execute its own projects, as had been required by the Law 5106, but accepted that

---

23. This Law is no longer in effect. It has been substituted by other legislation as elaborated below.

this could be done by a contractor. It only grants fiscal incentives to corporations while the Law 5106 granted for both corporations and individuals. Finally, in its fifth article it required that the income tax deducted must not exceed 75% of the projects's total cost.

Following these alterations, the federal government created 'Mandatory Development Programs'<sup>24</sup> - National Integration Plan (PIN) and Program of Land Redistribution and Stimulus to Agriculture (PROTERRA). The major aim of the government was to funnel resources to sectors that involve high risks and large amounts of capital and therefore attract little private investment. The funds for these programs were subtracted from the incentives previously offered under the regional and sectoral fiscal incentive programs. Hence, of the original 50% of tax liability allowed as tax deductions in reforestation projects, only half could now be spent directly on the project, while 30% went to PIN and the other 20% went to PROTERRA. For example, a corporation with a total tax liability of \$2000 could deposit \$1000 in the Banco do Brasil in a frozen account for reforestation (as referred to above). The investor could then apply just \$500 to the actual reforestation project while the other \$500 would go to PIN (\$300) and to PROTERRA (\$200), funds administered by the federal government.

In 1974, another step reduced the tax deduction applying to reforestation projects. According to the fourth article of Decree-Law No. 1307 of 16 January, 1974 the tax deduction for reforestation

---

24. 'PIN' was created by the Decree-Law No. 1106 of 16 June, 1970 and 'PROTERRA' by the Decree-Law No. 1179 of 06 July, 1971.

projects would be gradually reduced by 5% per year from the 1974 fiscal year onwards. Thus the maximum percentage of tax due, which could be diverted to reforestation, fell from the original 50% to 45% in 1974, to 40% in 1975 and so on and at 25% since 1978. Thus the same hypothetical corporation with the \$2000 tax liability would now deposit only \$500 to the special account, and use \$250 for reforestation directly, with the balance going to PIN (\$150) and PROTERRA (\$100).

SUDENE and SUDAM alleged that the increasing preference of investors for reforestation projects was responsible for the decrease of their funds. Although there is no concrete evidence to support this allegation, they succeeded in their claim. Currently, the maximum effective tax credit allowed for reforestation projects is 25% for projects established within either SUDENE's or SUDAM's areas of influence and 17.5% elsewhere (IBDF/DF 1983). These backward areas have been a matter of great concern for the Brazilian government which has made all sorts of efforts to promote their economic development. Thus, granting of higher tax deductions for projects to be established there, was expected to create economic activity. However, this policy has been criticized by entrepreneurs from the South and Southeast regions who claim that it has driven forest plantations away from the major industrial centres<sup>25</sup>.

Decree-Law No. 1376 of 12 December, 1974 created 'Investment Funds'. The 'Sectoral Investment Fund - Fiset' combined

---

25. See, for example: INDI (1975).

the resources from the sectoral incentives schemes - reforestation, fishery and tourism - into a single fund. The resources from the regional development incentive schemes for Northeast and Amazon regions were pooled into the 'Northeast Investment Fund - FINOR' and 'Amazon Investment Fund - FINAM', respectively. Most of funds' resources come from incentive deductions of income tax due by the investor. The investor can choose to apply his tax deduction into one of these funds, thus becoming a shareholder in a company in which the money is invested, i.e. the company which had its project approved by one of the funds. The resources of the Fiset are managed by the Banco do Brasil, of the FINOR by the 'Banco do Nordeste do Brasil' and of the FINAM by the 'Banco da Amazonia'. The FINOR and FINAM are under the supervision of SUDENE and SUDAM, respectively. The Fiset is under the supervision of the government agency in charge for the sector; for Fiset-Reforestation this is IBDF.

In the 1970's, complaints were made that large scale industrial forest plantations were taking over agricultural land. To solve this problem, Decree No. 79046 of 27 December, 1976 in its fourth article, determined that from the fiscal year of 1977 only projects to be established in 'Priority Regions for Reforestation' and/or 'Forestry-Industry Districts'<sup>26</sup> would be entitled to fiscal incentives. This decree also restored the concession of fiscal incentives to individuals as well as corporations (2nd article).

---

26. It was responsibility of each State to define which region or regions within the State would be considered the 'Priority Region for Reforestation' and/or 'Forestry-Industry District'. Once it was defined the State submitted the report for the consideration of the IBDF for approval.

The minimum area for reforestation projects eligible for fiscal incentives has been changed since the scheme began. Originally, according to Law 5106, a project had to plant a minimum of 10,000 trees to be entitled to fiscal incentives. Considering that the trees were planted at a spacing of 2 x 3 meters, a density of 1,666 trees per hectare, the minimum area was only 5 or 6 hectares. Later, the minimum area increased to 100 hectares (COALBRA, 1983). Then Decree 79046, referred to above, determined that the minimum area should be 1,000 hectares (13th article). Decree No. 84097 of 16/10/79 again introduced changes in the minimum area. However, this time the minimum area was decreased to 200 ha (1st article). The probable reason for this is detailed in Section 5.5.4.

The economic crisis since 1973/74 has affected the fiscal incentives scheme for reforestation. Decree No. 88207 of 30 March, 1983 was passed to define priorities in granting fiscal incentives and made other provisions (IBDF/DR 1983). First, it limited the area to be reforested under fiscal incentives to 200,000 hectares a year. Second, it determined that from 1984 onwards 50% of the total resources of Fiset must be directed to projects in the SUDENE area<sup>27</sup>. Third, it determined that the concession of fiscal incentives for reforestation would be provided on condition that a firm provided some of its own funds for pre-establishment and site preparation works, according to the following schedule:

---

27. This again suggests that SUDAM and SUDENE succeeded in their claim as referred to above.

Category	Area of the Annual Program	Part of the Firm's Own Funds
A	up to 200 ha	Nil
B	from 201 to 1,000 ha	5%
C	" 1,001 " 3,000 ha	10%
D	3,000 ha	15%

Source: IBDF/DR 1983: 68-A

Fourth, it determined that the projects must conform to priority programs of the federal government. From 1983 these were:

- fruit trees and xerophytes in the Northeast region and semi-arid areas;
- pulp and paper;
- charcoal for the steel industry;
- substitution of fuel oil;
- timber (IBDF/DR 1983: 65-A)

Fifth, it allocated the total area to be planted to programs as follows:

Destination	Unit: ha	
	Industrial Companies or their Subsidiaries	Independent Firms <sup>1</sup>
Pulp	30,000	10,000
Charcoal for the steel industry	30,000	10,000
Fruit trees	10,000	35,000
Timber	15,000	15,000
Substitution of fuel oil	20,000	25,000
Total	105,000	95,000

Source: IBDF/DR 1983: 74-A

Notes: 1. These are third-party firms like contractors who just design and execute projects for someone else.



#### 5.5.4. The Response of the Investors to Amendments to the Fiscal Incentives Scheme

From section 5.5.1 we saw that the total area reforested in Brazil before the fiscal incentives scheme was modest, having established a total area of about 500,000 hectares, at the rate of about 30-35,000 hectares per year.

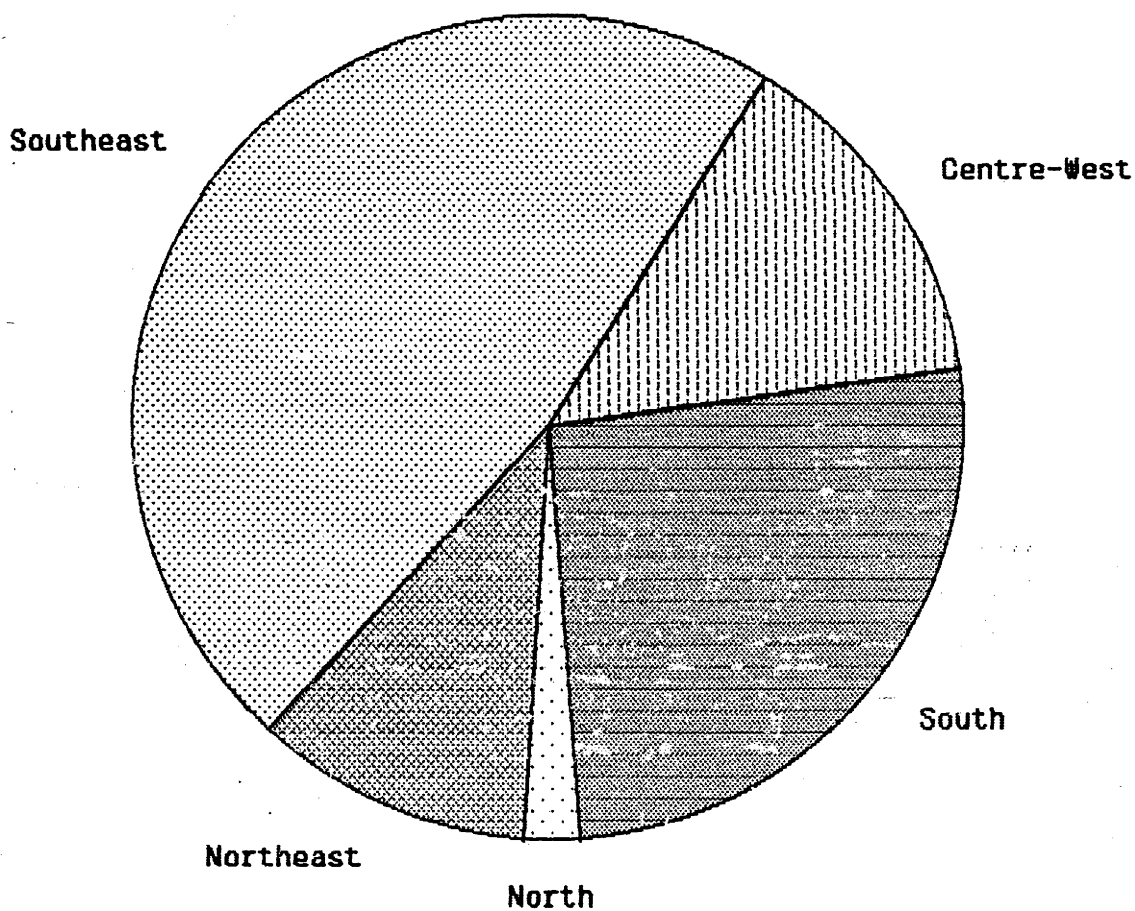
In its first year (1967/68) the fiscal incentives scheme attracted great interest from the private sector. IBDF received 610 requests for incentives of which 351 were approved, totaling 163,000 hectares (IBDF 1968: 27). The plantations have been concentrated, like the major economic activities, in the Southeast and South regions (see Graph 5.1), especially in the States of Sao Paulo, Minas Gerais and Parana and to a lesser degree in other states. The principal genera have been Eucalyptus and Pinus and to a lesser extent, some other native species, especially Araucaria angustifolia and fruit trees (see Graph 5.2). As can be seen in Graph 5.2, up to 1970 the genus Pinus predominated vis a vis Eucalyptus but from 1971 onwards Eucalyptus has predominated. Plausible explanations are the increased plantations in states and regions which are more suitable for Eucalyptus and increased plantations for charcoal production, for which Eucalyptus is more suitable. The major decline in area planted in 1977 (Graph 5.2) was due to investor uncertainty caused by rumours of proposed tax changes to the Fiscal Incentives Scheme.

Graph 5.1

1 Area Approved by IBDF for Reforestation with Fiscal Incentives by

Region as Proportion of Total Area Approved for Brazil

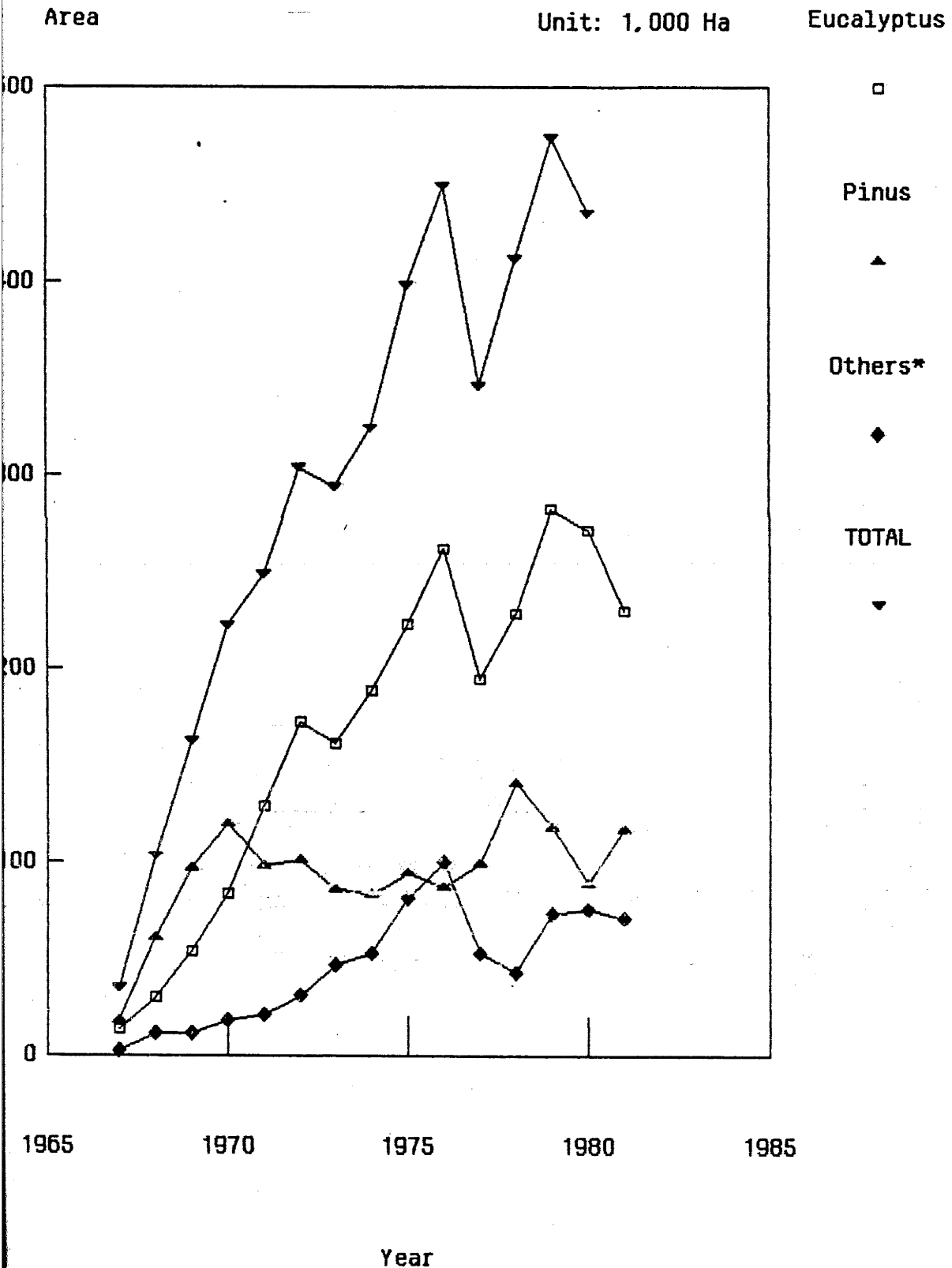
Period: 1967 - 1981



Graph 5.2

Annually Approved for Reforestation with Fiscal Incentives by  
Genera for Brazil

Períod: 1967 - 1981



Since the introduction of the fiscal incentives scheme a large number of firms have specialized in reforestation, especially through the establishment of subsidiaries of companies in the pulp and paper, steel and pig-iron, plywood, particle board, fibre board and veneer industries. Steel and pig-iron industries established plantations because they use charcoal as the reducing agent. There are also some independent firms which establish plantations for third parties, such as small companies which use wood as raw material, but which are not able to establish their own plantations. During the energy crisis, the biomass from reforestation began to be perceived by the government as an alternative source of energy so it encouraged some industries, (e.g. cement) to change their source of energy from oil to charcoal. Along with charcoal, other technologies have been developed, for example production of alcohol from wood, distillation of wood and production of tar. The know-how acquired during this period started to be exported, especially to other countries in Latin America<sup>28</sup>.

Like any other capitalist activity, reforestation is undertaken to generate profits. One of the factors which affects the profits is the price of land. As the price of land increases, so reforestation can be expected to decrease, ceteris paribus. Berger (1979) argued that with the consistent increase in the price of land from 1969 to 1972, and more rapidly thereafter, the rate of planting decreased rapidly in Sao Paulo. According to Berger the real land

---

28. For more detail see, for example: Brazil Trade & Industry (1983).

prices in Sao Paulo increased by more than 400 percent from 1969 to 1976 (Berger, 1979). This phenomenon was not restricted to Sao Paulo. This increase in the price of land has been one of the major concerns of others, including COALBRA<sup>29</sup> which conducted a survey and found that:

... in the beginning, i.e. after the launching of the fiscal incentives, the more active centres of reforestation were concentrated close to industries, such as pulp and paper, steel and so on, in the States of Sao Paulo, Santa Catarina, Parana and Minas Gerais. Then, due to factors such as an increase in the price for land, mainly in Sao Paulo, the necessity of extensive and contiguous areas, and especially because forest plantations can be established in infertile lands which are not suitable for agricultural uses, firms moved to areas each time further away. So, because of these factors forest plantations shifted towards other regions, such as the inland savannas of Minas Gerais ... (COALBRA 1983: 106).

Brazil is a market economy and prices of any good, including land, change according to demand and supply for it. Thus the increase in the price of the land cannot be simply attributed to the reforestation program, although no doubt it had a considerable

---

29. COALBRA is a firm created in 1980 by the Ministry of Agriculture which aims to develop and disseminate throughout the country the necessary technology to produce, on an industrial scale, different liquid and solid combustibles from biomass (COALBRA 1983: 15).

effect. In fact any other programs which promoted an increasing demand for large tracts of land would have the same effects. Also contributing to this increase in the price of land was the speculation factor which can be stimulated by programs, such as the fiscal incentives scheme and by inflation itself. The high inflation rates in Brazil lead people to invest, amongst other things, in land as a hedge against inflation.

However, it was not only the increase in price of land that became a constraint in the expansion of the reforestation, but also the required minimum area which increased to 1,000 hectares before declining to 200 hectares, as discussed in the previous Sub-section. This decline can be attributed to the lobby of entrepreneurs who found obtaining large and continuous tracts of land became a constraint in some states, for example in Rio Grande do Sul<sup>30</sup>. Because of its agrarian structure, finding a continuous area of 1,000 hectares was difficult or required buying many small estates. This claim is supported in the following quotation from an interview with the director of IBDF's Department of Reforestation (DR) who stated:

... the State of Rio Grande do Sul is sui generis, since it is a state with a great number of small proprieties and its edaphic-climatic conditions are good to grow soyabean and wheat, so the price of

---

30. The concern of the investors of this State regarding this alteration in the minimum area is expressed in newspaper articles, such as: 'As novas opcoes de localizacao' in: Gazeta Mercantil of 29/12/76 and, even by IBDF see: IBDF (1982).

the land is very expensive. Thus, the price of land and the small properties make an expansion of an intensive reforestation effort difficult ... we [IBDF] have talked with representatives from the south, with the Association of Reforestation Firms of the State of Rio Grande do Sul and so on, looking for an alternative solution to the problem ... some projects could not be established because firms could not acquire land, in time to establish forest plantations. For example, one firm to make viable the establishment of an area of 1,000 hectares needed to make 110 covenants... (IBDF 1982: 54).

However, it was not only these pressures that led the firms towards other regions, especially towards the Northeast. The government through its incentive policies (Section 5.4) has played an important role in this shift. For example, IBDF approved projects totalling 307,579 hectares during the period 1970-1981 just for the State of Bahia in the Northeast region (IBDF/DR). This is part of the overall policy to develop and integrate the North and Northeast regions into the overall process of development. Implicit in the policy is the idea that these plantations will attract industries to the less developed regions.

Thus given the high price of land and the difficulty in finding large tracts it is not surprising that reforestation firms shifted their activities to regions, such as the Jequitinhonha Valley, where these constraints were not as binding, even though these regions are far way from the major industrial and consumption

centres. In addition to these market forces, the government through its selective policies stimulated this push.

### 5.5.5 Justifications for the Fiscal Incentives Scheme

The most common justification of the incentives scheme was the process of deforestation and the consequent declining availability of wood for wood-based industry, especially in the Southeast and Southern regions. A former President of IBDF stated that:

... the concession of fiscal incentives for forest plantations was the climax for combating the process of deforestation and for the effective continuous supply of raw material to the wood-based industry ...  
(Berutti, 1974: 4)

Besides this, the socio-economic benefits from plantations have been commonly cited in official and private statements, and in academic theses. It was assumed that the establishment of plantations per se would promote economic activity in rural areas, create jobs (a major point in the literature) generate income and consequently diminish rural-urban migration<sup>31</sup>.

31. For more detail about these claimed socio-economic benefits see, for example: Berutti (1974); Fontes (1978); AMEF (1981); IBDF (1982b); Reis & Carneiro (1982); COALBRA (1983); IBDF (1985); Ladeira (n/d). For a different opinion see, for example: INDI (1975); Kotscho (1977); Moura et al. (1980) and Graziano & Graziano (1982).



Even national security has been used to justify the incentives scheme, e.g. Boer (1974) and AMEF (1981). For example, Boer (1974) concluded that the congress, when it approved the scheme, understood the objective of the forest plantations as contributing to the national security policy. Unfortunately, there is no way to verify his claim. However, since Brazil was governed by the military when the scheme began and any policy initiated at that time had a strong military influence, Boer's conclusion seems plausible.

Another enduring assumption was that the establishment of plantations per se would attract wood-based industries. For example, recently (1982) the final report of a Working Group<sup>32</sup> suggested that plantations should be established:

... to promote an integration of the Brazilian Northeast region in the forest activities with the objective of producing raw material to supply the industries to be established there ... (IBDF 1982b: 17)

The severe economic crisis in the 1980's has reduced the resources for establishing forest plantations so that it is expected that this will lead to the end of the fiscal incentives scheme. This possibility has led businessmen to lobby further for the incentives. For example, in 1981, the 'Associação Mineira de Empresas Florestais - AMEF' (Association of Reforestation Firms of the State of Minas Gerais) released a booklet, basically directed to the politicians in

---

32. This Working Group was formed by representatives from private and public sectors in charge of studying the Brazilian forestry sector and planning its future. Its final report is in: IBDF (1982b).

which it stated the socio-economic and environmental achievements of reforestation. It concluded that this activity is a priority for economic development and one of the 'medicines' for the crisis. It claimed that the stability of the forestry sector depends on the continuation of the scheme (AMEF, 1981). Another example of lobbying is provided by the Working Group referred to earlier, which concluded that the scheme should not only be continued, but strengthened (IBDF 1982b)<sup>33</sup>.

Following this brief account of the justifications which have been put forward by proponents of the scheme we will review them critically and see how the scheme has been analysed.

#### **5.5.6 The Fiscal Incentives Scheme: A critical review of justifications and analyses**

##### **5.5.6.1 Justifications**

A major justification for the fiscal incentives scheme for reforestation was that the establishment of industrial forest plantations would promote industrialization. Many plantations were established throughout the country on this premise. This was supported by the government's top priority of making Brazil not only

---

33. For a more complete account of the lobbying by the entrepreneurs, see 'Jornal dos Reflorestadores'. As the title itself indicates this publication is concerned to express the opinion of the entrepreneurs linked direct or indirectly to the reforestation activity. Also 'Revista Silvicultura' which is published by the 'Brazilian Silviculture Society - SBS' most of whose board of directors are entrepreneurs.

self-sufficient, but a net exporter of goods such as pulp, paper and steel. Within this context, programs such as the 'National Program of Pulp and Paper' and 'Expansion of the Metallurgy Industry Based on Charcoal' were launched, in 1974, in accordance with II PND (discussed in Chapter 3). Both programs advocated the reforestation of large areas in order to produce wood. So, the reforestation expanded and large areas were established on this expectation that industrialization would follow.

Examples of this are given by the plantations established in the States of Mato Grosso do Sul and Goias and even, in the Distrito Federal, all in the Centre-West region. These plantations were established between 1973 and 1979 based on expectations of the establishment of wood-based industries, especially pulp and paper (IBDF/DE, 1983). The National Pulp and Paper Program referred to above played an important role in raising these expectations. The plantations are still waiting, in 1985, for either the establishment of a wood-based industry close to them or for sales to industries in other regions or States. The President of IBDF also recognised this failure when he stated that:

... some forest plantations were established based on expectation, not confirmed, of establishment of industries ... (Reis 1983: 10)

However, as discussed in Chapter 3, the II PND started to be de-activated from 1976 and by extension its programs. In view of the economic crisis that Brazil has been facing, it is unlikely, at least in a short term, that capital intensive industries, such as

pulp and paper, will occur close to these plantations, particularly since there has been a surplus of pulp and paper at the international market (COALBRA, 1983).

This suggests that the existence of large scale forest plantations per se does not seem to be a necessary and sufficient condition to promote industrialization. There are other factors, such as markets, that also greatly influence the establishment of any industry. This suggests that the granting of fiscal incentives per se was the major reason for some investors, especially those without links to industrial users, to participate in reforestation activities. This is not surprising given the generous terms of the scheme.

However, more than the failure of market expectations are needed to explain the widespread existence of idle plantations. Indeed, as discussed in the previous Sub-section, the fiscal incentives scheme and the pertinent legislation indirectly caused some plantations to become idle. Amongst other things, the legislation encouraged investors to shift to regions further away from the major consumer centres.

It has been assumed also that reforestation per se creates jobs. Beattie & Ferreira calculated the following figures for the creation of jobs by reforestation activity:

Table 5.6 : Estimate of Employment Created Yearly

---

Planting:	0.150 men/year/hectare;
Maintenance:	0.002 " " " "
Exploitation:	0.150 " " " "
Harvest*:	0.750 " " " "

---

\*includes: transportation, processing and trading

Source: Beattie & Ferreira 1978: 60

These figures show that unless the whole cycle is completed, from planting and maintenance, to exploitation, transportation, processing and trading, and on to planting again, reforestation per se does not create many jobs. The last three activities generate 5 times more jobs than the planting and maintenance together. The assumption becomes more questionable, when one bears in mind the following two aspects. First, the grants of the scheme are just for the phase of planting plus the first three years of maintenance. It is unlikely that an owner will use his own resources to cover the costs of further maintenance until harvesting if a plantation has no obvious market. In general, the plantations which complete the whole cycle are those established and managed by subsidiaries of big industrial concerns. Examples include the steel and pig iron, and pulp and paper industries. In other words, those plantations established with a final purpose defined and not based simply on expectations. So in light of these points the often-praised characteristic of job creation attributed to forest plantations is in doubt. On the other hand, this suggests that there is a need of a careful review of the link between forestry and industry. Employment

generation will be also a direct function of the techniques used: i.e. whether they are labour or capital intensive techniques. In other words, if the whole cycle described above is conducted through the use of capital intensive technology, its impact on job creation probably will not be great.

Another common claim is that rural-urban migration will be alleviated. However, if as suggested forest plantations per se do not create permanent jobs, it is unlikely that they can contribute much towards diminishing migration. On the contrary, these plantations may increase rural-urban migration by displacing the original inhabitants. Many smallholders sold their properties to the reforestation companies and moved to the cities<sup>34</sup>. Some of them subsequently became employees of the companies but, after the peak of labour demanded for the planting phase were dismissed (F. CETEC, 1980). Rural-urban migration will be discussed in greater detail later in the analysis of the case study (Chapter 8).

In the 1980's the emphasis on reforestation has been on the production of biomass as an alternative source of energy for industrial use either as charcoal or as firewood substituting for fuel oil. For example, an agreement between the government and the pulp and paper industry in 1980, foresees the replacement of about 90% of the fuel oil it uses by the end of the 1980's (Reis, 1983; Thibau, 1983). However, the plantations cannot be far from the consuming industry, because of the cost and energy involved in

---

34. See, for example: Kotscho, 1977; 'Imprevistos do Reflorestamento' in: O Estado de Sao Paulo 08/4/78: 18; and Procopio 1984.

transport. There is a risk that distant plantations for industrial substitution will not be used due to their location while, in contrast, people around them are short of fuelwood, but cannot take advantage of these plantations. These facts cast doubt on the validity of the substitution policy while at the same time another policy induces the establishment of plantations in regions which are each time further away from the major industrial centres.

The expansion of industrial plantations has been blamed for an increase in the concentration of land tenure and a decline in food production since they have taken over agricultural lands. However, it is important to emphasise that these plantations are just one part of the overall development model which, as discussed in Chapter 3, has tended to benefit those who are already rich. There were other programs, such as the National Program of Alcohol (PROALCOOL), as well as incentives for large plantations of export crops such as soyabeans, which evolved in a similar context (COALBRA, 1983).

#### **5.5.6.2 Academic Analysis**

The fiscal incentives scheme has been the theme for a number of academic theses. They have practically all started from similar justifications to those advanced in the political arena and applied the techniques of financial and economic project analysis. We will consider the works of Beattie (1975); Berger (1979), Neves (1979) and Nogueira (1980).

### A. Beattie's Thesis

Beattie (1975) points out the following factors to justify the importance of the fiscal incentives for forest plantations:

- i. it was the best and most direct means of rapidly reaching the reforestation goals;
- ii. it was very influential in changing the way of thinking vis a vis forest, from a cut and burn concept to a reforestation and sound management outlook;
- iii. it was a key factor in the establishment of reforestation and professional forestry infrastructure which had been virtually non-existent;
- iv. it encouraged the employment of rural workers which aided the development of depressed rural areas and improved the regional and personal distribution of income; and
- v. it had great potential for improving the balance of trade.

Beattie (1975) conducted his analysis of the fiscal incentives scheme from the participant's and government's point of view. As far as the participant is concerned, he concluded:

... the fiscal incentive program is highly favourable to the participant regardless of the discount rate specified or stumpage prices assumed. This is due to the very low expenses on the part of the participant and the fact that he receives all of the direct benefits. In short, the incentive program participant stands to make an exceptionally good return on his investment due to the generous terms of the program ... (Beattie 1975: 142).

Beattie went on further to conclude that from the government's point of view:



... when all costs are considered the forestry incentive program yields a negative Present Net Worth (PNW) per hectare for all three discount rates [8, 15 and 22%], and for all but the highest hypothetical stumpage prices ... However, the plantations established by the fiscal incentive program will account for a considerable portion of the industrial wood supply ... [so] there is little doubt that the incentives have greatly helped import savings by producing wood which would have had to be imported. They have also apparently stimulated plans for industrial expansion, especially pulp and paper, by providing the necessary resource base ... Other secondary benefits from the program are also great, particularly employment and income generation, improved income distribution and capital formation ...(Beattie 1975: 143 & 144)

### **B. Berger's Thesis**

Berger used a similar approach to Beattie's to analyse the fiscal incentive scheme. Berger concluded that:

... even under the most costly assumption about land, the internal rate of return is calculated at 11.1 percent in pine plantations and 8.7 percent in eucalyptus plantations. This suggests that the federal government may have invested far more than it needed to in order to achieve the degree of reforestation attained ... (Berger, 1979: 60)

He also concluded that:

... the fiscal incentives program, in Sao Paulo, has provided lucrative investment opportunities to many investors ... the return has been higher for eucalyptus than for pine plantations ... (Berger 1980: 59-60).

In addition to these results Berger concluded in a similar fashion to Beattie that:

- a. the scheme contributed to the creation of employment and additional income in rural areas;
- b. Besides the direct employment and wages, it also contributed through multiplier effects to the regional economy; and
- c. the reforestation had the potential of generating significant amounts of combined foreign exchange savings and earnings.

### **C. Neves' Thesis**

Neves' (1979) study was on the same premises as the two previous studies. He stated the major objectives of his work were:

- a. to analyse the financial and economic performance of a reforestation project;
- b. to estimate the number of jobs and total wages generated by this project; and
- c. to devise subsidies to the establishment of forestry development policy to the Valley of Jequitinhonha and to the country. (Neves, 1979: 3)

As one can note from the above, Neves did not take account of the fiscal incentives. However, despite this, his study deserves attention given the results of his analysis of reforestation projects per se. Crucial conclusions were that:

- a. at an annual discount rate of 8%, reforestation was economically viable with the price of land equal to Cr\$ 5,000.00 per hectare, the net price for wood of Cr\$ 100.00 per stere<sup>35</sup> and the average productivity of 30 stere/hectare/year. With these assumptions, the net present value (NPV) was positive;
- b. with the same price of land and wood, but decreasing the average productivity to 25 stere/hectare/year, the NPV became negative;
- c. when the annual discount rate was increased to 15%, and the average productivity was 30 stere/hectare/year, the NPV was always negative irrespective of the price for land and wood he tested.

Regarding social aspects, Neves just listed the number of jobs created, wage paid and others secondary benefits, such as the health centre built by the company.

#### **D. Nogueira's Thesis**

Nogueira's (1980) study was concerned with describing the technology of forest operations and charcoal manufacture, analysing the supply and demand for charcoal, and relating the need for wood raw material for charcoal production to the economic feasibility of

---

<sup>35</sup>. Stere is a stacked volume 1 stere = 0.70 m<sup>3</sup> (FAO, 1983)

establishing large scale industrial forest plantations. Like the previous authors he basically concentrated his analysis on an economic and financial evaluation of these plantations. Amongst other points, he concluded that:

- a. the financial analysis of Eucalyptus plantations in southern Bahia showed that with the use of the government's program of fiscal incentives, plantations were an attractive investment. PNW showed a positive return under all assumptions of land costs using the 8 percent rate of return;
- b. plantations established without fiscal incentives were not financially attractive enterprises. An IRR of 6 percent might be attained where land cost approaches zero. Under all other assumptions of higher land costs or higher interest rates, the investment did not appear financially attractive;
- c. the establishment of more plantations is necessary to meet the demand for charcoal, in order to cope with the mandatory goals of charcoal self-sufficiency imposed on the steel and pig-iron industries (50% in 1985 and 100% in 1995);
- d. it is not improbable to visualize that the establishment of large scale tree plantations and charcoal kilns in southern Bahia would induce the location of new iron and steel mills closer to the charcoal source.

Regarding the social benefits, Nogueira arrived at similar conclusions to the previous researchers, regarding job creation, income generation and the like.

### 5.5.6.3 Common Ground of These Analyses

These analyses all used a similar approach. This led them to present common conclusions, which are reviewed below.

First, we notice implicit in all of them is the industrialization approach advocated by Westoby in his early work (1962). Although it has already been radically changed, even by Westoby himself (1975, 1978), as the result of experience, they were still parading the arguments in its favour. By 1978, even the World Bank had officially changed its financing policy to forestry projects becoming more people-oriented rather than industry-oriented as it used to be.

Second, none of them took account of the latest advances in the theories of development and new thoughts on the concept of development, many of which came from Latin American authors. These changes together with evidence from all over the world challenged the whole concept of development advocated in the 1950's and 1960's, i.e., development as an economic phenomenon in which rapid gains in overall and per capita GNP growth would either 'trickle down' to the masses in the form of jobs and other economic opportunities, or create the necessary conditions for the wider distribution of the economic and social benefits of growth. Yet despite all this 'revolution' in thinking, the 1950's and 1960's concept of development is still implicit in their works. There is no reference to any material on this subject in their bibliographies.

Third, they have suggested that the establishment of large scale industrial forest plantations would induce the creation, expansion or re-location of processing firms. As we will see in the following chapter, a project for expansion of forest plantations by a steel company in Minas Gerais was undertaken in the late 1950's as a result of previous expansion of pig-iron output - not the other way around (Osse, 1961). This experience suggests a firm expands its forest plantations as a result of a program of expansion for its final product. In other words, for example, a pulp and paper company is not going to expand its production of pulp or paper just because a forest plantation is available, if other pre-requisites are not met. Evidence has not been provided to show that firms locate because of the existence of a forest plantation as was believed in the early approach of forestry in development and widely assumed in these analyses. Some examples were cited above of the establishment of forest plantations based on expectations of future establishment of wood-based industries which have not eventuated and the plantations are there, waiting utilization. Even when, during field interviews for this study, the managers of those plantations established by consuming companies such as steel firms, were asked about the future plans for their plantations, the general reply was that they were 'studying the problem', a very vague answer. Such evidence suggests that there are numerous other factors beyond the mere existence of forest plantations which determine the expansion or location of wood-based industries.

Fourth, this group of analysts share the belief that the the fiscal incentives law for forest plantations helped to slow the depletion of Brazil's forest resources - a depletion which had been occurring since the country was discovered.

#### 5.5.6.4 Comments On the Analyses

These analyses were conducted using standard techniques for financial and economic project analysis. Despite the importance of these conventional analyses, they were partial, overlooking the interactions which exist between economic, social and political aspects. As such, the studies were not able to recognise some important deficiencies, especially those with social impacts which do not allow ready economic quantification. Thus these analyses do not seem appropriate for dealing with broader aspects of development because they do not take an integrative multi-disciplinary systems approach. Furthermore they do not consider the spatial structure of the region where the project is located nor view the economic sector as an integral part of the whole economic system. However, this tendency noticed in Brazil is not unique, in fact it is widespread all over the world, as Douglas (1983) and Arnold (1974) noted. Arnold (1974) recognised that a project's relationships to such objectives as employment, balance of payments, distribution of income amongst others, have usually been confined to merely listing or stating the number of jobs created, foreign exchange earned or saved, trade and so on.

Despite the reference to multiplier effects these studies seemed to consider the region and the sector in isolation. In other words, the establishment of large scale industrial forest plantations was considered as a means to regional development and independent from other economic sectors. This regional development would be promoted by the backwards and forwards linkages of these plantations and their respective multiplier effects. Then, these plantations ought to induce other industries to expand or locate in order to take advantage of existing plantations. Such assumptions were in accordance with the early industrialization approach on the role of forestry in development. By extension they were guided by the conventional economic development theory.

On the other hand, the conclusions of these studies are virtually the assumptions used by the government to justify the fiscal incentives scheme for forest plantations. As such, they suggest that even if the government spent more than was necessary to fund the scheme, this is outweighed by the social benefits. Within this context, they directly or indirectly suggested an expansion of reforestation. For example, Nogueira suggested in his conclusion that it was necessary to establish new plantations in the south of Bahia to satisfy the demand for charcoal. However, this conclusion is strange considering that there are already idle plantations in the State of Minas Gerais, which is the biggest charcoal producer and consumer.

The social benefits mentioned in these studies were restricted to listing, for example, employment and income



generation. In fact, these may be substantial at the time of establishment of plantations, but if the stand is not harvested and replanted, both are drastically decreased (Beattie and Ferreira 1978). This suggests that those plantations which have been established, but which are waiting for a future use are unlikely to generate any jobs at all unless they are exploited.

It has also been claimed that this generation of jobs and income avoids or diminishes rural-urban migration. At this stage, the validity of this claim cannot be assessed, but this point will be object of careful examination in Chapter 8.

The results of these studies showed that reforestation under the scheme is highly profitable to the investor. In fact, this conclusion is quite obvious when one bears in mind how the fiscal incentives scheme works, i.e. very low risk for the participant since it employs money which otherwise he would pay in tax while the investor receives any or all benefits which can accrue from the plantation. This also explains the intensive lobbying by reforestation firms and their associations close to the IBDF as well as the federal government, in order to avoid the end of the fiscal incentives for forest plantations. On the other hand, these results suggested that reforestation would not have expanded and probably would not be established in regions like the Jequitinhonha Valley, but for the fiscal incentives scheme. This conclusion is reinforced when Neves' results cited above are taken into account.

In summary, this review suggests the necessity of a much deeper analysis of the scheme, especially when one bears in mind the

present Brazilian economic crisis with its shortage of resources and consequent requirement for much more care in application of public funds. It seems nonsense to suggest that new plantations should be established when one considers that there are already idle stands in some states. If there is shortage in a region, the stimulus should be given for this particular region and not to expand all reforestation simply based on general theoretical assumptions.

### 5.6 Conclusions

From the discussions above, one can observe that practically the whole thrust of the Brazilian forestry sector has been around the concession of fiscal incentives for reforestation.

However, the fact that the Brazilian forestry sector is virtually based on the fiscal incentives scheme, makes the whole sector vulnerable. Given the Brazilian economic crisis there is a strong probability that the fiscal incentives will finish. The forestry sector together with the government must soon find another solution. This whole effort over the years, the evolution of the reforestation activity, the large areas already established, the know-how acquired and the like cannot be abandoned. It is time for the entrepreneurs to assume their own risks. On the other hand, it is already time to consider an increase in productivity of the plantations and not their indefinite expansion in area.

While obviously important in the current setting, short-run economic advantage may be offset over time by less favourable socio-

economic consequences, some of which have already become discernible. These include higher land prices, conflict-generation, land concentration, questionable employment generation and associated migration effects, and income benefits primarily for a selected very wealthy group. Besides these deficiencies the fiscal incentives scheme for large scale industrial forest plantations has faced many criticisms, such as its high per-hectare costs. However, these pitfalls have been justified in the name of social benefits, but few have been investigated whether the benefits actually occur.

## CHAPTER 6

### FORESTRY DEVELOPMENT IN THE STATE OF MINAS GERAIS

#### 6.1 Introduction

Forestry evolved in the State of Minas Gerais within the context we discussed for Brazil in the previous chapter. For example, most of the exploitation of forest resources in Minas Gerais was a response to the economic cycles of producing gold, coffee, cattle, and then charcoal for the steel and pig-iron industries. More recently, as a consequence of the fiscal incentives scheme initiated by the federal government, large reforestation projects have been established in Minas Gerais.

The chapter will follow the same structure employed previously and emphasise the establishment of large scale industrial forest plantations under the fiscal incentives scheme<sup>1</sup>.

---

1. For those interested in a detailed analysis of other parts of the forestry sector which will not be covered more extensively in this chapter see, for example: IBDF/UFRRJ (1983), especially chapters III and V.

## 6.2 Vegetation Types: A general overview

The purpose of this section is to provide the reader with a broad view of the major vegetation types<sup>2</sup> of Minas Gerais with special reference to forest types, and the estimated total area originally and now covered by each. This will provide clues to past deforestation.

The first vegetation type is the forest. The major types of forest described previously (tropical, sub-tropical and coastal or Atlantic forests) occur in Minas Gerais<sup>3</sup>. It has been estimated that at the time of the discovery of Brazil primary forest formations covered a total area of 262,000 km<sup>2</sup> or 45% of the total area of Minas Gerais (Magnanini 1959). Magnanini estimated that these were reduced to 58,000 km<sup>2</sup> or 10%, by 1958-59. More recently, according to the National Forest Inventory (henceforth IFN) the total area had been reduced to 2,978 km<sup>2</sup> which corresponds to 0.5% of the total area of the State (IBDF/DE, 1983).

The second type is the Capoeira (Transition Forest), i.e. those secondary formations in different stages of regeneration, originating from the primitive forest which had been exploited or

---

2. Since the vegetation types will be the same as those presented in section 5.1 above in which they were defined and their major characteristics were listed, we will not repeat the description in this section. For detailed analyses of the major vegetation types of Minas Gerais see, for example: Barreto (1949); and F. CETEC (1978 & 1983).

3. They may have distinct names in different regions, such as 'Mata de Cipo', 'Mata do Rio Doce', 'Mata de Jaiba' and 'Mata da Mantiqueira' (F. CETEC, 1983).

burnt. According to the IFN this type covers a total area of 50,557 km<sup>2</sup> which corresponds to 8.7% of the total area of the State (IBDF/DE, 1983)<sup>4</sup>.

The third type is the Cerrado (Savanna) which occurs throughout Minas Gerais. Originally, it was estimated that it covered a total area of 262,000 km<sup>2</sup> or 45% of the total area of the State (Magnanini, 1959). In 1958-59 there were 175,000 km<sup>2</sup> (30%) (Magnanini, 1959) while according to the IFN, the area is now 71,838 km<sup>2</sup> or 11.8% (IBDF/DE, 1983).

The fourth and last type is the Caatinga (Thornbush), mainly found in the northeast part of the State of Minas Gerais as in some parts of the Jequitinhonha Valley. Magnanini estimated that the Caatinga originally covered a total area of about 29,000 km<sup>2</sup> or 5% of the total area of Minas Gerais. He estimated that, by 1958-59, the area had increased to 30,000 km<sup>2</sup> (5.2%) (Magnanini, 1959), but made no comment about the increase in area covered with Caatinga. Since then, the total area covered with caatinga, according to the IFN, dropped to 13,227 km<sup>2</sup> which represents 2.3% of the total area of the State of Minas Gerais.

This brief review shows that the forest resources of State of Minas Gerais declined. However, this did not occur by chance, but as will be shown was closely linked with the economic formation of the State.

---

4. For this type we are restricted to a description of its present situation since there are no records for previous periods.

### 6.3 Historical Exploitation of Forest Resources

From Chapter 4 we saw that settlement of Minas Gerais followed the gold rush in the eighteenth century. In consequence, forest was cleared for mining, agriculture and to provide fuel and timber to the settlers. The Portuguese crown adopted a policy of restricting settlement in the gold mining region to people employed in extraction and to those engaged in producing foodstuffs, and even prohibited new roads from being opened (Furtado, 1982a). There was only one road linking the mining region to Rio de Janeiro, which made access and gold smuggling easier to control. Although these policies had no conservationist intentions, being merely to preserve the Crown's monopoly over gold production and trade, they indirectly helped avoid greater deforestation (IBDF/UFRRJ, 1983).

However, despite such prohibitions the gold rush attracted many people to Minas Gerais and its surroundings. The wilderness became a populated region of about 350,000 inhabitants at the peak of the gold cycle (Dean, 1983). There are no specific data regarding the total forest area cleared in Minas Gerais during the gold cycle. However, since the mining activity was almost entirely located within Minas Gerais, the following figures estimated by Dean suggest the extent of the forest removals:

... about 20,000 km<sup>2</sup>, most of it forested land, was burned away for mining, and perhaps another 25,000 km<sup>2</sup> of forest was burned for the planting of manioc, corn and rice - calculating one hectare per year at an average population of 250,000 for a

century, and abandonment after ten years, on the average. A much larger area of campo and cerrado began to be burned continuously, perhaps 50,000 km<sup>2</sup>, for cattle ranching during the first century of occupation ... (Dean 1983: 59)

These figures become more meaningful when one considers that the whole gold cycle lasted for less than a century (see Chapters 3 and 4). The decline of gold production led the economy of Minas Gerais to shift to agricultural activities, including cattle raising.

Later, in the nineteenth century, coffee production became the central focus of the Brazilian economy. It expanded throughout Brazil, especially in the Southeast and Southern regions, including Minas Gerais, where the ecological conditions for plantations were suitable. This caused the greatest expansion of settlement<sup>5</sup>.

Within the State, coffee plantations were mainly established in the south and in the Zona da Mata where ecological conditions were very suitable. Production increased due to the expansion of the area planted; hence more forests were removed in the south and in the Zona da Mata<sup>6</sup>.

Despite the economic importance of coffee, its production did not adopt conservationist practices. Evidence from Rio de

---

5. The biggest movement towards the occupation of Minas Gerais' lands (Valverde, 1958 quoted in IBDF/UFRRJ 1983: 176).

6. Zona da Mata corresponds what is now the macroregion II Mata, and south to the macroregion III South (see Map 4.1).



Janeiro, which had been the pioneer in coffee plantations, showed a decline in the productivity due to erosion and a drop in soil fertility (IBDF/UFRRJ, 1983). Taking this as an example, the coffee farmers were alerted to the necessity of employing techniques to avoid the same problems. However, since virgin land was still available for expansion, the false illusion developed that the supply of new land was inexhaustible. Above all, the coffee economy generated such income and prosperity for farmers that it blinded them to the dangers and the need to listen to the cries for the adoption of conservationist practices.

It was not just coffee growing that prospered in Minas Gerais, but also cattle raising. There are no data to evaluate the impact of the expansion of this activity on forest resources. However, given that cattle were raised extensively it is fair to assume that the expansion of cattle raising had negative impacts on the forest resources.

This overall prosperity of the agricultural sector of Minas Gerais required tools which were imported at a high cost. This seemed illogical when one bears in mind the iron ore reserves and forest resources which could be transformed into charcoal. The first pig-iron plants were established in the middle of the nineteenth century, but the major expansion did not occur until the 1930's, coincidentally with the shift of the Brazilian economy from a solely agricultural economy to a more industrialized one. What was the relationship between the expansion of the steel and pig-iron industries and the exploitation of forest resources?

The answer is very simple, the metal industry used charcoal as a reducing agent. To supply its demand for charcoal, the forests and the Cerrado were cut (IBDF/UFRRJ, 1983). The expansion of the steel and pig-iron industries was a major concern to the government because it appeared that the forests that could supply the essential charcoal were being exhausted. Working Groups were set up to analyse and to present guidelines that could lead to a solution of the problem<sup>7</sup>. One of the measures suggested was the need to increase the area reforested in order to diminish the pressure on natural forest resources, including Cerrado. Plantations were established so that by the 1970's about 60% of the charcoal used by the steel and pig-iron industries came from Cerrado, 30% from other forests and 10% from plantations (all of them with Eucalyptus spp) (Azambuja & Thibau, 1973). By 1980, charcoal from native resources, i.e. from forests and Cerrado, had decreased to 80% while the supply from plantations had increased to 20%. The governmental goal was to achieve 50% from natural resources and 50% from plantations, by 1985.

The metal companies maintained forests, including Cerrado, to produce their own charcoal. These areas were not depleted, but properly managed to assure natural regeneration. Thus, because they needed a continuous supply of wood to produce charcoal, the companies

---

7. For a comparison regarding the development of the perception of the problems and the guidelines suggested to solve them by those Working Groups see, for example: INP (1951); Azambuja & Thibau (ed.) 1973. Also see: Chapter 5, especially section 5.5.

had to maintain the forest resources (INP, 1951)<sup>8</sup>. However, the metal industry's reserves were not enough to satisfy its demand for charcoal and the foundries bought charcoal from independent charcoal producers. This saved the companies' reserves for any eventual problem of supply, and at the same time allowed natural regeneration of their forests.

Some firms, especially the larger ones, started to establish their own industrial forest plantations with Eucalyptus spp to supplement their own reserves and external supplies as early as the 1950's. This measure was consistent with the Brazilian process of development of the 1950's, based on an intensive industrialization with consequent increasing demand for metal products. It was possible to predict that such an expansion would demand an increasing supply of charcoal that would not be possible under the previous arrangements.

This review reveals that the forest resources have been under pressure since the early stages of Minas Gerais' formation, yet there is also a long history of reforestation there. Thus, it is not surprising that Minas Gerais has become the leading state in terms of the area reforested since the introduction of the fiscal incentives scheme.

---

8. Although the metal industry has contributed to the exploitation of the natural forests, Beattie argued: '... the forest removal for coffee plantations, in Minas Gerais, is considered more important, in terms of devastation, than the wood removals for charcoal production for use in the pig-iron industry ... (Beattie, 1975: 18).

## 6.4 The Forestry Sector

The State of Minas Gerais has the second largest forestry sector within the Brazilian southeast region (the first is in the State of Sao Paulo). According to a survey by the 'UFRRJ'<sup>9</sup>, a total of 11,770 firms encompassing 45 different activities were listed. These activities can be grouped in three major categories, namely: producers, dealers and consumers<sup>10</sup>. These three major groups and the proportion of each one of them in the total forestry sector is summarized in Table 6.1 below.

Table 6.1: Composition of Minas Gerais' Forestry Sector - 1980

Segments	Proportion of Each Segment Within the Sector (%)
Producers	39.7
Dealers	16.0
Consumers	44.3

Source: Personal calculations based on the results presented in IBDF/UFRRJ, 1983.

The forestry sector is distributed throughout the State. However, it is an uneven distribution, for example 12.1% of its total is

9. UFRRJ = Universidade Federal Rural do Rio de Janeiro.

10. 'Producers' are those in the wood processing activities, such as sawmills, furniture factories, pulp and paper plants, charcoal plants and so on; 'Traders' are wood and timber dealers, including log dealers; 'Consumers' are just industrial consumers, especially of charcoal and firewood, such as steel and pig-iron plants, brickyards, cement plants and so on. Activity related to establishment of forest plantations was not included in any of the groups above but is discussed, in particular, later.

located in Belo Horizonte (the State's capital) and surrounding areas (IBDF/UFRRJ, 1983).

The primary wood-based industry in Minas Gerais consists of two major activities sawmilling and the production of plywood. According to the records of the IBDF's agency in Minas Gerais, in 1981, there were 1,311 sawmills, 1 plywood plant, but no veneer, particleboard or fiberboard plants (IBDF/UFRRJ, 1983). Despite the large number of sawmills these were almost entirely of small capacity as shown in Table 6.2 below.

Table 6.2: Distribution of the Sawmills According to Their Consumption of Logs - 1981

Classes	Consumption (m <sup>3</sup> /year)	Number of Sawmills	%
A	< 499	1,268	96
B	500 - 999	23	2
C	1,000 - 1,999	10	1
D	> 2,000	10	1
TOTAL		1,311	100

Source: IBDF/UFRRJ 1983: 187 & 212

Given their small size, 46.8% of the sawmills have between 1 and 5 employees, and more than 50% of them produce less than 250 m<sup>3</sup>/year (IBDF/UFRRJ, 1983). These figures suggest that the sawmill industry is basically directed to meeting the local demand for its products.

One of the effects of deforestation can be noticed in the wood consumption pattern of the sawmilling industry. As natural forest resource become scarcer and further away from the industry, there is an increase in the cost of logs. Given the small size of the majority of

sawmills, they cannot afford the high cost of logs and tend to diversify the number of species they saw, i.e. they start to saw those species which are still available close to them and consequently, are cheaper. By the 1980's, they were sawing more than 50 different species and were starting to use the logs from the older eucalyptus stands. The 1983 survey, referred to above, found that 31.3% of the State's sawmills were already sawing eucalyptus logs. Given the increasing scarcity of the natural forest resources it is to be expected that the utilization of wood from eucalyptus plantations, and also from pinus plantations, will increase.

Another segment within the primary wood-based industry is plywood production. This segment is represented by only one firm which works only with native species harvested in its own forest located in the State of Bahia about 350 km from the plant. The firm has about 400 employees (IBDF/UFRRJ, 1983).

The charcoal industry is important as the supplier of the reducing agent for the metal industry. In 1980, the IBDF estimated that just in Minas Gerais this industry alone consumed 17.7 million tonne of charcoal (IBDF/UFRRJ, 1983). Besides this, the international oil crisis of 1973 made charcoal an attractive alternative source of energy for industrial purposes. This new use was stressed by the Brazilian government which had already requested some industries, such as pulp and paper, cement, ceramic, food, beverage and textiles, to change their source of energy for the production of heat from oil to firewood and charcoal (Thibau, 1983). It is expected that by 1990, 25% of the fuel oil consumed by these industries will have been substituted by wood,

including firewood and charcoal<sup>11</sup>. This policy has led the steel and pig-iron industries to face competition for their supply of charcoal.

The pulp and paper industry in Minas Gerais consisted of two pulp mills (one of which is integrated, i.e. it also produces paper), and nine paper mills, in 1982. This corresponds to 4.4% of all pulp plants and 6.1% of all paper mills in Brazil. Both pulp mills produce short-fibered pulp, for which Minas Gerais ranks in third place nationally with 15.2% of national production. However, as far as paper production is concerned, Minas Gerais ranks in fifth position with about 3% of the national production (IBDF/UFRRJ, 1983).

There are no historical data on the contribution of the pulp and paper industry to the economy of the State. However, we can provide a general picture since there are data available for the paper industry, including cardboard in the period 1970-80. The proportion of the paper industry in the total value of the industrial production was 0.6% in 1970, which rose to 1.1% in 1974, and decreased again in 1980 to 0.6% (SEI<sup>12</sup>, 1981).

Data are not also available to determine the participation of the whole forestry sector and the industries discussed above within the economy of Minas Gerais. However, assuming the approach used by Prado (1977a) at the Brazilian level (see section 5.5), some indication of the

---

11. The substitution of fuel oil by firewood and charchoal is part of a larger program entitled 'Programa de Mobilizacao Energetica' (Energy Program) which was created by the 'Comissao Nacional de Energy' (Energy National Commission). For a detailed analysis of the overall program see, for example: Thibau (1983).

12. This agency is subordinated to the Secretary of Planning of Minas Gerais (SEPLAN-MG). For a complete analysis of the whole GNP of Minas Gerais in the period 1970-80 see: SEI (1981).

agricultural component of the forestry sector in the State's economy can be given.

The agricultural component of the forestry sector increased from 4.4% in 1970 to 11.2% in 1980, at constant 1970 prices, of the total value of agricultural production (SEI, 1981). While the forestry sector increased, the agricultural sector's share of the total State's GNP (at 1970 constant prices) decreased from 20.4% in 1970 to 12.4% in 1980. Actually, this declining trend can be observed since 1950 when it represented 38.4% of the total State's GNP and in 1960 when the share of total production declined to 29.6%. Again, this declining trend cannot be dissociated from the overall Brazilian model of development, especially since 1950 when the emphasis was on industrialization. By extension, the State of Minas Gerais struggled to follow the same pattern. However, on the other hand, the increasing proportion of the forestry sector in the total agricultural sector can be attributed to factors such as the fiscal incentives scheme which promoted reforestation activity and the increased demand for wood as an industrial energy source either in the form of firewood or charcoal.

In the next section the establishment of the large scale industrial forest plantations before and after the fiscal incentives scheme is discussed.

## **6.5 Establishment of Large Scale Industrial Forest Plantations**

### **6.5.1 Before the Fiscal Incentives Scheme**

As briefly referred to above, the establishment of large scale industrial forest plantations is an activity with a long tradition in



the State of Minas Gerais. It was started by the pig-iron and steel industries to ensure their supplies of charcoal. In 1950, only two of the twelve firms did not have any forest reserves, including Cerrado, and had to buy all their charcoal. Those with reserves both produced their own and bought from third parties. The reserves varied from only 145 hectares to almost 150,000 hectares owned by the largest firm (INP, 1951). These reserves were managed so that they regenerated naturally for future exploitation in 20 or 25 years time (INP, 1951). However, the increasing demand for metal products led the larger firms to establish plantations as the answer to a possible future shortage in the supply of charcoal. Eucalyptus had already been planted in the State of Sao Paulo with good results. The genus was fast growing so that 250 m<sup>3</sup> of wood per hectare could be produced at the end of the 7th or 8th years of growth (INP, 1951). The rotation of 7 or 8 years when compared to the 20 to 25 years needed for natural regeneration led to the conclusion that the same area planted with eucalyptus could be exploited three or four times as often. This led the firms, especially the largest ones, to opt for plantations. Other firms were still reluctant to adopt such a policy because of the great investments required to establish plantations (INP, 1951).

The expansion of the metal industry also led to an increasing pressure on the natural vegetation. Concerned with this situation, the federal government created a Working Group in 1950 to study the problem and finally to present a reforestation plan. This plan might be undertaken by the metal industry to compensate for and to reduce its

rate of removal of natural vegetation (forests and savannas) for charcoal production<sup>13</sup>.

Despite the reluctance of some firms to commence forest plantations, the Working Group observed:

... it can already be signalled, with praise, that there is a willingness of some firms in the metallurgy industry of Minas Gerais to adopt reforestation with the genus Eucalyptus as a complement to and, in the future, as the substitute for the natural regeneration that they have used previously, in its great part from their own reserves. Indeed, the biggest firms already have their own forest service ... (INP 1951: 248).

Reviewing this report in the section where the situation of each firm is described, a total area of about 3,666 hectares was already reforested by 1950. Of this, one firm alone had planted 1,518 hectares.

Concluding its studies, the Working Group presented a reforestation plan with the goal that each firm should plant an area to meet its demand for charcoal at its then level of production. The plan envisaged that a total area of about 9,305 hectares should be planted by the end of 10 years. It is interesting to note that the Working Group realised that some firms had already reforested areas which were greater than the goals established by the plan. Independent of the plan some of the companies, especially the biggest ones already had their own

---

13. See INP (1951) for the final report of this Working Group.

reforestation plans. For example, of the two most important firms, Companhia Aços Especiais Itabira-ACESITA had planned to establish an annual average area of 800 hectares while the Companhia Siderurgica Belgo Mineira had planned to establish an annual average area of between 1,000 to 1,200 ha (INP, 1951).

There are no data to evaluate how these and other plans were implemented. However, by the 1960's a total area of about 60,000 hectares in Minas Gerais alone had been already established with Eucalyptus spp. (INP, 1961)<sup>14</sup>. In comparison with the total area planted until 1950, the total area planted grew during the decade at an annual average rate of 32%. This considerable expansion was not surprising since this was the period when the Brazilian process of industrialization was intensified (see Chapter 3). Hence, the pig-iron and steel industries needed to expand their supply of charcoal to cope with increasing demand. An increase in the area reforested to produce charcoal seemed to be better than the traditional pattern of basing charcoal production solely on the natural vegetation and its natural regeneration.

The strong commitment to reforestation, at least among the biggest firms, is evident from the following statement by Osse, manager of the forestry service of one of the largest steel companies:

To Belgo Mineira, as to the steel industry at large based on charcoal, the eucalyptus plantations have the same significance as coal

14. Figure comprised in a paper presented to the Second International Conference on Eucalyptus held in Sao Paulo (13-26 August, 1961), 'A Cultura do Eucalipto no Brasil: Valor social e economico das plantacoes de Eucaliptos no Pais' (INP 1961: 81-87).

mines have to those plants not based on charcoal, however with the advantage of being renewable and easily located in relation to the plant (Osse 1961: 102).

Osse described the plantation programs already undertaken by his company which totalled an area of 22,300 hectares by 1960 (Osse, 1961). In order to match the charcoal demand for an expansion of its steel production to 500,000 tonne/year, a fourth plantation program was put forward with the following characteristics:

---

Eucalyptus plantations to be established:	87,700 to 97,700 hectares
Annual average planting rate:	5,000 hectares
Duration of the whole program:	18 to 20 years

---

Source: Osse 1961: 102<sup>15</sup>.

This would add to the area already planted (22,300 hectares) and give the company a total area of 110,000 to 120,000 hectares by the end of the program (18 to 20 years).

Thus one can observe that large scale industrial forest plantations were undertaken, without governmental incentives. However, as noted in the previous chapter, it was claimed continually that the rate of plantation establishment was very small and not enough to cope with the demand of wood-based industry. It was suggested that the government should provide incentives to increase the rate of planting. Finally, these claims found a fertile soil in the ambitious Brazilian model of development put forward from 1964 onwards and the fiscal

---

15. For a complete account of the overall Belgo Mineira's planting program see: Osse (1961).

incentives scheme for reforestation began in 1967. Given its generous terms, reforestation spread throughout the country, but was concentrated in the Southeast and South regions. In the State of Minas Gerais, large scale industrial forest plantations have flourished since the introduction of the scheme.

### 6.5.2. After the Fiscal Incentives Scheme

Given the tradition of reforestation in the State of Minas Gerais planting went ahead with a new impulse with the introduction of the fiscal incentives scheme. From 1973 onwards Minas Gerais became the leading state in terms of the area planted<sup>16</sup>. From the introduction of the fiscal incentives scheme in 1967 until 1981, the reforestation projects approved by IBDF for Minas Gerais totaled an area of about 1.4 million hectares, which corresponds to about one-third of the total area approved for the whole of Brazil (IBDF/DR)<sup>17</sup>, as shown in Graph 6.1.

However, it is important to bear in mind that this total area approved did not necessarily equal all that was actually established. The results of the IFN<sup>18</sup> undertaken by the IBDF present the following as the area actually planted (Table 6.3).

---

16. This leadership of MG was even the object of articles in newspapers, for example: Neves (1974); and 'Tecnologia garante liderança de Minas' in: O Globo (newspaper) 21/9/76: 23.

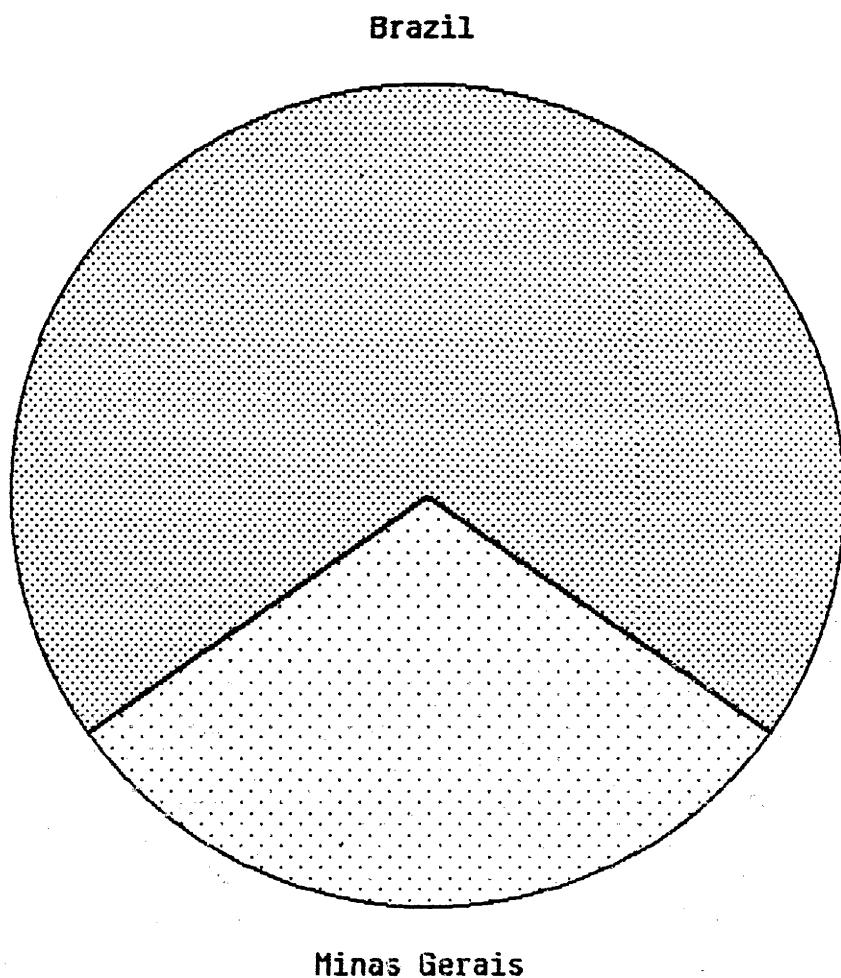
17. These figures were collected from the files of the Reforestation Department - 'DR' of the IBDF during field work.

18. The results of the IFN released to date (IBDF/DE, 1983) just cover figures for areas covered with natural vegetation and those planted with the Eucalyptus spp. and Pinus spp. while areas planted with other species are not referred to. However, this makes little difference since the total area planted with other species, such as native and fruit trees, accounted for only 2.3% of the total area approved.

Graph 6.1

Total Area Approved by IBDF for Reforestation with Fiscal Incentives  
for Minas Gerais as Proportion of Total Area Approved for Brazil

Period: 1967 - 1981



Statistical source: IBDF/DR

Table 6.3: Area Actually Planted by Genera According to the IFN.

<u>Genera</u>	<u>Area (1,000 ha)</u>
Eucalyptus	1,030.8
Pinus	<u>179.5</u>
<u>Total</u>	<u>1,210.3</u>

Source: IBDF/DE 1983: 19

These figures show that about 85% of the total area approved was actually established. Although the whole area approved was not established, the total area planted was still quite remarkable.

The proportion of the total area reforested set aside for particular uses is summarized in the following table.

Table 6.4: Proportion of the Total Area Reforested in Minas Gerais up to 1980, by End Use

<u>Final Destination</u>	<u>% of the Total Area*</u>
Charcoal	48.4
Pulp	7.6
Firewood	0.8
Timber	0.4
Unknown	<u>42.8</u>
<u>Total</u>	<u>100.0</u>

Source: IBDF/UFRRJ 1983: 510-511

\* This includes just the total area planted with Eucalyptus and Pinus.

From the above it is clear that charcoal production is the major aim of the forest plantations established in Minas Gerais. One of the consequences is that the great majority of reforestation

activity in Minas Gerais is with Eucalyptus spp, more than two-thirds of the total area planted. On the other hand, for 42.8% of the total area approved, the final use is unknown. That suggests that these plantations were established in the expectation of the establishment an industry that would demand this wood. Underlying this assumption one can clearly see the early approach to forestry in development reviewed in Chapter 2. It is interesting to note that despite the evidence contradicting this assumption, it still continues to be advocated.

The reforestation in the State is concentrated in priority regions created to attend the requirements of the Decree 79046 of 27/12/76 as discussed in Chapter 5. The proportion of the total area reforested in Minas Gerais in each of the regions is shown below:

Table 6.5: Proportion of the Total Area Planted by Priority Region - 1980

Priority Region	Proportion (%)
Rio Doce	2
Triangulo	1
Centro Oeste	9
Jequitinhonha	36
Sao Francisco	53

Source: IBDF/UFRRJ 1983: 509-510

From Table 6.5 we observe that large forest plantations in the State of Minas Gerais are concentrated in two regions. One of



the reasons for the concentration is that some of the municipalities within these regions are within SUDENE's area of influence and as we know from section 5.5, tax deductions are greater for projects established in the areas of influence of this agency.

When the National Program of Pulp and Paper (PNPC) was announced in 1974, as discussed above, the government of Minas Gerais through its Institute for Industrial Development (INDI) released a report which analysed reforestation in Minas Gerais and suggested how to achieve the overall goals established in the PNPC<sup>19</sup>. INDI undertook intensive consultations with domestic and foreign groups to induce them to invest in establishing a pulp and paper mill in Minas Gerais and to take advantage of the availability of plantations (INDI, 1975). However, despite this only one firm actually established a pulp and paper mill although another considered the possibility of doing so.

On the other hand, the report suggested that the major failure could be attributed to a spatial dispersion of the stands (INDI, 1975). Finally, the report concluded that the fiscal incentives scheme for reforestation did not contribute to an integrated reforestation industry (INDI 1975). It also called attention to the fact that most of the jobs were created during harvesting and processing and not with the plantations and much less during maintenance.

---

19. For a full account of the report see: INDI (1975).

INDI's assertions are coincident with our conclusion in section 5.5, that the establishment of a plantation was not a necessary and sufficient condition for the generation of permanent jobs - to generate permanent jobs the plantation must be integrated with an industrial project. Then, with the de-activation of the II PND, and by extension of the PNPC, these efforts of the INDI lost their force, and their arguments were generally forgotten. INDI's conclusions also suggest the failure of the assumption widespread in the forestry circles that the existence of plantations per se is enough to attract a wood-based industry.

## 6.6 Conclusions

There is no doubt that the advent of the fiscal incentives scheme led to an expansion of reforestation in Minas Gerais. However, since reforestation was already undertaken prior to the grant of fiscal incentives, and at a quite reasonable rate, it appears that the activity would have expanded anyway, but possibly not with the same speed. But, on the other hand it would probably have increased in a more rational way since investments would have been made with a firm's own money, taking into account the location and the costs of the plantations and the real economic need and prospective markets for wood.

What is surprising to note is that the report quoted above called attention to some of the weak points of the fiscal incentives scheme and the need for a thorough revision of the scheme to avoid

the initial mistakes. However, it seems that the direction given by fiscal incentives legislation was practically opposite to these recommendations. For example, the establishment of large plantations without any link to an industrial project had directed these plantations to regions where their commercial and industrial exploitation, at least in the short and medium runs, was not likely to occur. This practice was not stopped due to the myth that the establishment of a large scale industrial forest plantation per se is enough to generate jobs and so justifies the concession of fiscal incentives.

What is noticeable is the persistence of the federal government in maintaining the fiscal incentives scheme, despite the evidence, such as this from Minas Gerais, which suggested an urgent and thorough evaluation.

Once more it seems to be disproved as for example in the case of the Jequitinhonha Valley where, in 1975, 11 out of 12 reforestation projects proposed or in the establishment phase, had as the major justification 'to supply the demand for pulp logs of a pulp and paper plant which would be established in the region' (FJP/CODEVALE<sup>20</sup>, 1975: annex 1). Again this emphasis on demand for pulp logs is not surprising given the National Program of Pulp and Paper and its ambitious goals in 1974-75, as discussed in Chapters 3

---

<sup>20</sup>. FJP = Fundacao Joao Pinheiro, this institution is linked to the planning system of the State of Minas Gerais; CODEVALE = Comissao de Desenvolvimento do Vale do Jequitinhonha (Commission for Development of the Jequitinhonha Valley), this agency is tied to the Minas Gerais' government.

and 5. One can find reference to this emphasis on the establishment of forest plantations to supply pulp logs, even in the fiscal incentives legislation, for example Article 7, item III of the Decree 79046 of 27/12/1976. Later, this program was abandoned and consequently many of the expected pulp and paper firms were not established. A survey of the forestry sector of the State of Minas Gerais shows that of the 11 pulp and paper plants located in the State none was located in the Valley (IBDF/UFRRJ, 1983). Once more this is evidence that the existence of plantations per se is not enough to attract a wood-based industry, especially those which are more capital intensive, such as the pulp and paper industry.

## CHAPTER 7

### THE JEQUITINHONHA VALLEY

#### 7.1 Introduction

Minas Gerais is a mosaic of regions as heterogeneous as is Brazil; development has not evolved equally in all regions, nor have the benefits of this development been distributed evenly. As discussed in Chapters 3 and 4, the process of development in Minas Gerais and in Brazil as a whole has not been uniform and continuous.

Within this context of contrasts and as a part of the mosaic which is the State of Minas Gerais emerges the Jequitinhonha Valley. It has been considered as one of the poorest regions not just in Minas Gerais, but even in Brazil. This situation has led the Valley to become the focus of attention of State and Federal governments and even of private institutions. However, despite this no major improvement in its overall socio-economic conditions has occurred (F. CETEC, 1980<sup>1</sup>). This led to industrial reforestation being perceived as the solution for the Valley's problems.

Following this introduction is an overview of the Valley's location and its administrative structure is presented. The third

---

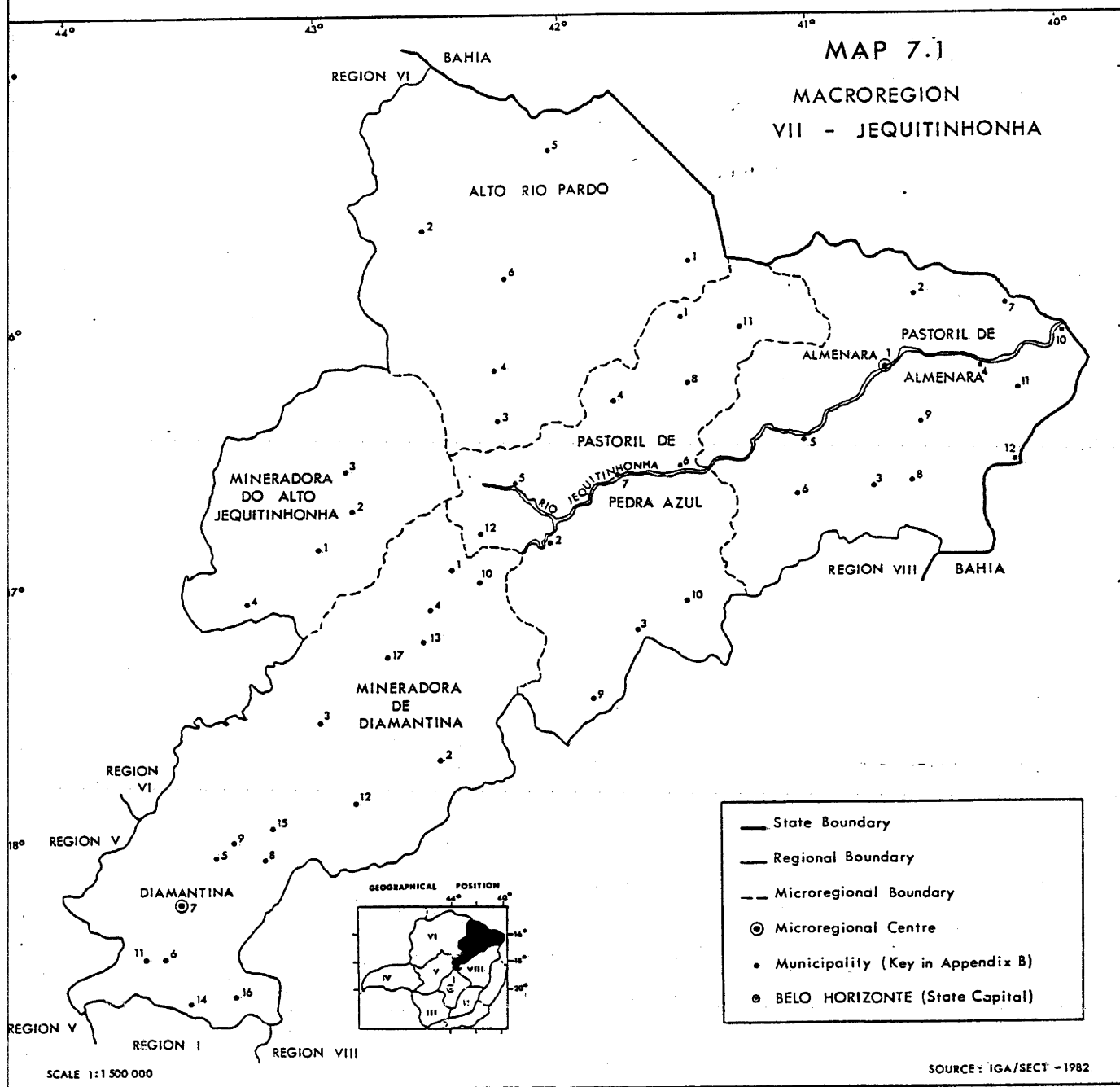
1. F. CETEC = Fundacao Centro Tecnologico de Minas Gerais (Technological Centre of Minas Gerais Foundation). This Foundation is similar to CSIRO, but at State level.

section of this Chapter presents a review of the Valley's historical formation. The fourth section discusses the impacts of settlement on the Valley's vegetation. The fifth gives a general overview of the major vegetation types. The sixth section analyses the Valley's forestry sector with special emphasis on the large scale industrial forest plantations, and the seventh draws conclusions.

## 7.2 Location and Administrative Divisions

The Jequitinhonha Valley is located in the Northeast of the State of Minas Gerais (see map 1). It lies between parallels 15<sup>0</sup> and 18<sup>0</sup> 40' latitude South and meridians 40<sup>0</sup> and 43<sup>0</sup> longitude West. It covers an area of 78,451 square kilometres which corresponds to 13.5% of the area of the State (equivalent in Australia to 9.7% of the total area of the State of New South Wales). The Valley encompasses a total of 51 municipalities<sup>2</sup>(IGA<sup>3</sup>, 1982). In 1980 it had a population of 824,502 inhabitants of which only 38.2% lived in urban areas<sup>4</sup>.

- 
2. For the purpose of this thesis the Jequitinhonha Valley is in accordance with the Planning Region VII (the State has been divided in a total of 8 Planning Regions by SEPLAN/MG, (See Map 1) defined by the Secretary of Planning of the State of Minas Gerais - SEPLAN/MG). This division is in accordance with the division adopted by the Brazilian Institute of Geography and Statistics - F.IBGE which is the Federal agency in charge of conducting census.
  3. IGA = Instituto de Geociencias Aplicadas (Institute of Applied Geo-science of the State of Minas Gerais).
  4. Data regarding population for the Valley and all microregions were collected from the Censo Demografico de 1980 (F. IBGE).



The Valley's 51 municipalities are grouped into five homogeneous micro-regions<sup>5</sup> which are:

**Alto Rio Pardo**

This microregion comprises 6 municipalities with a population in 1980 of 160,034 of which 75.5% lived in rural areas. Large forest plantations have been established and sugar cane, cotton and beans are cultivated in some municipalities, mainly for local consumption.

**Mineradora do Alto Jequitinhonha**

This microregion comprises 4 municipalities with a population in 1980 of 42,757 of which 84.5% lived in rural areas. It used to be a mining region. Then, with the decline of the mining activities, subsistence farming became widespread. From the mid-1970's, large industrial forest plantations have been established.

**Mineradora de Diamantina**

This microregion comprises 17 municipalities with a population in 1980 of 238,280 of which 65.7% lived in rural areas. It too used to be a mining region. Along with an increase in large forest plantations, coffee has recently been established in some municipalities.

5. Brazil has its municipalities grouped in homogenous microregions, a total of 361, according to resolution No. 1 of 08 May, 1969 of the Brazilian Institute of Geography and Statistics - F.IBGE. These microregions are areas which group, within the same State or the Territory, municipalities with physical, social and economic characteristics that have certain homogeneity. Each one of these microregions has a name and a number (from 1 to 361). We chose to use both to identify the homogeneous microregions which form the Jequitinhonha Valley.



### Pastoril de Pedra Azul

This microregion comprises 12 municipalities with a population in 1980 of 219,712 of which 50.4% lived in rural areas. Cattle farming occupying large tracts of land (latifundia) is predominant throughout this microregion.

### Pastoril de Almenara

This microregion comprises 12 municipalities with a population in 1980 of 163,719 of which 52.1% lived in rural areas. It has similar characteristics of cattle raising and latifundia to the Pastoril de Pedra Azul.

## **7.3 Jequitinhonha Valley's Historical Formation**

Historically, northern Minas Gerais was administrated from Salvador, State of Bahia, until 1750 when it reverted to the State of Minas Gerais' administration (Wirth, 1977). The settlement of the Valley was a result of the gold and diamond rushes in the eighteenth century. During that time most efforts were concentrated on mining activities and almost everything consumed there came from outside.

The Valley's economic stagnation has been commonly attributed to the decline of gold production (e.g. FJP/CODEVALE<sup>6</sup>, 1975; F.CETEC, 1980). However, this seems to be more complex as

6. FJP = Fundacao Joao Pinheiro (Joao Pinheiro Foundation) is linked to the State Secretary of Planning - SEPLAN/MG; CODEVALE = Comissao de Desenvolvimento do Vale do Jequitinhonha (Commission for the Development of the Jequitinhonha Valley).

discussed later. The present economic problems of the Valley can be traced to their roots in the eighteenth century as mining did not contribute to a major regional accumulation of wealth. The Valley also had difficult access and poor transportation links - a result of a deliberate policy of the Portuguese crown which used the Valley's isolation to control gold and diamond production and to avoid smuggling (FJP/CODEVALE, 1975).

The decline of mining led to both a migration away from and a dispersion throughout the Valley. Graziano and Graziano (1982) argue that this dispersion had a great impact on the origin and formation of the Valley's society. The ex-miners occupied lands left after mining and were the origin of the peasants of today.

Following this dispersion, subsistence farming spread throughout the Valley and other farms were started to raise cattle and grow cotton. Both evolved within a mercantile economy. The major characteristics of the cattle industry were that:

- (i) the cattle were raised extensively, occupying large tracts of land and;
- (ii) they were sold as calves to be raised in other regions, especially in the south of the State of Bahia due to its proximity to the Valley (Pereira, 1911<sup>7</sup>).

---

7. The edition consulted for this thesis is the re-edition of Pereira's original work published by the Government of the State of Minas Gerais, in 1969, as part of the celebration of the author's centenary birthday.

This suggests that the impact of this activity on the generation of jobs and income in the Valley was not great. Despite its lower value than gold and diamonds growing cotton can be seen as an attempt to re-establish, through cotton export, the commercial ties of the mining period (Moura et al. 1980). Graziano and Graziano (1982) attribute the establishment of these farms to the realization by some mining entrepreneurs of the advantages of occupying the labour force discharged from mining.

As cotton farming flourished, cotton-wool was exported and some small textile companies were established locally to produce fabrics which were consumed locally and also exported. However, the long distance and poor accessibility of the Valley from the major consumer centres and its poor accessibility constrained expansion. These constraints reflected increased the final costs of these products in such way that they could not compete with those produced near the consumer centres. Thus, the entrepreneurs' expectations were not fulfilled, and hence the Valley experienced another decline in its economy. While cotton production failed, extensive cattle raising could survive (Pereira, 1911; Moura et al., 1980; Graziano and Graziano, 1982).

However, the importance of cotton farming in particular parts of the Valley was quite remarkable, as can be observed in the following quotation:

The growing of cotton, which used to be on a large scale in the first half of the nineteenth century, was almost abandoned during some years due to a lack of

markets. However, it has been increasing lately ... Its production is almost entirely exported to plants in the municipalities of Diamantina, Gouvea and Curvelo while a small part is consumed there (Pereira, 1911: 67).

Pereira is not precise regarding how the cultivation of cotton began to increase again. However, it was clearly carried on at least in some parts of the Valley in the second half of the last century and early in this century. Since the municipalities of Diamantina and Gouvea are within the Valley, this suggests that there was a certain diversification of the Valley's economy. Pereira also mentions some extractive activities, such as the extraction of oil from copaiba and the latex extracted from mangabeira, both native species from the vegetation surrounding the municipality of Aracuai. Pereira also noted that the north of Minas Gerais, including the Valley, supplied foodstuffs and cattle to the south of the State of Bahia where cocoa and tobacco were cultivated on an expanding scale in monocultural estates with no major emphasis on food production (Pereira, 1911).

Later, food also began to be produced in the south of Bahia, although cocoa and tobacco continued to be the predominant crops, which reduced demand from the Valley, especially from its northern areas. When railways and roads were built bypassing the Valley, other centres appeared and became more important (Pereira, 1911; FJP/CODEVALE, 1975).

The decline of cotton farming enabled peasants and landless people to establish subsistence farming (Graziano and Graziano, 1982). Unfortunately, there are no figures to show the area occupied by cotton farming and how much of it became available for other agricultural farming. However, it seems that this release of land was of great importance. For example, Pereira's work mentions that the Valley not only produced food for its own consumption, but even for export, especially to the southern region of Bahia. Discussions with local people during the field work also supported this observation. The peasants occupied what was basically vacant land but had no legal documents to prove any legal rights to their possession. The lack of legal title can be attributed to lack of knowledge of the necessity for such a document or how and where to get it, lack of money to legalise their possession, and lack of competing demand for the land. This feature became critical for the penetration and expansion of industrial reforestation, supported by the intervention of the State, in the Valley from the 1970's.

The debate concerning the Valley's economic formation contains a similar sort of disagreement among authors as was evident from discussions of Minas Gerais' economic formation (Chapter 4). The facts cited above suggest the Valley's economy did not collapse following the decline of gold and diamond production. On the contrary, they suggest that the Valley, or at least some of its municipalities, experienced some economic development, at least for a while. They also suggest that the Valley's lands were occupied with agricultural farming, and consequently that these lands produced some

foodstuffs. This is the opposite to most statements used to justify the capitalist expansion into the Valley, namely that the land was without use. It is true that over the years the economic activities which were set up in the Jequitinhonha Valley were not able to generate conditions for continuous economic growth nor were they able to establish a centre which could work as a pole of development (F. CETEC, 1980).

Although the Valley's land had been used mainly by peasants for subsistence farming and because there was no major industrial or export growth, the Valley has been labelled as the 'Valley of Death', 'Famine Valley' or 'Absolute Poverty'. Such labels provide a convenient justification for the capitalist expansion into the Valley.

The Valley was not affected by the revolution of 1930 and its consequences referred to in Chapter 3 (F. CETEC, 1980). However, Sol (1981) has argued that one of the consequences of the revolution was a new political leadership in many municipalities. Even if Sol is correct a new political leadership does not indicate major transformations in social and economic fields. What Sol's book suggests is that the political power of the latifundiario (owner of the latifundia) was consolidated in an association of economic and

political powers which enabled the rural oligarchies to exercise complete control<sup>8</sup>.

As mentioned earlier, the Valley is one of the poorest regions in both Minas Gerais and Brazil. Innumerable reports and studies of the Valley's socio-economic situation have been prepared and State and Federal governments and even private institutions have designed many plans, programs and projects to promote its economic development. By the 1980's there were 73 agencies active in the Valley: 28 Federal agencies, 35 State agencies and 10 other religious and private ones acting in the fields of education, health and basic sanitation, habitation, food and nutrition, planning, financing, technical assistance including rural extension and the like. There is even a special State agency - CODEVALE - to promote the Valley's development<sup>9</sup> (F. CETEC, 1980).

However, this overall paraphernalia does not seem to have made a major contribution to the Valley's development. Indeed:

... if there was a direct proportion  
between development of a region and the

---

8. He noted that: '...Salto da Divisa has a particular characteristic which is worthy of mention: it always has just one political party ...' (Sol 1981: 149). Although his statement refers to a particular municipality this situation is not unusual in the Valley.

9. CODEVALE was created by the Constitutional Law No. 12 of 06 October, 1964 by the State of Minas Gerais Government (Badaro, n/d). CODEVALE's jurisdiction covers an area of 71,552 km<sup>2</sup> and encompasses 52 municipalities. It is important to note that its jurisdiction is not coincident with the Planning Region VII (Jequitinhonha Valley) defined by the Minas Gerais' Secretary of Planning. For the purpose of this thesis we will use the Valley as being the Planning Region VII.

number of agencies, programs and projects which act on it, the Jequitinhonha Valley would be better off vis a vis others. This situation would be reinforced given the number of reports and studies already conducted regarding its development. However, on the contrary, the Valley presents a context of depression in many of its basic aspects, despite the potential of its human and natural resources ... (F. CETEC 1980: 593).

The lack of development can be attributed, among other things, to a lack of integration between the different agencies. Each has acted within its own responsibilities which has led to an overlap of studies and a waste of scarce funds and labour. Moreover, the rigidity of institutional projects does not allow alternative solutions which could be more suited to the Valley's special problems, especially that of its socio-economic structure (F. CETEC 1980). This difficulty was one of the reasons for creating the CODEVALE (Badaro, n/d). However, it is a very sensitive point since it involves the interests of the powerful local oligarchy. Hence, projects, plans or programs which are perceived to threaten the oligarchy's interests, lack the necessary political support to go ahead. This is aggravated if they have any sort of relationship to agrarian reform. These aspects make it easier to understand a generalized tendency to neglect the socio-economic structure.



#### 7.4 Impacts of the Valley's Settlement on Its Vegetation

As referred to above, the Jequitinhonha Valley was settled as a consequence of gold and diamond discoveries. Following the gold rush, the forests were exploited to supply timber and firewood, cleared to grow foodstuffs and especially, cleared to establish natural pastures for the herds brought in quite considerable numbers from Bahia. This movement is attributed to both the decline of sugar production in the Northeast and the need to supply meat to the miners. Both mining and agriculture were operated on a large scale (FJP/CODEVALE, 1975).

Following the decline of mining, the area under pasture increased. Since the cattle were raised extensively large tracts of land were required and the Atlantic Forest was practically eliminated (CODEVALE, n.d.) This process of deforestation continued and by 1911 the '...forests in the region have already declined to one-tenth of what they used to be 50 years ago...' (Pereira 1911: 46).

In fact, what happened in the Valley was no different from the pattern observed in other regions of Minas Gerais and Brazil as well as in other parts of the world with similar histories of settlement<sup>10</sup>.

The environmental effects of deforestation were severe. In 1911, Pereira reported that:

---

10. For examples from other countries, see: Pinkett (1970); Houghton (1980); Calder (1980); and Tucker & Richards (eds.) 1983.

in the last 40 years the water resources in the Northern part of Minas Gerais have declined. This decline has accelerated in the last 20 years. Even the big rivers no longer have the same volume of water (Pereira 1911: 42).

The increasing impoverishment of springs since the end of the nineteenth century has also been attributed to deforestation (FJP/CODEVALE, 1975). These effects have been considered to have contributed to an expansion of the 'drought polygon'<sup>11</sup>, characteristic of the Northeast region of Brazil, further into the southern region. A decline in local fauna has been attributed to deforestation since early in this century (FJP/CODEVALE, 1975; Ferreira, 1911). The loss of local fauna has reduced the number of natural predators of some insects which transmit disease. However, it should be stressed that deforestation followed the same pattern in the Valley as the State as a whole.

There are not sufficient data to detail the process of deforestation further but the native forest types and the areas they cover now can be described briefly<sup>12</sup>.

The natural forest in the Valley seems to constitute a transitional stage between xerophytic vegetation and sub-deciduous

---

11. 'Drought Polygon' is the expression used throughout the literature to designate the drought zone of the Brazilian Northeast region (Hall 1978: 11-13).

12. The definition of each of the types presented in this review has already been provided in Chapter 5. This revision is based on F. CETEC, 1983. For a more detailed analyses see, for example: F. CETEC (1980 & 1983).

tropical forest. It covers an area of about 16.5 thousand hectares, or 0.2% of the Valley.

Transition forests are areas subjected to human intervention which are in the process of natural regeneration. This type covers an area of 1,703.2 thousand hectares, or 21.7% of the Valley.

Cerrado (Savanna) covers an area of about 1,281.2 thousand hectares, or 16.3 % of the Valley. Caatinga (Thornbush) covers 515.4 thousand hectares, or 6.6 % of the Valley.

## 7.5 Establishment of Forest Plantations

### 7.5.1 Prior to the Fiscal Incentives Scheme

We have divided the Valley in two groups of microregions. The first group which we have called ALTO-MINERADORAS comprises the three microregions in which the reforestation expanded: Alto Rio Pardo, Mineradora do Alto Jequitinhonha and Mineradora de Diamantina. The second we have called PASTORIS and comprises the two other microregions: Pastoril de Pedra Azul and Pastoril de Almenara in which reforestation did not expand. The extent of natural forests and plantations is reported in the Agricultural Census<sup>13</sup> (Table 7.1)

13. As the Agricultural Census only covers the farmland, the data in Table 7.1 do not include all the forests types referred to in the previous Section. Figures of natural forests presented in this table refer to the area within the estates.

Table 7.1: Distribution of the Areas Occupied with Natural and Planted Forest by Microregions

Unit: 1,000ha

Microregions	1950				1960				1970			
	Natural		Planted		Natural		Planted		Natural		Planted	
	Area	% <sup>1</sup>	Area	% <sup>1</sup>	Area	% <sup>1</sup>	Area	% <sup>1</sup>	Area	% <sup>1</sup>	Area	% <sup>1</sup>
Alto Rio Pardo	68.5	1.0	1.5	47.4	2.1	4.3	80.1	0.9	1.1			
Mineradora do Alto Jequitinhonha	3.4	0.7	16.5	15.0	0.2	1.4	11.5	0.1	1.3			
Mineradora de Diamantina	<u>54.7</u>	<u>2.3</u>	<u>4.0</u>	<u>75.3</u>	<u>3.9</u>	<u>4.9</u>	<u>45.1</u>	<u>0.9</u>	<u>1.9</u>			
<b>Alto-Mineradoras</b>	<b>126.7</b>	<b>4.0</b>	<b>3.1</b>	<b>137.6</b>	<b>6.2</b>	<b>4.3</b>	<b>136.7</b>	<b>1.9</b>	<b>1.4</b>			
Pastoril de Pedra Azul	130.4	2.5	1.9	95.2	6.2	6.1	143.2	0.6	0.4			
Pastoril de Almenara	<u>167.3</u>	<u>1.4</u>	<u>0.8</u>	<u>114.4</u>	<u>2.1</u>	<u>1.8</u>	<u>98.2</u>	<u>0.5</u>	<u>.5</u>			
<b>Pastoris</b>	<b>297.7</b>	<b>3.8</b>	<b>1.3</b>	<b>209.5</b>	<b>8.3</b>	<b>3.8</b>	<b>241.4</b>	<b>1.1</b>	<b>0.5</b>			
<b>Jequitinhonha Valley</b>	<b>424.4</b>	<b>7.8</b>	<b>1.8</b>	<b>347.1</b>	<b>14.5</b>	<b>4.0</b>	<b>378.0</b>	<b>3.0</b>	<b>0.8</b>			

Source: F. IBGE. Censos Agrícolas 1950 & 1960; and Censo Agropecuario 1970. Serie Regional (MG)

Note: 1. In relation to the total area covered with forests (natural + planted)

There is no survey or reference in the literature regarding forest plantations in the Valley prior to the fiscal incentives scheme. However, according to the Agricultural Census some areas of farmland were covered with natural and planted forests but there is no reference regarding who established them and for what purpose. From the Table above one can observe that of the total farmland area occupied with forests in the period 1950-70 only a very small proportion was planted forests. Nevertheless, these data suggest that there was some reforestation activity in the Valley before the introduction of the fiscal incentives scheme and before the assisted plantations expanded into the Valley - from the mid-1970's onwards.

In the decade 1950/60, the area occupied by plantation increased in four of the five microregions, but it still only represented 4% of the area covered with forest in the estates. Given the economic conditions of the Valley these plantations were probably established just to satisfy local demand, such as construction on the farm, fences and the like. Perhaps increases in local demand were anticipated.

In the following period 1960-70 the area of plantations declined in all microregions. Reviewing the literature revealed no explanation for this decline<sup>14</sup>. As discussed in more detail later, the Valley's wood-based industry, even in the 1980's, is very small

---

14. Actually the release of the 1960 Census faced many problems, including the long delay of its results which were only released in the 1970's for all states. Given this sort of problem it is difficult to say more about this increase in the plantation between 1950/60 and the sharp decline in the following decade. However, the data of the Census are the official ones.

and only consists of small sawmills (see Sub-section 7.5.2). So, it is unlikely that this decline was due to any major demand from the Valley's wood-based industry. What is clear from the table above is that until 1970 there was no sign of a major penetration of reforestation on a large scale. However, this was to change dramatically early in the 1970's.

### 7.5.2 Post Fiscal Incentives Scheme

The expansion of large industrial forest plantations in response to the fiscal incentives scheme introduced in 1967 only reached the Valley in the 1970's, and it was not until the mid-1970's that the great rush towards the Valley actually occurred. This rush was so significant that it was even classified as the Valley's third discovery<sup>15</sup> (Kotscho, 1977). In the 10 years, (1971-80) a staggering total of 354,500 hectares were planted. By comparison all the States of Australia only planted approximately 282,000 hectares in the same decade, of which about 30% is privately owned.

The establishment of large scale industrial forest plantations were widely perceived as the redemption of the Valley's

---

15. The other two discoveries, according to Kotscho, were first, the discovery of gold and diamonds in the Valley and consequently its settlement, and second, the expansion of cattle raising.

problems<sup>16</sup>. They were thought to be the 'medicine' to cure the Valley's chronic underdevelopment. The expansion of the plantations was rapidly visible and caused an obvious dynamism by the arrival of people, machines and increasing consumption<sup>17</sup>. In fact the initial establishment, the preparation of the land and planting required a substantial labour force which greatly increased the demand for labour. Within this context, reforestation was received euphorically by the Valley's population. They expected that the plantations would generate economic activities, bring modernization, develop the Valley and solve its problems, which the previous official policies had been unable to do. Actually, the lack of direct relationship between official policies and real development of the Valley had made the Valley's people, including its politicians, sceptical about government policies and promises (F. CETEC, 1980).

16. This euphoria could be observed in articles published in newspapers, for example: 'Projeto reflorestara o Jequitinhonha e criara 8 mil empregos', O Globo (10/09/74); 'Reflorestamento desenvolve o Vale do Jequitinhonha', Folha de Sao Paulo (28/03/76); 'A floresta "blue chip" da Acesita', Jornal do Brasil (25/03/76). Later, this euphoria shifted to scepticism as suggested by articles published in newspapers, for example: 'Imprevistos do reflorestamento', O Estado de Sao Paulo (08/04/76); Kotscho (1977) 'O progresso chegando ao vale da fome' set of 7 articles published in the newspaper 'O Estado de Sao Paulo' from 28/8/77 to 04/9/77; Procopio (1984) 'Jequitinhonha refletindo o Brasil', O Estado de Minas Gerais 04/03/84.

17. The area of farmland occupied by plantations grew at an average annual rate of 61.1% during the 1970/80 period while in the same period agriculture and grazing grew at only 2.9% and 2.0%, respectively (Personal calculation on the basis of the Agricultural Census 1970 and 1980).

Plantations which had been insignificant in the Valley during the period 1950-70, increased from 3 thousand hectares to 52.9 thousand hectares in only five years (1970-75). Then, from 1975 to 1980 they grew to 354.5 thousand hectares. However, as shown in Table 7.2 the plantations were concentrated in the Alto-Mineradoras, while in the Pastoris there was a decline. There is no conclusive explanation for the difference between the Alto-Mineradoras and the Pastoris. However, it can be suggested that in the former, subsistence agriculture was predominant while the cattle raising economy based on large estates, generally latifundia, in the latter with more economic and political power seems to have acted as a barrier to the expansion of reforestation. It can also be suggested that it was because some municipalities in the microregions Alto Rio Pardo and Mineradora do Alto Jequitinhonha of the Alto-Mineradoras are within SUDENE's jurisdiction and higher tax deductions were available for projects established there (See Section 5.5). On the other hand, none of the municipalities in the Pastoris is within the SUDENE's jurisdiction. In summary, these figures showed that the expansion of reforestation into the Valley was not only rapid, but it was also concentrated in the Alto-Mineradoras.



Table 7.2: Distribution of the Areas Occupied with Natural and Planted Forest by Microregions

Microregions	Unit: 1,000ha								
	1970			1975			1980		
	Natural Area	Planted Area	% <sup>1</sup>	Natural Area	Planted Area	% <sup>1</sup>	Natural Area	Planted Area	% <sup>1</sup>
Alto Rio Pardo	80.1	.9	1.1	131.2	9.6	6.8	189.9	147.5	43.7
Mineradora do Alto Jequitinhonha	11.5	.1	1.3	39.3	18.3	31.8	68.5	59.6	46.5
Mineradora de Diamantina	45.1	.9	1.9	69.4	24.9	26.4	173.2	147.1	45.9
<b>Alto-Mineradoras</b>	<b>136.7</b>	<b>1.9</b>	<b>1.4</b>	<b>239.9</b>	<b>52.9</b>	<b>18.1</b>	<b>431.6</b>	<b>354.2</b>	<b>45.1</b>
Pastoril de Pedra Azul	143.2	.6	.4	168.5	---	---	215.7	.3	.1
Pastoril de Almenara	98.2	.5	.5	138.8	---	---	128.9	---	---
<b>Pastoris</b>	<b>241.4</b>	<b>1.1</b>	<b>.5</b>	<b>307.2</b>	<b>---</b>	<b>---</b>	<b>344.6</b>	<b>.3</b>	<b>.1</b>
<b>Jequitinhonha Valley</b>	<b>378.0</b>	<b>3.0</b>	<b>0.8</b>	<b>547.1</b>	<b>52.9</b>	<b>8.8</b>	<b>776.1</b>	<b>354.5</b>	<b>31.4</b>

Source: F. IBGE. Censos Agropecuarios 1970, 1975 & 1980. Serie Regional-MG

Note: 1. In relation to the total area covered with forests (natural + planted)

--- Smaller than the unit used

The major genera planted were Eucalyptus and Pinus. However, Eucalyptus has been preferred as ecological conditions are more suitable for it and as almost all of the plantations are intended to produce wood for charcoal (see Graph 7.1) to supply the pig-iron and steel industries.

The Agricultural Census does not distinguish between plantations established with fiscal incentives and those without. However, data on the projects approved by IBDF for fiscal incentives are available (Table 7.3).

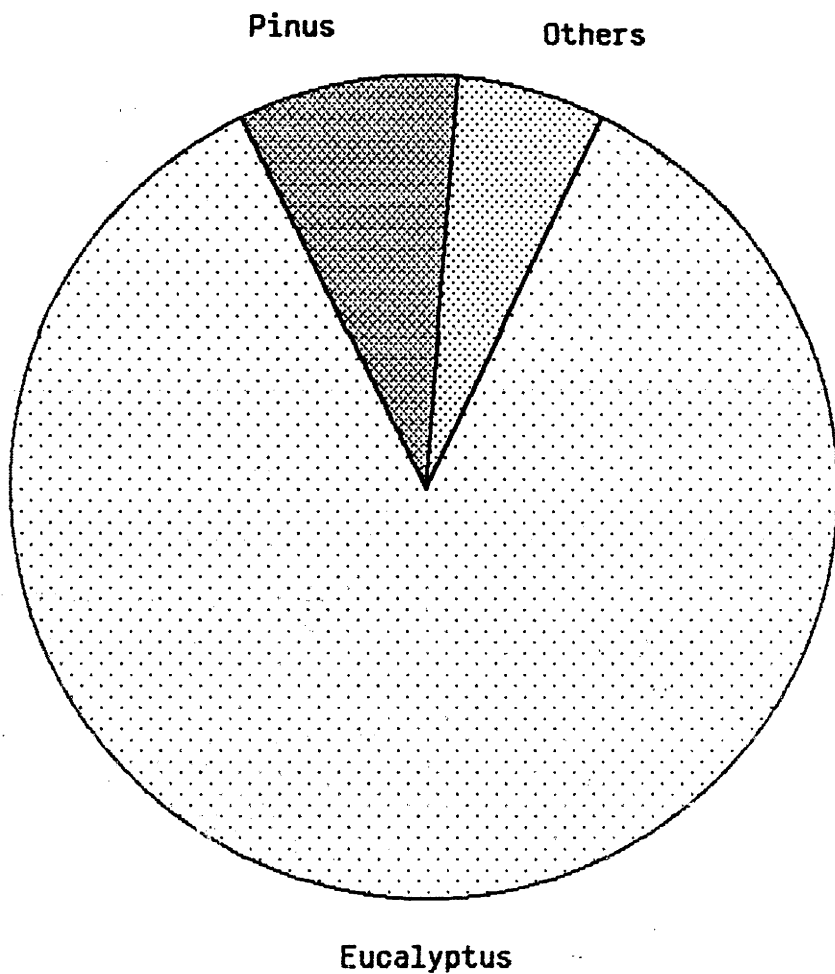
These data in Table 7.3 confirm both the rapid expansion of reforestation in the Valley, especially from 1975 onwards, and its clear trend to concentrate in the Alto-Mineradoras. The expansion reached its peak in 1978 and then declined due to the economic crisis, cuts in government expenditures and reduction in granting fiscal incentives. However, more than 25% of the total area approved by IBDF for reforestation in Minas Gerais, between 1972 and 1981, was planted in the Valley (See Graph 7.2), although planting under fiscal incentives had been underway elsewhere since 1967.

The establishment of these plantations was by two major groups of firms. The first group is the so-called independent firms, i.e. they are speculative and not linked to any final user. This suggests that the establishment of these plantations was just to take advantage of the fiscal incentives, but without any assurance of markets for the wood. However, there is the expectation that markets will develop to demand the wood from these plantations and consequently generate substantial profits. Actually, this perception is very similar to that advocated in the early approach for forestry in development discussed in Chapter 2. These are the so-called "plantations without assignment".

Graph 7.1

al Area Approved by IBDF for Reforestation with Fiscal Incentives by  
Genera as Proportion of Total Area Approved for the Valley

Period: 1967 - 1981

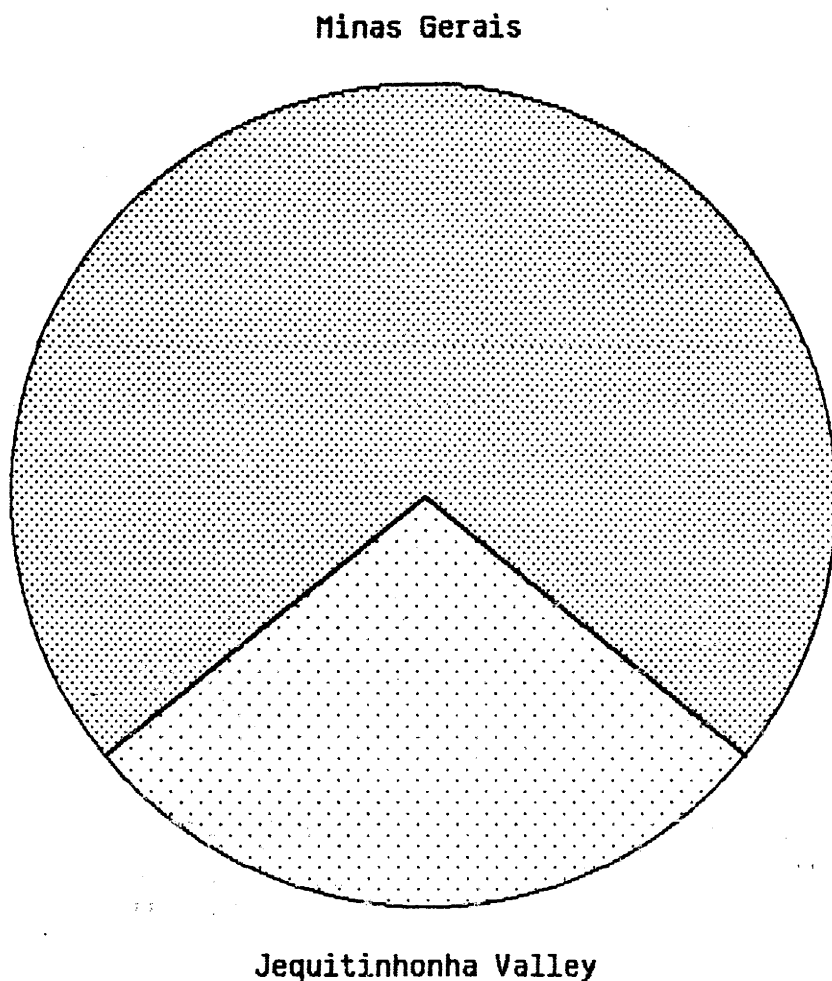


Statistical source: IBDF/DR

Graph 7.2

Total Area Approved by IBDF for Reforestation with Fiscal Incentives  
for the Valley as Proportion of Total Area Approved for Minas Gerais

Period: 1967 - 1981



Statistical source: IBDF/DR

Table 7.3: Expansion of the Large Scale Industrial Forest Plantations According to Projects Approved by IBDF

Microregions	Years <sup>1</sup>											Unit: 1,000 ha
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981		
	Area	Area	Area	Area	Area	Area	Area	Area	Area	Area		
- Alto Rio Pardo	---	---	1.8	4.1	13.6	30.4	41.7	38.0	32.7	20.2		
- Mineradora do Alto Jequitinhonha	---	---	---	17.8	15.6	9.2	12.7	7.5	3.6	2.7		
- Mineradora de Diamantina	<u>0.8</u>	---	<u>6.1</u>	<u>14.8</u>	<u>16.5</u>	<u>16.2</u>	<u>22.6</u>	<u>14.8</u>	<u>17.8</u>	<u>14.3</u>		
<b>Alto-Mineradoras</b>	<b>0.8</b>	---	<b>7.9</b>	<b>36.7</b>	<b>45.7</b>	<b>55.8</b>	<b>77.0</b>	<b>60.3</b>	<b>54.1</b>	<b>37.2</b>		
- Pastoreil de Pedra Azul	---	---	---	---	---	---	1.0	1.5	---	---		
- Pastoreil de Almenara	---	---	---	---	---	---	---	---	---	---		
<b>Pastoris</b>	---	---	---	---	---	---	<b>1.0</b>	<b>1.5</b>	---	---		
<b>Jequitinhonha Valley</b>	<b>0.8</b>	---	<b>7.9</b>	<b>36.7</b>	<b>45.2</b>	<b>55.8</b>	<b>78</b>	<b>61.8</b>	<b>54.1</b>	<b>37.2</b>		

Sources: IBDF/DR (Brasilia) and IBDF/DE (Minas Gerais)

Notes: 1.No projects were filed at IBDF prior to 1972 for the Valley;

2.(---) means that no projects were filed or approved by IBDF;

The second group is composed of firms which are subsidiaries of final users, especially pig-iron, steel and pulp and paper industries. In this case the future production from these plantations is already assigned, e.g. the wood harvest will be transformed into charcoal or pulplogs. Data are available for the genus Eucalyptus, but there are no figures to show the assignment of plantations of the genus Pinus. This is not a major constraint, as Eucalyptus is the most important so far, as seen in Graph 7.2.

Table 7.4: Area Approved With and Without Assignment as Proportion of the Total Area Approved by Microregion<sup>1</sup> - 1980

	Unit: %	
Microregions	With Assignment	Without Assignment
Alto Rio Pardo	14.9	85.1
Mineradora do Alto Jequitinhonha	35.0	65.0
Mineradora de Diamantina	95.1	4.9
Pastoril de Pedra Azul	100.0	---
Pastoril de Almenara <sup>2</sup>	---	---
Jequitinhonha Valley	47.8	52.2

Source: IBDF/UFRRJ 1983: 402-4.

Notes: 1. Refers only to forest plantations with fiscal incentives and with the genus Eucalyptus;

2. No project was filed for this microregion.

From the table above one can observe that more than 50% of the plantations in the Valley are without assignment. This is similar to the situation for Minas Gerais as whole, where 50.3% of the plantations are assigned (IBDF/UFRRJ, 1983). Another point which warrants attention is that almost all plantations without assignment

are concentrated in the microregions Alto Rio Pardo and Mineradora do Alto Jequitinhonha, which represent about 67% of the total plantations within the Valley. This appears to be because some of the municipalities in these two microregions are located in the jurisdiction of SUDENE<sup>18</sup>. As discussed in section 5.5 above projects to be established in SUDENE's area of influence are granted higher tax deductions. In this sense the government policy to push reforestation towards other regions, especially towards the northeast, seems to be working. On the other hand, these figures suggest that those are the speculative plantations.

As discussed in Chapter 5, economic reasons played an important role in the entrepreneurs' decision to shift their plantations to other regions. Among the economic reasons, increasing prices of land rendered reforestation economically less attractive or even non viable<sup>19</sup>. Thus changes in the relative price of land had an important effect on entrepreneurs' decisions to plant in the Valley.

However, it was not only economic reasons which pushed the entrepreneurs further, but the government also contributed to this shift. Indeed, the State is not an exogenous element in the economy, on the contrary it is an institution which reflects the underlying social forces and structure of production (Griffin and Khan, 1978).

---

18. SUDENE's jurisdiction is not exclusively restricted to the Northeast region, but it also some municipalities in the north and northeast regions of the State of Minas Gerais.

19. Regarding increased prices of land as a constraint in the expansion of the reforestation in other areas, see for example: Fontes (1978); Berger 1979: 36-38; and IBDF (1982a).

In this particular case, the government contributed in two forms. The first was an indirect contribution, especially from the federal government when, for example it granted differentiated tax deductions which ultimately drive reforestation to regions considered priorities or the requirement dictated by the scheme that the reforestation project must have a minimum area of 200 ha (See Section 5.5).

The second form in which the government contributed significantly was directly through the participation of the State government agency, 'RURALMINAS'<sup>20</sup>. One of RURALMINAS' first steps was to determine the legal condition of the land in the Valley. Although the majority of the peasants in the Valley has been living there for generations, most of them did not have any legal document to prove their legal possession of the land. This fact, together with the willingness of the government to promote 'development' in the Valley led RURALMINAS to consider most of the land in the Valley as devolutas, i.e. ownerless and therefore belonging to the government. A total of 1,131,900 ha of land was allocated to this category. This total was divided among 17 companies in tracts of land varying from 8,000 ha to 400,000 ha (Kotscho, 1977). However, there was a legal problem to be solved. According to the law any piece of land over 3,000 hectares can only be given or sold by the State with the Federal Senate's approval which only came at the end of 1976 (Kotscho, 1977). However, while waiting, the companies were able to advance work. As can be observed in Table 7.2 the area of

---

20. RURALMINAS is linked to the Government of Minas Gerais and was created by the Law 4278 of 21 November, 1966.



farmland occupied with plantations jumped from 3.0 thousand hectares in 1970 to 52.9 thousand hectares in 1975. Considering only those plantations established with fiscal incentives (Table 7.3) the increase was from 0.8 thousand hectares in 1972 to 36.7 thousand hectares in 1975. This shows clearly the expansion of reforestation even before the legal approval by the Federal Senate.

This keen interest demonstrated by the state government through providing land to the expansion of industrial reforestation suggests that:

The persistence in which the social question of the Jequitinhonha Valley is centralized on increasing income levels indicates how an alliance between labels and figures wants to impute negative attributes to a society - absence of a significant economic activity, weak dynamism of the people involved, traditionalism - so that the expansion of activities based on capitalist profit become the medicine par excellence for development, bringing, after all, life to where supposedly there was only a dying people and an agonising land. (Moura 1983: 8)

That plantations were established without a defined final use illustrates the idea advocated in the early industrialization approach for forestry in development discussed in Chapter 2, i.e. the availability of plantations per se would attract wood-based industries, and consequently lead to a process of industrialization. Although evidence presented in the following section does not seem to support this idea, it still persists - at

least this is suggested by more and more plantations being established in regions far away from major consumer centres and without any assurance of markets for the wood. Despite the initial benefits that these plantations can bring, such as generation of jobs, these benefits are liable to decline if the initial work of planting is not succeeded by maintenance, harvesting and re-planting, i.e. the circle is completed.

The rapid expansion of the large industrial forest plantations in part of the Valley has been documented here. What effects has it had on the Valley's wood-based industry?

#### **7.6 Wood-Based Industry**

The Valley's wood-based industry is relatively unimportant in the State's context, as shown in Table 7.5. This suggests a paradox given the great expansion of industrial reforestation in the Valley, especially when one bears in mind that more 50% of these plantations were without assignment (Table 7.4). The notion of any relationship between the establishment of large scale industrial forest plantations and their capacity to attract or expand wood-based industries is not supported by the evidence in the Jequitinhonha Valley. This claim is better supported when the Valley's wood-based industry is sub-divided.

Table 7.5: Valley's Wood-based Industry as a Proportion of Minas Gerais' Wood-based Industry by Microregions - 1981

Microregions	Proportion of the State's Wood-based Industry (%)
Alto Rio Pardo	0.58
Mineradora do Alto Jequitinhonha	0.03
Mineradora de Diamantina	<u>1.10</u>
<b>Alto-Mineradoras</b>	<b>1.71</b>
Pastoril de Pedra Azul	0.40
Pastoril de Almenara	<u>0.26</u>
<b>Pastoris</b>	<b>0.66</b>
Jequitinhonha Valley	<u>2.37</u>

Source: IBDF/UFRRJ, 1983

The primary wood processing industry in Minas Gerais consists of Sawmills, Veneer Plants, Veneer and Plywood Plants and Particleboard Plants. However, only the simplest form, sawmills, is present in the Valley and there are few of those (Table 7.6).

Table 7.6: Number of Sawmills by Microregions and Their Proportion in the Valley and the State

Microregion	No.	Percentage of the Valley	Percentage of the State
Alto Rio Pardo	4	6.5	0.3
Mineradora do Alto Jequitinhonha	1	1.6	0.1
Mineradora de Diamantina	<u>27</u>	<u>43.6</u>	<u>2.1</u>
<b>Alto-Mineradoras</b>	<b>32</b>	<b>51.7</b>	<b>2.5</b>
Pastoril de Pedra Azul	16	25.8	1.2
Pastoril de Almenara	<u>14</u>	<u>22.5</u>	<u>1.1</u>
<b>Pastoris</b>	<b>30</b>	<b>48.3</b>	<b>2.3</b>
Jequitinhonha Valley	62	100.0	4.8

Source: Personal calculation based on IBDF/UFRRJ, 1983: 187

From the above it can be observed that the mills themselves are small, suggesting that they only supply the Valley's demand. As one can note from this table, Pastoril de Almenara is the second in terms of number of sawmills. It plus Pedra Azul represents almost 50% of the whole sawmill industry in the Valley. This fact acquires another dimension when one bears in mind that they are the two microregions where the reforestation did not expand (See Tables 7.1 and 7.2). Of the other 50% most is concentrated in Mineradora de Diamantina.

However production of sawlogs has not been the major concern of these plantations, and even of the whole fiscal incentives scheme. These plantations were primarily to produce pulplog and wood for charcoal. For example, in 1975, the principal aim of 11 out of 12 projects proposed to establish forest plantations in the Valley was to produce pulplogs to supply a pulp and paper industry there (FJP/CODEVALE, 1975). Yet still, in 1983, there were no pulp or paper mills located in the Valley (IBDF/UFRRJ, 1983).

The small size of the sawmill industry in the Valley also becomes evident when one observes the total installed capacity, in terms of  $m^3$ /month, in the following table:

Table 7.7: Total Installed Capacity of the Sawmills by Microregion and Its Proportion to the Valley and to the State

Microregion	Total Installed Capacity m <sup>3</sup> /month	Proportion in the Valley (%)	Proportion in the State (%)
<b>Alto-Mineradoras</b>			
Alto Rio Pardo	310	12.74	0.50
Mineradora Alto Jequitinhonha	10	0.41	0.02
Mineradora de Diamantina	916	37.63	1.49
<b>Pastoris</b>			
Pastoril de Pedra Azul	214	8.79	0.34
Pastoril de Almenara	984	40.43	1.60
<b>Jequitinhonha Valley</b>	<b>2,434</b>	<b>100.00</b>	<b>3.96</b>

Source: IBDF/UFRRJ, 1983

However, this trend observed in the Valley of producing for local consumption is the same as observed for Minas Gerais as a whole - 96.6% of its entire production is consumed within the State (IBDF/UFRRJ, 1983). Given their small size the Valley's sawmills also consume a small quantity of wood per year. IBDF/UFRRJ (1983) grouped them in four groups according to their annual consumption as follows:

Table 7.8: Classes of Sawmills According to Annual Consumption

Classes	Wood Consumption
A	up to 499
B	500-999
C	1,000-1,999
D	2,000 and more

Source: IBDF/UFRRJ, 1983: 187

Of the total number of sawmills in the Valley (Table 7.6) 93.6% are class A, just 2 sawmills are in each class B and C which represents a proportion of 3.4% for each class, and none in class D. Once more this shows the small size of the wood-based industry in the Valley and consequently its lack of major economic importance.

### 7.7 Conclusions

What has been discussed so far suggests that the Valley's process of development has not been much different from that in Brazil and by extension in Minas Gerais. In both, this process was characterized by economic cycles. In one of them the gold cycle, the Valley played a major role. Consequently it was affected by its decline, but as discussed above some other economic activities, especially cattle raising and cotton for a while could survive. However, they do not seem to have been strong enough to promote a major integration of the Valley into Minas Gerais' process of development and by extension, into the overall Brazilian process. The development of the Valley paralleled and lagged behind development in Minas Gerais. As discussed in Chapter 4, Minas Gerais stayed for a while in isolation from the overall Brazilian development based on industrialization which was basically concentrated in Sao Paulo and only later, was Minas Gerais integrated into it. The Valley was only integrated into Brazilian development from the 1970's and it is fair to say that the expansion of the large industrial forest plantations through fiscal incentives played an important role in this.

It is also clear from the discussion above that the reforestation did not expand uniformly throughout the Valley. On the contrary it tended to concentrate in the Alto-Mineradoras while in the Pastoris it almost does not exist.

The expansion did not seem to contribute to the Valley's wood-based industry which is still exclusively small-scale sawmilling. The microregion Pastoril de Almenara is second in terms of number of sawmills and is the first in terms of total installed capacity, yet no project for establishment of large industrial forest plantations has been approved for it (see Table 7.2).

This leads one to reconsider this generalized perception regarding the role of establishment and availability of large plantations per se as capable of attracting or expanding wood-based industries, and consequently leading to a process of industrialization. Plantations may be necessary, but not a sufficient condition for such.

That the Valley's wood-based industry is restricted to sawmills, and their small size shown through the tables above, suggests that they do not have a major economic significance, in contrast to the industrial reforestation established in the Valley at a quite considerable rate and at considerable expense.

What is most likely was that those plantations were just established there because of the fiscal incentives, which made these projects low risk from the entrepreneurs' point of view. Given the characteristics of the Valley, its lack of infrastructure and the like, it does not suggest that this expansion would have occurred

without the fiscal incentives. In fact, this conclusion is reinforced when one takes into account that Alto Rio Pardo and Mineradora do Alto Jequitinhonha are the microregions in which the greatest proportion of reforestation without assignment occurs (Table 7.5) with the fact that some of their municipalities are in the SUDENE'S jurisdiction, with higher tax deductions. These two microregions account for more than 60% of the total area reforested in the Valley.

However, this availability of large plantations without assignment is not unique to the Valley, as referred to above a similar pattern is observed in Minas Gerais as a whole. This indicates how strong still is the philosophy of the early approach to the role of forestry in development.

The magnitude and speed of the expansion of the industrial reforestation into the Valley played an important role in the Valley's socio-economic structure, which will be discussed in the following chapter.



## CHAPTER 8

### THE EXPANSION OF REFORESTATION ACTIVITY AND ITS IMPACTS ON THE JEQUITINHONHA VALLEY'S SOCIO-ECONOMIC STRUCTURE

#### 8.1 Introduction

It is not feasible to develop a comprehensive model which would explain all the causative factors bearing on forestry and the development of the Jequitinhonha Valley, or enable one to trace the results of all possible influence of these plantations on the Valley. Such a task would go beyond the scope of a thesis and would require a multi-disciplinary team to carry out. However, some specific parts of the process can illuminate the likely major interrelationships between socio-economic and political aspects underlying the expansion of reforestation and its impacts on the Valley's socio-economic structure.

In this chapter the major issues of land tenure, agricultural production and rural-urban migration raised by both proponents and opponents of the large scale reforestation in the Valley are discussed.

Following this introduction the second section will review the debates which have been conducted by these groups referred to above. The third section will discuss the impacts of these plantations on the Valley, under seven sub-headings. Finally, the fourth will draw conclusions.

## 8.2 The Debate on the Impacts of the Expansion of Reforestation

The debate about the impacts of reforestation has been polarized into two schools of thought. The first argues that reforestation has been a major agent of development since it has promoted economic activity, brought progress and modernization to backward regions and consequently has contributed to integrating them into the overall Brazilian process of development. The second school perceives this expansion from a quite different perspective and it argues that the aspects considered by the previous school as advantages increased dependence and maintain or aggravate their underdevelopment.

### 8.2.1 The Proponents School

The arguments that reforestation has developed the Valley are similar to those used to justify the overall fiscal incentives scheme, and are commonly cited in forestry literature. Industrial forestry it is claimed:

- a. occupies marginal lands, does not compete with agriculture, and consequently does not interfere with food production;
- b. transforms abandoned and unproductive lands into valuable ones;
- c. creates jobs and generates income in rural areas;
- d. encourages rural people to stay put and perhaps reverses rural-urban migration;
- e. promotes economic activity where there was little; and
- f. increases the access of local people to health care,

f. increases the access of local people to health care, education and better nutrition (Fontes, 1978; AMEF<sup>1</sup>, 1981)

Besides this, reforestation has been associated with national security since promoting economic development diminishes the risk of social unrest (Boer, 1974; AMEF, 1981). By promoting these benefits industrial plantations contribute to modernization, understood as progress or development of backward regions which puts the benefits available in the major centres within reach of the population of these regions. Fontes, for example, argues:

... the reforestation is, actually, an activity prodigious in generation of indirect benefits, creating material, human and social infrastructure in regions previously marginal to the whole process of development ... without any doubt this is what happened in the Jequitinhonha Valley ... (Fontes, 1978: 50).

The plantation owners association, AMEF, has argued that:

... in the Jequitinhonha Valley, municipalities which until recently represented the synthesis of the distress picture from this region that is listed by UN among the 5 most underdeveloped regions in the world because it has high indexes of diseases, malnutrition, child mortality and a low per capita income these municipalities are becoming transformed and already show improvement in their social and economic structure thanks to the reforestation firms which established there ... (AMEF, 1981)

---

1. AMEF = Associação Mineira de Empresas Florestais (Association of Forestry Enterprises of Minas Gerais).

These arguments have been used again and again and are based on the assumptions<sup>2</sup> that the benefits of large scale capital development will trickle-down throughout the economy, as reviewed in Chapter 1 and by extension, on the assumptions of the early industrialization approach to forestry in development, discussed in Chapter 2. This school assumes that the plantations are net additions to the economies of their region.

### 8.2.2 The Critical School

The second school does not view industrial reforestation so optimistically. The critical school no longer consists only of independent authors, such as Moura et al. (1980), Graziano and Graziano (1982) and Moura, (1983), but also of some official agencies, e.g. F. CETEC. Critical views perceive, each to a certain extent, that the penetration of more capitalist modes of production, such as industrial reforestation, into the Valley, tends to exclude all other forms of non-capitalist production in the land and affects the labour relationships (Moura, 1983).

One of the conclusions from the F. CETEC's<sup>3</sup> work on the Jequitinhonha Valley was that:

2. See besides those works referred to in Chapter 5 and in footnote 1 of Chapter 7, for example: Ladeira (n/d); Reis (1983). COALBRA (1983); IBDF (1985).
3. This work was a comprehensive study of the Jequitinhonha Valley's natural resources, environment and socio-economic situation. Its principal aim was to provide the planning agencies (Federal and State) with the necessary background which could allow the design and establishment of policies and programs accordingly to the Valley's real situation.

... the major characteristic from this process of changes as a consequence of the expansion of the reforestation is the sharp speed in which it has occurred. Acquisition of small properties by large companies has happened in rhythm of rush, with low prices, speculation, third parties and the like. This sets up the recent picture of occupation of the land in the Valley. With this same rush the available labour force which could not understand very well the new reality was absorbed ... despite the benefits that the reforestation could bring to the Valley, such as temporary creation of new jobs, increase in the tax collection by the municipalities, improvement of roads... However, the social costs imposed by the expansion of this activity suggest that changes in the legislation are required in order to better take note of the interests of the population and municipalities ... (F. CETEC 1980: 599)

F. CETEC's finding is not surprising, given our earlier discussion of the effects of the Brazilian model of development. However, it is not reforestation per se that imposed heavy social costs, but rather the way in which it was conducted, dictated by the overall model, that led to such social costs.

The large farmers in the Valley blamed the reforestation firms as being solely responsible for all transformations there, especially regarding expropriation of small farmers. This usefully covers their own exploitation of the peasants, for "if the firm expropriates, the large farm also expropriates" (Moura 1983: 4). This argument used by Moura sheds some light on the changes that the

Valley has experienced and their multiple interactions of the process.

F. CETEC's report lists the social and ecological factors disturbed by the expansion of the plantations into the Valley as:

- a. the loss of cultural and environmental references due to changes in the natural countryside;
- b. the poor lost their natural sources of energy, food and medicinal plants;
- c. the peasants, small farmers and those who occupied a piece of land but did not have legal property, lost their land;
- d. the sudden changes in the work relationship which shift from a pre-capitalist stage to an advanced stage of capitalist exploitation (F. CETEC 1980: 600)

It goes on to note that there was also a decline in attending the basic needs for a better quality of living conditions of the population in relation to dwelling, health, nutrition and education.

F. CETEC's findings are supported in by studies done by other official agencies. Recent work by CODEVALE/FJP/SEPLAN-MG in 1983 argues that expansion of industrial reforestation into the Valley:

- a. imposed a location specific dynamism which exacerbates intermunicipal disequilibrium;
- b. generated major disequilibrium among sectors through a modernization restricted to some segments;
- c. contributed to increased concentration of land tenure either by buying small farms or by expropriation from the small owner, or by both;

- d. led to changes in the old labour relationships and promoted a casual labour market;
- e. fomented rural-urban migration, especially as a consequence of the items c and d above (CODEVALE/FJP/SEPLAN-MG 1983: 45)

The contentions of these two opposite schools, can be tested by an empirical analysis of impartial data mostly draw from the data from the Agricultural Census of 1950, 1960, 1970, 1975 and 1980.

### **8.3 Impacts of the Expansion of the Reforestation**

Following the approach used in Chapter 7 the Valley is divided in two sub-regions of the Valley, ALTO-MINERADORAS and PASTORIS<sup>4</sup>.

#### **8.3.1 Land Use**

A typical statement from the proponent school has been that:

... the reforestation just occupies land not used for agriculture, not good for any type of crop, such as plateaus while the subsistence agriculture continues to be developed in the low

---

4. The reader should note that in some cases because of either lack of data, or data which cannot be added, e.g. net migration balance, data must be presented for the Valley as a whole or by microregion.

lands, especially gullies which are fertile ...

(AMEF 1981)

However, authors from the opponent school, such as Graziano and Graziano (1982), argue strongly that these lands were classified as abandoned simply because the smallholders could not prove their legal possession. The productivity of the plateaus, where most of the forest plantations have been established, was naturally low given their edaphic-climatic characteristics. However, they have been used for grazing and collecting medicinal plants and fuelwood on a communal basis (F. CETEC, 1980; Graziano and Graziano, 1982). Further 'these plateaus are understood as Nature by the local people, and Nature is God who created, so it does not belong to anybody' (Graziano & Graziano 1982: 9). Capitalist expansion in the Valley broke the 'complexo grotta-chapada' (gully-plateau complex) natural ecosystem in which peasants in the Valley have been living for centuries and which was important in the social organization of the Valley (Graziano and Graziano, 1982). Within this context, the plateaus were far from being marginal lands as proponents stated<sup>5</sup>. To examine this question in detail we need to analyse Census data on land use (Table 8.1).

---

5. It is interesting to note that this subject has been treated in quite different sources which range from newspaper articles, e.g.: Kotscho (1977); Procopio (1984); to papers, e.g.: Moura et al. (1980); Graziano & Graziano (1982); and somewhere in between, even official reports, such as F. CETEC (1980) and CODEVALE/FJP/SUPLAN-MG (1983).



Table 8.1: Land Use

Unit: 1,000 ha

	1950		1960		1970		1975		1980	
	Area	%	Area	%	Area	%	Area	%	Area	%
- Agriculture	104.5	10.4	118.2	11.2	138.6	11.8	160.6	8.2	196.9	8.5
- Grazing	485.6	48.4	534.3	50.6	679.2	57.6	1,048.2	53.8	985.3	42.4
- Planted Forests	4.0	0.4	6.2	0.6	1.9	0.2	52.9	2.7	354.2	15.3
- Natural Forests	126.7	12.6	137.6	13.0	136.7	11.6	239.9	12.3	431.6	18.6
- Fallow	282.7	28.2	260.2	24.6	222.1	18.9	445.9	22.9	354.7	15.3
<b>Alto-Mineradoras</b>	<b>1,003.5</b>	<b>100.0</b>	<b>1,056.6</b>	<b>100.0</b>	<b>1,178.6</b>	<b>100.0</b>	<b>1,947.5</b>	<b>100.0</b>	<b>2,322.6</b>	<b>100.0</b>
- Agriculture	91.7	4.6	146.1	6.8	98.0	4.7	110.3	4.7	118.9	5.2
- Grazing	1,133.7	56.9	1,382.1	64.4	1,506.4	71.9	1,786.3	76.0	1,676.1	72.7
- Planted Forests	3.8	0.2	8.3	0.4	1.1	0.1	---	---	0.3	---
- Natural Forests	297.7	14.9	209.5	9.8	241.4	11.5	307.2	13.1	344.6	14.9
- Fallow	466.3	23.4	401.5	18.7	249.1	11.9	148.2	6.3	166.3	7.2
<b>Pastoris</b>	<b>1,993.3</b>	<b>100.0</b>	<b>2,147.5</b>	<b>100.0</b>	<b>2,096.0</b>	<b>100.0</b>	<b>2,352.0</b>	<b>100.0</b>	<b>2,306.1</b>	<b>100.0</b>
- Agriculture	196.3	6.6	264.3	8.3	236.6	7.2	270.8	6.3	315.7	6.8
- Grazing	1,619.3	54.0	1,916.4	59.8	2,185.7	66.8	2,834.6	65.9	2,661.4	57.5
- Planted Forests	7.8	2.6	14.5	4.5	3.0	0.1	52.9	1.2	354.5	7.7
- Natural Forests	424.4	14.2	347.1	10.8	378.0	11.5	547.1	12.7	776.1	16.8
- Fallow	749.0	25.0	661.7	20.7	471.2	14.4	594.1	13.8	520.9	11.3
<b>Valley</b>	<b>2,995.8</b>	<b>100.0</b>	<b>3,204.0</b>	<b>100.0</b>	<b>3,274.5</b>	<b>100.0</b>	<b>4,299.5</b>	<b>100.0</b>	<b>4,628.7</b>	<b>100.0</b>

Source: F. IBGE. Censos Agrícolas 1950 & 1960 and Censos Agropecuarios 1970, 1975 & 1980.

Note: (---) Less than the unit used.

From the Census data it can be seen that besides subsistence agriculture and cattle raising which occur throughout the Valley, other forms of land use, such as large scale industrial forest plantations, coffee, sugar cane increased in importance. However, it has been industrial reforestation that has expanded remarkably, especially in the Alto-Mineradoras. Grazing was still the major form of land use in 1980 when more than 50% of the total farmland in the Valley as a whole was under pasture, and 72% in the Pastoris (Table 8.1).

In Table 8.1 one can observe that from 1950 to 1960, in the Alto-Mineradoras, just about 50 thousand hectares were incorporated into the productive process. In the next decade, this incorporation was greater. However, these transformations can be considered very small when one takes into account that for the whole period of 20 years, i.e. from 1950 to 1970 the total of land incorporated was less than 200 thousand hectares. In other words, an average of less of 10,000 hectares annually was included in the productive process. From 1970 to 1980 the total area of land under production practically doubled. The greatest part of this occurred in a period of only 5 years (1970/75) when about 800 thousand hectares, i.e. from 1,178.6 thousand to 1,947.5 thousand hectares were included into the productive system.

In the Pastoris this incorporation of new lands during the period 1950/70 was very small, even during the decade 1960/70 these data suggest that there was an inversion of the process, i.e. some land was put out of the productive process. During the decade

1970/80 the Pastoris experienced an increase in the first half of the decade which was followed by a slight decline in the last half. However, the consolidation of grazing in this region is clear. This once more proves that the reforestation did not expand throughout the Valley. This increase in grazing area can be attributed, at least in part to the conversion of fallow land. As far as agricultural use is concerned these figures show that the land use for agricultural purposes in this region was never intensive, e.g. it never reached even 8% of the total productive land.

These data suggest that most of this incorporation was into grazing activities since during the same period of 20 years (1950/70) the area occupied with this activity increased from 485.6 thousand hectares to 679.2 thousand hectares, proportionally to the total area under the productive process this increase was from 48.4% to 57.6%, respectively. However, from 1970 onwards, this process sharply accelerated.

On the other hand, since most of the actual establishment of plantations occurred from 1975 onwards, this rapid inclusion of land into the productive system suggests that it was a way to assure the possession of a piece of land to then design and establish the project. Besides the governmental intervention which contributed to this as discussed above, the fiscal incentives scheme legislation requires the ownership or leasing of the land in order to apply for the concession of a tax deduction to establish a project. These figures suggest that most of the land was incorporated under grazing and fallow uses. In the following period (1975/80) when the actual

establishment of most of the plantations occurred, these data suggest that new lands were brought into the productive process while maybe others came from the conversion of grazing and fallow into planted forests, given their decline in area. On the other hand, the total area under agricultural use increased in absolute terms, but proportionally decreased.

One can also observe that the area covered with natural forests in the period 1950/70 increased slightly. However, from 1970 onwards it accentuated. There is not a conclusive answer to explain such an increase. As far as the wood-based industry is concerned, there was no basis from Chapter 7 to suggest that those areas have increased in order to supply it with raw material. However, it can be attributed, at least in part, to the expansion of reforestation. As discussed in Chapter 5, the legislation of the fiscal incentives scheme requires that at least 10% of the total area of the project must be preserved with natural vegetation. If the natural vegetation covers an area less than 10%, the IBDF can require an additional plantation of native species in the proportion of 1 or 2% of the total area of the project (Decree 79046 of 27/11/76, 14th article, § 1). Within this context, it is cheaper if a firm leaves aside an area covered with natural vegetation which, in general, exists in the gullies where edaphic conditions are better. At the same time, planting and exploitation in these gullies would be more difficult and expensive.

This supports Moura's (1983) arguments that the Valley has experienced transformations since early in the 1960's.

However, from the above one can observe that it was from 1970 onwards that the Valley experienced major transformations in the form of land use which is coincident with the expansion of the reforestation activity. Allied to this it is once more clear that this expansion was concentrated in the Alto-Mineradoras. This analysis also suggests that this expansion was based on an incorporation of new lands into the productive process which partially agrees with the views of those who advocate the expansion of reforestation. It is partially because, although these lands were not previously incorporated into the productive process, this does not necessarily mean that they were waste lands or that they were not being used for example as common lands for grazing or collection of firewood and medicinal plants as argued by authors, such as Moura (1980) and Graziano & Graziano (1982). As far as land used for agricultural purpose is concerned it can be noticed that this increase in absolute terms, but decreased in proportion. Actually, this increase was even a little bit greater in the Alto-Mineradoras than in the Pastoris.

Parallel to these changes in land use, the Valley also experienced changes in its land tenure structure.

### **8.3.2 Land Tenure**

Land tenure in the Valley has an asymmetrical distribution and a concentrated structure (CODEVALE 1979). This seems to constitute the Valley's "Achilles' heel" because:

... the quality of life in the region  
(Valley) is directly related to the

existing land ownership structure, i.e. to the concentration of the rural and urban estates and consequently, to the income concentration ... (F. CETEC 1980: 83)

The impacts of reforestation on this structure have been generally ignored by the proponents' school, but always raised by the critical school. Data from the Agricultural Census display the changes in distribution that have occurred (Tables 8.2, 8.3).

Tables 8.2 and 8.3 show that in 1950, in the Alto-Mineradoras, small farms (< 100 ha) which represented 88.6% of the total number of farms represented 31.9% of the total farmland. In this same period, the medium size farms (100-1,000 ha) corresponded to 10.8% of total number of farms and kept 47.2 % of the total farmland. The large size farms (> 1,000 ha) represented 0.6% of the total number of farms while they occupied 20.9% of the total farmland. Actually, from 1950 to 1970 as one can observe there were not any major changes in the land tenure structure.

However, it was from 1970 onwards that major changes in the land tenure structure can be observed, coincident with the expansion of large scale reforestation. The small farms continued to constitute about 90% of the total number of farms, but their share of the total farmland decreased from 33.8% in 1970 to 24.5% in 1980. A similar pattern can be observed for the medium size farms, i.e. they kept almost constant in proportion of the total number of farms, but their share of the total farmland declined slightly. On the other hand, the large farms did not change in proportion to the total number, i.e. they continued to represent about 1% of the total number

of farms. However, their share of the total farmland more than doubled, from 19.5% in 1970 to 40.8% in 1980. However, it is interesting to note that this process was practically concentrated in the first half of the decade, the period when the rush towards the Valley occurred.

In the Pastoris, in both decades 1950/60 and 1960/70 the overall process was very similar to that which could be observed in the Alto-Mineradoras, referred to above. However, from 1970 onwards the pattern in the land tenure of this region was different from the Alto-Mineradoras. Small farms that, in 1970, represented 62.4% of the total number of farms and 13.9% of the total farmland, increased in both number of farms and area occupied by them, i.e. 70.2% and 15.2%, respectively. During the same period, medium size farms decreased proportionally to the total number of farms from 34.9% in 1970 to 27.7% in 1980. However, in proportion of the total farmland area their share increased from 55.8% in 1970 to 56.8% in 1980. On the other hand, large farms which, in 1970, represented 2.7% of the total number of farms and occupied an 30.3% of the total farmland area decreased proportionally to 2.1% and 28.0%, respectively, in 1980.

These data suggest that most of the changes discussed above for the Valley as a whole can be attributed practically to those in the Alto-Mineradoras - the region where the reforestation expanded. This suggests that is likely that the expansion of the industrial reforestation played some role in these changes.

Table 8.2: Area of Farmland According to Size of Farms

	1950		1960		1970		1975		1980	
	Area	%	Area	%	Area	%	Area	%	Area	%
< 100 ha	400.6	31.9	529.3	39.1	500.0	33.8	571.8	26.6	626.1	24.5
100 - 1,000 ha	593.5	47.2	599.3	44.2	689.9	46.7	799.4	37.2	887.5	34.7
> 1,000 ha	262.4	20.9	226.7	16.7	289.1	19.5	778.7	36.2	1,041.1	40.8
<b>Alto-Mineradoras</b>	<b>1,256.4</b>	<b>100.0</b>	<b>1,355.4</b>	<b>100.0</b>	<b>1,478.9</b>	<b>100.0</b>	<b>2,194.9</b>	<b>100.0</b>	<b>2,554.7</b>	<b>100.0</b>
< 100 ha	273.4	12.5	376.6	15.8	312.8	13.9	355.7	14.3	369.6	15.2
100 - 1,000 ha	1,139.3	52.2	1,255.3	52.7	1,256.2	55.8	1,361.4	54.8	1,381.3	56.8
> 1,000 ha	770.7	35.3	750.9	31.5	683.2	30.3	765.8	30.8	681.5	28.0
<b>Pastoris</b>	<b>2,183.4</b>	<b>100.0</b>	<b>2,382.7</b>	<b>100.0</b>	<b>2,252.2</b>	<b>100.0</b>	<b>2,482.9</b>	<b>100.0</b>	<b>2,432.4</b>	<b>100.0</b>
< 100 ha	673.9	19.6	905.9	24.2	812.8	21.8	927.5	20.0	995.6	20.0
100 - 1,000 ha	1,732.8	50.4	1,854.6	49.6	1,946.1	52.2	2,160.7	46.6	2,268.8	45.5
> 1,000 ha	1,033.1	30.0	977.6	26.2	972.3	26.1	1,544.4	33.3	1,722.6	34.5
<b>Valley</b>	<b>3,439.8</b>	<b>100.0</b>	<b>3,738.1</b>	<b>100.0</b>	<b>3,731.2</b>	<b>100.0</b>	<b>4,632.7</b>	<b>100.0</b>	<b>4,987.1</b>	<b>100.0</b>

Source: F. IBGE. Censos Agrícolas 1950 & 1960 and Censos Agropecuarios 1970, 1975 & 1980.



Table 8.3: Number of Farms According to Size

	1950		1960		1970		1975		1980	
	Number	%	Number	%	Number	%	Number	%	Number	%
	Unit: 1,000									
< 100 ha	18.1	88.6	26.8	91.5	26.5	90.3	31.1	90.4	32.0	89.6
100 - 1,000 ha	2.2	10.8	2.4	8.2	2.7	9.3	3.1	9.0	3.5	9.7
> 1,000 ha	0.1	0.6	0.1	0.3	0.1	0.5	0.2	0.7	0.3	0.7
<b>Alto-Mineradoras</b>	<b>20.4</b>	<b>100.0</b>	<b>29.3</b>	<b>100.0</b>	<b>29.3</b>	<b>100.0</b>	<b>34.4</b>	<b>100.0</b>	<b>35.7</b>	<b>100.0</b>
< 100 ha	6.2	58.7	10.0	67.1	7.9	62.4	10.0	66.1	12.1	70.2
100 - 1,000 ha	4.0	37.8	4.5	30.3	4.4	34.9	4.8	31.3	4.8	27.7
> 1,000 ha	0.4	3.5	0.4	2.5	0.3	2.7	0.4	2.6	0.4	2.1
<b>Pastoris</b>	<b>10.6</b>	<b>100.0</b>	<b>14.9</b>	<b>100.0</b>	<b>12.6</b>	<b>100.0</b>	<b>15.2</b>	<b>100.0</b>	<b>17.3</b>	<b>100.0</b>
< 100 ha	24.3	78.4	36.8	83.3	34.3	81.9	41.1	83.0	44.1	83.3
100 - 1,000 ha	6.2	20.0	6.9	15.7	7.1	17.0	7.8	15.8	8.2	15.6
> 1,000 ha	0.5	1.6	0.5	1.1	0.5	1.1	0.6	1.2	0.6	1.2
<b>Valley</b>	<b>31.0</b>	<b>100.0</b>	<b>44.2</b>	<b>100.0</b>	<b>41.9</b>	<b>100.0</b>	<b>49.5</b>	<b>100.0</b>	<b>53.0</b>	<b>100.0</b>

Source: F. IBGE. Censos Agrícolas 1950 & 1960 and Censos Agropecuarios 1970, 1975 & 1980.

This tendency to an increasing concentration in land tenure in the Valley, can be better visualised when the concept of Gini Coefficient is applied to measure it as it can be seen in the Table 8.4 and Graph 8.1 below.

Table 8.4: Land Concentration According to Gini Coefficient

	YEAR				
	1950	1960	1970	1975	1980
Alto-Mineradoras	0.7251	0.7133	0.7292	0.7818	0.7833
Pastoris	0.6391	0.6733	0.6427	0.6668	0.6890
Valley	0.7276	0.7367	0.7376	0.7644	0.7650

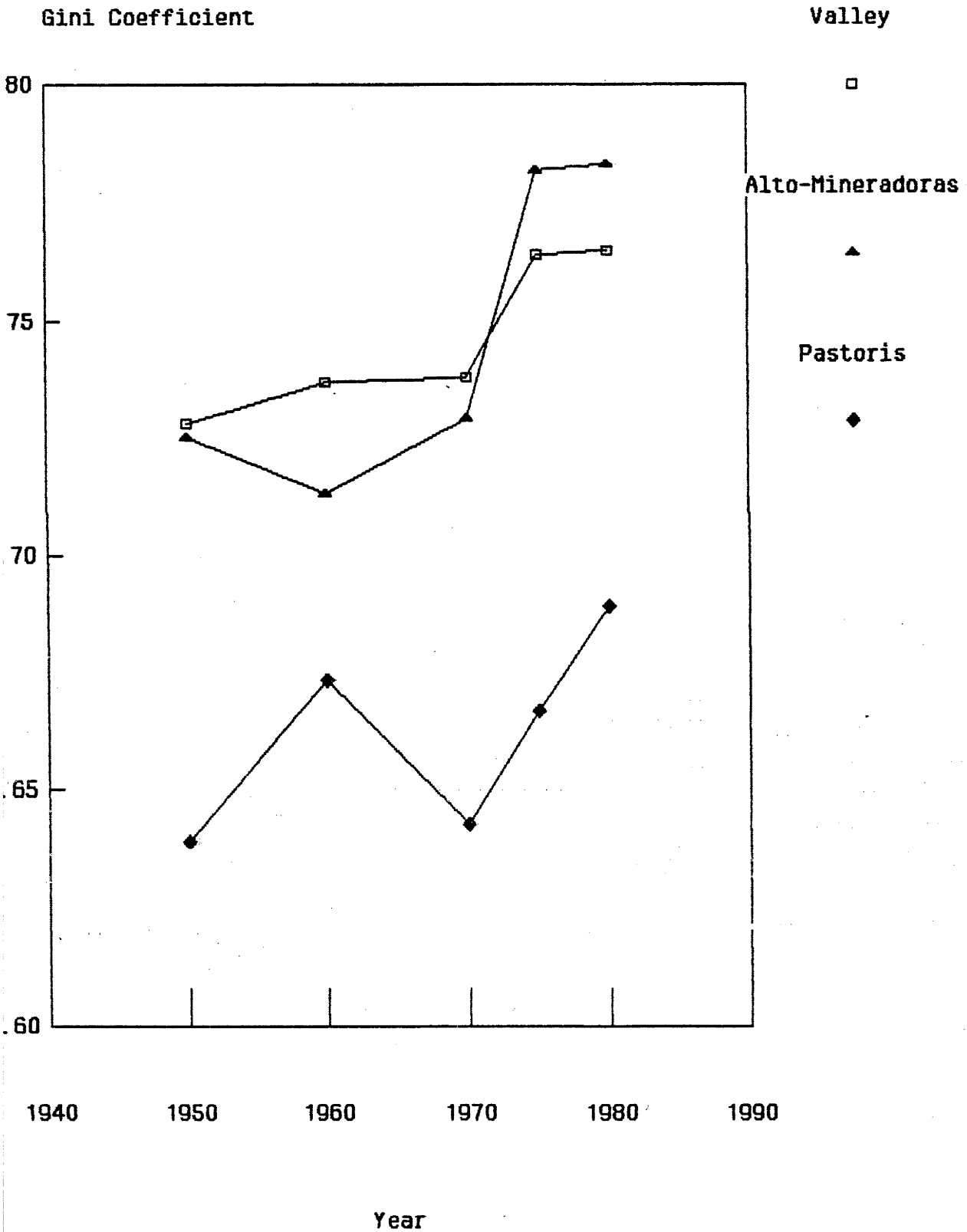
Source: Personal calculations on basis of data from Tables 8.2 & 8.3.

From the above it is clear that the concentration of land tenure has been a characteristic in the Valley as a whole. However, Table 8.4 shows that major changes occurred since 1970 and that these changes were more intensive in the period 1970/75. The figures above suggest that these changes were slightly greater in the Alto-Mineradoras.

From the graph one can observe that in the Alto-Mineradoras a sharp increase in the Gini coefficient occurred from 1970 to 1975, then from 1975 to 1980 it almost remained constant. On the other hand, in the Pastoris this increase is in a continuous process for the entire decade. It is interesting to note that Gini coefficient for the Alto-Mineradoras became higher than for the Valley. This again suggests that the expansion of the large scale reforestation contributed to this concentration in land tenure.

Graph 8.1

Land Concentration According to Gini Coefficient



Source: personal calculations based on data from Tables 8.2 & 8.3

As discussed in Chapter 5, the large industrial forest plantations evolved in Brazil in an agro-business context and expanded on large estates. The scheme's legislation per se, required a minimum area of 1,000 ha (Decree No. 79046 of 27/12/76) for reforestation projects to be entitled to tax deductions, suggesting a new impetus to this concentration of land tenure. Later this requirement was changed according to Decree 84097 of 16/10/79 and the minimum area required declined to 200 ha. However, despite this decline, the small farmers were still generally excluded, because they do not have enough income to benefit from tax relief by participating in the scheme.

The small farmers did not fully understand the rapid expansion of reforestation into the Valley. They "sold their lands because they were scared, being afraid that the government may take everything" (Kotscho 1977: 1). In fact, this fear was not without foundation, for as one company manager commented:

... many people come to the office to sell their lands. It is because we pay on demand and they are taking advantage to sell now, before something much more serious can occur ... (Kotscho 1977: 1)

Since the real meaning of 'something much more serious' was not explained clearly it suggests that pressure was exercised on people to sell their properties.

As noted above, the impact of reforestation on the land distribution has been ignored by the proponents' school. However, there is at least one exception which recognises that reforestation activity tends to concentrate land tenure but argues that this is

out-weighed by the generation of jobs (COALBRA, 1983). This is not surprising when one bears in mind that the scheme is part of the overall Brazilian model of development that concentrated not just land, but wealth in general.

In summary, it is clear that the Valley has experienced major transformations in land use, especially from 1970 onwards, and that land tenure became more concentrated. The evidence above suggests that the expansion of large scale reforestation played a great role. As one can expect these facts were reflected in the Valley's agricultural production.

### 8.3.3 Agricultural Production

The usual argument put forward in the proponents' school is that reforestation does not compete with agriculture production since it uses marginal lands. Critics such as Procopio argue that the problem is not restricted to a competition in land use, but that:

... people have sold their land to the firms, such as Acesita and they go to live in the cities ... they no longer grow even their own subsistence as they used to do ... the cities of the Valley have stopped ... it has already been said that nothing that people eat is grown or harvested there. Everything is imported from Belo Horizonte and Sao Paulo...(Procopio 1984:1)

This decline in food production has also been raised by F.CETEC (1980) which points out that the variety of food traded in the

feiras<sup>6</sup> has declined, and a large proportion of the food comes from outside the Valley. Regional fruits became difficult to find and oranges and bananas were brought from Sao Paulo, and even the domestic raising of chickens and the production of eggs declined.

Data from the Agricultural Census enable the situation to be considered in more detail (Table 8.5). It is clear that with the exception of coffee both quantity and area harvested have been greater in the Alto-Mineradoras than in the traditionally grazing lands of the Pastoris, in the period 1950/70. From 1970 to 1980, the figures suggest a consolidation of the Alto-Mineradoras as a food producer when compared to Pastoris. However, in both one can observe that if there was some increase in quantity produced the area harvested also increased. Indeed, for most of the crops the increase in area harvested was greater than the increase in the quantity produced, i.e. the average productivity per unit of area remained almost the same, as can be seen in the following table. In this case, it is likely that the increase in production of some crops observed in the Table 8.5 can be attributed to an expansion of the area under cultivation and not due to an improvement in agricultural methods. One can observe in the table below that the productivity of coffee and sugar cane which can be considered as industrial crops,

---

6. Feira is a weekly marketplace, in general every Saturday, which takes place on public fairgrounds. Peasants bring their products to sell. At the same time they buy goods, such as salt and kerosene. It also performs a social function as a meeting place.

Table 8.5: Agricultural Production of Selected Crops

	1950		1960		1970		1975		1980	
	Quantity <sup>1</sup>	Area <sup>2</sup>	Quantity	Area	Quantity	Area	Quantity	Area	Quantity	Area
<b>Alto-Mineradoras</b>										
- Beans	13.5	25.9	14.2	23.0	7.8	26.0	12.0	35.6	13.1	43.2
- Cassava	75.6	6.8	94.4	11.8	96.6	13.8	89.9	13.2	82.9	10.4
- Coffee	3.3	4.4	4.5	5.0	3.4	5.4	2.5	3.1	5.0	6.5
- Corn	42.0	33.6	50.3	37.2	41.9	52.6	54.4	61.1	56.5	66.1
- Rice	8.9	10.7	11.3	12.4	6.2	13.1	6.1	10.3	8.0	13.8
- Sugar-Cane	146.3	7.8	161.1	10.8	151.7	12.2	140.6	9.2	113.5	7.2
<b>Pastoris</b>										
- Beans	8.4	14.8	8.5	18.6	6.0	17.5	5.3	16.9	8.4	27.2
- Cassava	74.4	6.8	63.0	7.6	86.6	11.4	45.9	7.6	49.0	7.0
- Coffee	2.5	5.5	7.0	12.3	1.2	3.0	1.0	2.3	5.5	5.8
- Corn	16.0	15.8	16.2	18.1	15.8	25.5	16.6	32.8	28.3	32.8
- Rice	5.8	10.9	6.5	8.5	3.1	6.3	2.0	4.3	4.1	8.1
- Sugar-Cane	54.2	2.7	48.9	2.8	43.9	3.7	17.2	1.2	19.8	1.3
<b>Valley</b>										
- Beans	21.9	40.7	22.7	41.6	13.8	43.5	17.3	52.5	21.5	70.4
- Cassava	150.0	13.6	157.4	19.4	183.2	25.2	135.8	20.8	131.9	17.4
- Coffee	5.8	9.9	11.5	17.3	4.6	8.4	3.5	5.4	10.5	12.3
- Corn	58.0	49.4	66.5	55.3	57.7	78.1	71.0	93.9	84.8	98.9
- Rice	14.7	21.6	17.8	20.9	9.3	19.4	8.1	14.6	12.1	21.9
- Sugar-Cane	200.5	10.5	210.0	13.6	195.6	15.9	157.8	10.4	133.3	8.5

Source: F. IBGE. Censos Agrícolas 1950 & 1960 and Censos Agropecuarios 1970, 1975 & 1980.

Notes: 1. Quantity harvested, in 1,000 t; 2. Area harvested, in 1,000 ha.

increased more in Pastoris than in the Alto-Mineradoras. The average productivity of coffee more than doubled in the former while in the latter it slightly increased. On the other hand, the average productivity of the basic foodstuffs remained constant or slightly increased.

Table 8.6: Average Productivity of Each Crop per Hectare

	Unit: t/ha				
	1950	1960	1970	1975	1980
<b>Alto-Mineradoras</b>					
- Beans	0.5	0.6	0.3	0.3	0.3
- Cassava	11.1	8.0	7.0	6.8	8.0
- Coffee	0.8	0.9	0.6	0.8	0.8
- Corn	1.3	1.4	0.8	0.9	0.9
- Rice	0.8	0.9	0.5	0.6	0.6
- Sugar-Cane	18.8	14.9	12.4	15.3	15.8
<b>Pastoris</b>					
- Beans	0.6	0.5	0.3	0.3	0.3
- Cassava	10.9	8.3	7.6	6.0	7.0
- Coffee	0.5	0.6	0.4	0.4	0.9
- Corn	1.0	0.9	0.6	0.5	0.9
- Rice	0.5	0.8	0.5	0.5	0.5
- Sugar-Cane	20.1	17.5	11.9	14.3	15.2
<b>Valley</b>					
- Beans	0.5	0.5	0.3	0.3	0.3
- Cassava	11.0	8.1	7.3	6.5	7.6
- Coffee	0.6	0.7	0.5	0.6	0.9
- Corn	1.2	1.2	0.7	0.8	0.9
- Rice	0.7	0.9	0.5	0.6	0.6
- Sugar-Cane	19.1	15.4	12.3	15.2	15.9

Source: Personal calculations based on data from data of Table 8.5



The overall changes in the Valley's tenure structure and demographic structure since the 1970's led to new labour relationships (see next sub-section) which were reflected in the agricultural production of the people resident on the farms (Table 8.7).

The data show a decline in the production of food by people living on the farms which can be attributed to the changes in the labour relationships. The Pastoris which used to have the greater proportion of this type of production has constantly declined. These figures support the view that the large farmers are no longer allowing people living in the interior of the farms to plant their own subsistence agriculture as in the past (Moura et al., 1980) or are granting fewer licenses for such occupation. On the other hand, one can observe that in the Alto-Mineradoras this type of production has always been small, and further declined between 1970 and 1980. This is not surprising when one observes that this region has been characterized by a large number of small estates which generally are run by the owner and his family, i.e. another sort of labour relationships.

Table 8.7: Production of Basic Foodstuffs by People Living in Farms

Unit: 1,000 t

	1950		1960		1970		1975		1980	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
<b>Alto-Mineradoras</b>										
- Beans	0.4	6.1	1.2	20.2	0.9	29.9	0.8	37.3	0.5	25.0
- Cassava	2.1	2.5	4.0	7.0	4.3	13.0	2.2	11.1	3.3	21.4
- Corn	1.6	14.8	1.8	23.1	3.3	53.2	2.8	50.0	2.4	40.7
- Fava	n.a.	--	0.6	80.2	0.5	75.6	---	53.2	0.2	66.7
- Rice	n.a.	--	0.5	15.2	0.5	42.2	0.3	39.4	0.3	30.0
- Sweet Potato	n.a.	--	0.1	5.4	0.1	26.0	---	7.2	---	11.6
<b>Pastoris</b>										
- Beans	5.5	94.0	4.7	79.8	2.0	70.1	1.4	62.7	1.5	75.0
- Cassava	83.1	97.5	54.0	93.0	29.1	87.0	17.4	88.9	12.1	78.6
- Corn	9.4	82.3	5.9	76.9	2.9	46.8	2.8	50.0	3.5	59.3
- Fava	n.a.	---	0.1	19.8	0.2	26.4	---	46.8	0.1	33.3
- Rice	n.a.	---	2.8	84.8	0.7	57.8	0.5	60.6	0.7	70.0
- Sweet Potato	n.a.	---	2.3	94.6	0.4	74.0	0.3	92.8	---	88.4
<b>Valley</b>										
- Beans	5.9	100.0	5.9	100.0	2.9	100.0	2.2	100.0	2.0	100.0
- Cassava	85.2	100.0	58.0	100.0	33.4	100.0	19.6	100.0	15.4	100.0
- Corn	11.0	100.0	7.7	100.0	6.2	100.0	5.6	100.0	5.9	100.0
- Fava	n.a.	100.0	.7	100.0	.7	100.0	0.1	100.0	0.3	100.0
- Rice	n.a.	100.0	3.3	100.0	1.1	100.0	0.8	100.0	0.9	100.0
- Sweet Potato	n.a.	100.0	2.5	100.0	0.5	100.0	0.4	100.0	0.1	100.0

Source: F. IBGE. Censos Agrícolas 1950 & 1960 and Censos Agropecuarios 1970, 1975 & 1980.

From the above analysis we can consider the rival claims of both schools of thought about the probable impacts of the reforestation on the Valley's food production. We saw that the area harvested in the Alto-Mineradoras, from 1970 to 1980, increased for almost all crops and the quantity of almost all crops increased with the exception of cassava and sugar-cane. This fact seems to support the argument that the expansion of reforestation did not compete with agriculture. However we can observe that this increase was only enough to put the quantity produced back to the same level as it used to be in 1950 and in 1960. In the Pastoris, a similar pattern could be observed, but it seems that something else occurred there since the quantity of some crops decreased below 1950 and 1960 levels. In other words, these data suggest that the agricultural production in the Valley as whole, despite, some exceptions, is almost at the same level as twenty or thirty years ago, before reforestation.

When one considers increase in total population, especially in the urban population (Tables 8.14 and 8.15) it is clear that more people became dependent on the food produced in the country. This need not be a problem if agricultural productivity had been increased; however this was not the case.

The "progress and modernization" of the Valley led to new patterns of food consumption and sale, as canned food bought at supermarkets was adopted. But, when one takes into account the cost of freight and that most of the population live on a low income, this suggests that modernization did not just affect food production, but contributed, in some sense, to a lower nutritional level amongst large segments of the population.

Finally, the critical school has blamed reforestation for the decline of the Valley's food production. However, as shown above reforestation did not expand throughout the Valley, but was concentrated in the Alto-Mineradoras while in the Pastoris grazing continues to be the major activity. Both reforestation and grazing expanded rapidly and required large tracts of land, so if there was a decline in food production in the Valley as a whole, it was not reforestation that was solely responsible.

#### **8.3.4 Economic Development**

One of the major claims of the proponents school was that reforestation would promote economic development. Usually economic development has been measured through the growth of the Gross Domestic Product (GDP). However, the forestry sector is grouped within the primary sector and the GDP is available, at macroregion level, for only 1970 and 1975. These constraints do not allow a major inference regarding the expansion of the reforestation whose big push occurred from 1975 onwards and consequently, its actual contribution to the GDP.

Given the above constraints, we have used the tax collection as a measure which can at least provide a clue regarding the dynamic of the Valley's economy. There are no specific data on all different taxes collected by the different segments of the economy nor if the tax is municipal, state or federal. However, there are data from 1970 to 1980 for a particular tax collected

regarding the flow of goods the - Imposto sobre Circulação de Mercadorias - ICM (Tax on Trading of Goods or Turnover Tax)<sup>7</sup>. The data on this tax provide an insight into how dynamic the economy of a particular region is (Table 8.8).

Table 8.8: Collection of ICM in the Valley

	Unit: Cr\$ 1,000.00 of 1980					
	1970		1975		1980	
	Collection <sup>1</sup>	% <sup>2</sup>	Collection	%	Collection	%
Alto-Mineradoras	94,648	38.4	118,267	40.9	126,899	43.5
Pastoris	151,709	61.6	170,808	59.1	164,818	56.5
Valley	246,357	1.1	289,075	0.7	291,717	0.5

Source: SEI, 1983

Notes: 1. The data above were inflated to Cruzeiros of 1980 according to IGP for 1980 of the 'Fundacao Getulio Vargas' (Conjuntura Economica 34(2), 1980: 103);

2. % of the regions in proportion to the total of the Valley, and of the Valley in proportion to the total of Minas Gerais.

These data show that the Alto-Mineradoras has increased its collection of ICM proportionally within the Valley. Actually, this was to be expected when one bears in mind that the expansion of reforestation activity brought an inflow of money to the region and, consequently contributed to improvement of the local commerce. However, the Valley as whole does not seem to be better off. The percentage of the Valley's ICM to the total ICM collected in Minas

7. The ICM works in the following way, when a firm buys something it has a credit of this tax, and when it sells, it has a debt. The balance resulting from these operations will be the tax to be paid to the State.

Gerais, has decreased from 1.1% in 1970, to 0.7% in 1975 and to 0.5% in 1980. Once more, these figures lead one to question the progress experienced by the Valley as generally praised by the proponents school.

However, just a small percentage of the total ICM collected returns to the region (Table 8.9).

Table 8.9: Quota from ICM which Returns to the Municipalities

	Unit: Cr\$ 1,000.00 of 1980					
	1970		1975		1980	
	Quota <sup>1</sup>	% <sup>2</sup>	Quota	%	Quota	%
Alto-Mineradoras	21,426	22.6	35,839	30.0	38,319	30.2
Pastoris	51,267	33.8	67,036	39.3	65,118	39.5
Valley	72,693	29.5	102,875	35.6	103,437	35.5

Source: SEI, 1983

Notes: 1. Same as in Table 8.8;

2. % in relation to the total ICM collected in each one.

This table shows that only a small proportion of the ICM collected returns to the region. This leads to a lack of resources by the local governments to improve the infrastructure of their municipalities in order to cope with the pressure on the already deficient facilities existent throughout the Valley's municipalities, especially in their urban areas. This pressure has been aggravated by an increasing rural-urban migration as discussed in 8.3.6.

### 8.3.5 Economically Active Population

The Valley's primary sector changed, as discussed earlier, in ways which changed the owner-worker relationships. The proponents school refers to reforestation generating jobs without detailing the type of jobs created (Fontes, 1978; AMEF, 1981; COALBRA, 1983). The critical school noted that peasants having sold their land went to the cities to work as casual labourers (Moura et al. 1980; F. CETEC, 1980; Graziano and Graziano (1982); Procopio (1984). Data from the Census enable us to examine the employment situation in detail (Table 8.10).

From Table 8.10 one can observe that both regions - Alto-Mineradoras and Pastoris followed a similar pattern either in absolute numbers or in percentage for each of the labour categories throughout the entire period (1950/80). However, it is noteworthy that the number of permanent workers, in the Alto-Mineradoras, almost tripled from 1970/80 during the period when reforestation expanded. This suggestion of causality is reinforced by the characteristics in which reforestation expanded, i.e. based in a rural enterprise and waged labour. In this sense, the data suggest that the proponents school claim that reforestation generates jobs is correct. However, one can observe that this category also increased in the Pastoris, although to a lesser extent, i.e. it doubled while in the former it tripled. This suggests that despite the contribution that the expansion of the reforestation may have had in leading the rural workers to become a proletariat, it is not the sole agent, since a similar trend is evident in the Pastoris in which reforestation did not expand.

Table 8.10: Population Economically Active<sup>1</sup> in the Primary Sector by Category

	1950		1960		1970		1975		1980	
	Number	%	Number	%	Number	%	Number	%	Number	%
	Unit: 1,000									
- Permanent	4.2	3.2	6.7	4.4	4.0	2.6	5.6	3.1	11.8	6.1
- Casual	42.6	32.6	30.5	20.2	23.3	14.7	27.6	15.3	36.8	19.0
- Sharefarmer	4.7	3.6	5.0	3.3	2.6	1.6	2.1	1.2	4.5	2.3
- Family Members	79.2	60.6	105.1	69.4	124.5	79.8	143.0	79.3	139.7	72.2
- Others	n.a.	--	4.1	2.7	3.6	2.3	2.0	1.1	0.6	0.3
<b>Alto-Mineradoras</b>	<b>130.8</b>	<b>100.0</b>	<b>151.5</b>	<b>100.0</b>	<b>157.9</b>	<b>100.0</b>	<b>180.3</b>	<b>100.0</b>	<b>193.4</b>	<b>100.0</b>
- Permanent	7.0	8.4	6.5	6.4	6.5	10.1	8.4	9.7	12.6	13.7
- Casual	32.9	39.9	36.9	36.1	11.2	17.4	12.1	14.0	18.5	20.2
- Sharefarmer	5.2	6.3	4.7	4.6	1.4	2.1	1.6	1.9	2.0	2.2
- Family Members	37.4	45.4	49.7	48.7	41.3	64.2	58.5	67.5	57.9	63.1
- Others	n.a.	--	4.2	4.1	4.0	6.3	6.0	6.9	0.7	0.8
<b>Pastoris</b>	<b>82.5</b>	<b>100.0</b>	<b>102.1</b>	<b>100.0</b>	<b>64.4</b>	<b>100.0</b>	<b>86.7</b>	<b>100.0</b>	<b>91.8</b>	<b>100.0</b>
- Permanent	11.2	5.2	13.2	5.2	10.5	4.7	14.0	5.3	24.4	8.6
- Casual	75.6	35.4	67.4	26.6	34.5	15.5	39.7	14.9	55.3	19.4
- Sharefarmer	9.9	4.6	9.8	3.9	3.9	1.8	3.7	1.4	6.5	2.3
- Family Members	116.7	54.7	154.9	61.1	165.8	74.6	201.5	75.5	197.7	69.3
- Others	n.a.	--	8.3	3.3	7.6	3.4	8.0	3.0	1.3	0.5
<b>Valley</b>	<b>213.3</b>	<b>100.0</b>	<b>253.5</b>	<b>100.0</b>	<b>222.4</b>	<b>100.0</b>	<b>267.0</b>	<b>100.0</b>	<b>285.2</b>	<b>100.0</b>

Sources: F. IBGE. Censos Agricolas 1950 & 1960; Censos Agropecuarios 1970, 1975 & 1980.

Note: 1. Henceforth PEA; n.a. = not available.



Parallel to these changes, employment declined from 1950 to 1970 in both Alto-Mineradoras and Pastoris before increasing in both. This seems to agree with the argument that reforestation contributed to increased casual labour, as argued by the critical authors referred to above. However, as the increase occurred in both regions, it is clearly not just reforestation that contributes to an increase in casual workers, as the critics usually claim. Once more, this suggests that there are other factors operating in the Valley besides the expansion of reforestation, such as the expansion of extensive cattle raising.

The overall transformations have also led to changes in the distribution of employment according to economic sectors<sup>8</sup> (Table 8.11).

Although most of the people employed in the Valley are still in the primary sector one can observe that both absolutely and proportionally, this sector has been declining. This has been a little more accentuated in the Pastoris than in the Alto-Mineradoras suggesting that grazing may have a greater contribution than reforestation. However, this contrasts with the arguments of the proponents that reforestation would increase the number of jobs in the primary sector. It is also interesting to note that in 1970,

---

8. The difference observed between the total number of people occupied in the primary sector referred to in the table above and total number of people occupied in the agricultural sector presented in Table 8.12 is due to the fact that the source of the data presented in it is from the Agricultural Census while the source of the Table 8.13 above is the Demographic Census and between both there are methodological differences regarding the computation of the people occupied in the primary sector.

both regions had 8.4% of the total population occupied in the secondary sector. By 1980, this proportion increased to 9.8% in the Alto-Mineradoras and to 11.2% in the Pastoris. In other words, this increase was proportionally greater in the latter where there was no expansion of reforestation. These data also suggest that expansion of reforestation does not seem to have contributed to a major industrialization, as the PEA in the secondary sector, both absolutely and proportionally, did not substantially increase from 1970 to 1980 in the Alto-Mineradoras. This also challenges the common argument that the establishment or availability of large scale forest plantations per se are enough to attract or promote an industrialization process.

Table 8.11: Population Economically Active According to Economic Sectors

	1950		1960		1970		1980	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%
- Primary	98.5	87.7	106.7	82.2	101.0	79.5	94.3	71.4
- Secondary	3.4	3.0	7.0	5.4	10.7	8.4	12.9	9.8
- Tertiary	10.4	9.3	16.2	12.5	15.3	12.1	24.8	18.8
<b>Alto-Mineradoras</b>	<b>112.3</b>	<b>100.0</b>	<b>129.9</b>	<b>100.0</b>	<b>126.9</b>	<b>100.0</b>	<b>132.0</b>	<b>100.0</b>
- Primary	70.8	83.8	81.5	77.7	83.7	72.9	69.5	63.3
- Secondary	4.0	4.7	4.2	4.0	9.7	8.4	12.3	11.2
- Tertiary	9.7	11.5	19.2	18.3	21.5	18.7	27.9	25.5
<b>Pastoris</b>	<b>84.5</b>	<b>100.0</b>	<b>104.9</b>	<b>100.0</b>	<b>114.9</b>	<b>100.0</b>	<b>109.7</b>	<b>100.0</b>
- Primary	169.4	86.0	188.2	80.2	184.7	76.4	163.7	67.8
- Secondary	7.4	3.7	11.2	4.8	20.3	8.4	25.2	10.4
- Tertiary	20.1	10.2	35.4	15.1	36.8	15.2	52.7	21.8
<b>Valley</b>	<b>196.9</b>	<b>100.0</b>	<b>234.8</b>	<b>100.0</b>	<b>241.8</b>	<b>100.0</b>	<b>241.7</b>	<b>100.0</b>

Source: F. IBGE. Censos Demograficos 1950, 1960, 1970 & 1980.

Along with these changes in the labour pattern the Valley became increasingly urbanized. Rural-urban migration has not stopped or diminished, but on the contrary it seems that it will continue to increase as discussed in the following sub-section.

### **8.3.6 The Valley's Population**

One of the key points in the debate about the impacts of reforestation concerns rural-urban migration. The different schools argue reforestation tends to either reduce rural-urban migration, or the opposite. The arguments can be evaluated by examining the data from the Demographic Census (Tables 8.12 and 8.13).

From Table 8.12 one can observe that despite an increase in the urban population most of the Valley's population still live in rural areas. The process of urbanization has characterized not just the Alto-Mineradoras where industrial reforestation expanded, but also in the Pastoris. This suggests that although reforestation could have some contribution in the acceleration of this process, those changes which are taking place in the Pastoris have similarly contributed to the Valley's increasing urbanization.

Table 8.12: Distribution of the Population According to Domicile

Unit: 1,000

	1950						1960					
	Urban		Rural		Total		Urban		Rural		Total	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Alto-Mineradoras	45.4	14.2	273.5	85.8	318.9	100.0	61.1	16.5	308.5	83.5	369.6	100.0
Pastoris	53.2	18.7	231.6	81.3	284.8	100.0	82.2	24.6	252.4	75.4	334.6	100.0
Valley	98.6	16.3	505.0	20.4	603.6	100.0	143.3	20.4	560.9	79.6	704.2	100.0

Source: SEI, 1982.

Table 8.12: Continuation

	1970						1980					
	Urban		Rural		Total		Urban		Rural		Total	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Alto-Mineradoras	80.8	19.7	329.8	80.3	410.6	100.0	127.5	28.9	313.5	71.1	441.1	100.0
Pastoris	124.3	32.0	263.7	68.0	388.0	100.0	156.4	40.8	226.6	59.2	383.0	100.0
Valley	205.1	16.3	593.5	83.6	798.6	100.0	284.0	34.5	540.1	65.5	824.1	100.0

Source: SEI 1982.

This process of urbanization can be better visualised in terms of the average annual growth rate of the population according to its domicile presented in the following Table 8.13.

Table 8.13: Average Annual Growth Rate of the Population According to Domicile

	PERIODS			
	1950/60	1960/70	1970/80	1950/80
<b>Alto-Mineradoras</b>				
- Urban	3.0	2.8	4.7	3.5
- Rural	1.2	0.7	- 0.5	0.5
- Total	1.5	1.1	0.7	1.1
<b>Pastoris</b>				
- Urban	4.4	4.2	2.3	3.7
- Rural	0.9	0.4	- 1.5	- 0.1
- Total	1.6	1.5	- 0.1	1.0
<b>Valley</b>				
- Urban	3.8	3.7	3.3	3.6
- Rural	1.1	0.6	- 0.9	0.2
- Total	1.6	1.3	0.3	1.0

Source: Personal calculations based on data from Table 8.12

During the periods 1950/60 and 1960/70, the urban population in the Alto-Mineradoras increased, but at rates well below those of the Pastoris. Conversely the Alto-Mineradoras' rural population increased at rates higher than those observed in the Pastoris. However, in the decade 1970/80, the data show that the urban population in the Alto-Mineradoras grew at a rate which was more than double that observed in the Pastoris. On the other hand,

in the same decade, both regions had negative growth rates of their rural population, but in the Pastoris this rate was almost three times bigger than in the Alto-Mineradoras. This suggests that the economic activity developed in the Pastoris contributed more to expel rural people than that in the Alto-Mineradoras. However, it is clear that reforestation was insufficient to check negative growth of the rural population in the Alto-Mineradoras as is usually argued by the proponents school.

However, it is interesting to note that the increase in urban population in the Alto-Mineradoras has been perceived as one of the benefits which reforestation has brought to the region, as can be noted, in the following quotation:

... the population of the city (understood as the urban area and referring to the municipality of Itamarandiba) doubled after the arrival of the Acesita Florestal, reaching five thousand inhabitants ... (Fontes 1978: 52)

Yet this same author also claimed:

... without any doubt, one of the positive aspects of the reforestation in the social sector is just to avoid an intensive rural exodus, responsible for a continuous shift of great human mass that each year goes to big urban centres where they start to vegetate in marginal levels of life, increasing the unemployment and the underemployment ... (Fontes 1978: 52)

These two arguments seem to be quite contradictory. In fact, the population of this municipality, between 1970 and 1980,

more than doubled, i.e. from 3,785 to 8,182 inhabitants. However, during the same period its rural population declined from 23,235 to 20,175 inhabitants (SEI, 1982). These data challenge the above author's views.

Later, COALBRA following almost the same line argues:

... if on one side the reforestation is an activity which brings as a consequence a concentration of land tenure, on the other, evidence from our research shows that it promotes a significant generation of jobs because it occurs in regions where there was no prior economic activity. For example, in the municipality of Taiobeiras, in the Valley, residents who had left it prior to the reforestation came back looking for jobs. This can be observed through the increase of its population growth rate. In other words, there was an inversion of the exodus ... (COALBRA 1983: 141 & 143).

Like the other municipality mentioned above, this municipality (Taiobeiras) experienced a growth in its urban population in the decade 1970/80 from 4,813 to 10,253 inhabitants, while its rural population declined from 9,210 to 8,873 inhabitants (SEI 1982).

In fact, evidence suggest that throughout the Valley there has been a trend to lose rural population, as can be seen in the following table.



Table 8.14: Migration According to Domicile by Microregions

Microregion	1960/70		
	Urban	Rural	Total
	NMB	NMB	NMB
<b>Alto-Mineradoras</b>			
Alto Rio Pardo	1,334	-41,490	-40,156
Mineradora do Alto Jequitinhonha	-286	-14,270	-14,556
Mineradora de Diamantina	-2,482	-70,096	-72,578
<b>Pastoris</b>			
Pastoril de Pedra Azul	1,904	-54,855	-52,951
Pastoril de Almenara	5,311	-62,443	-57,132
Jequitinhonha Valley	7,156	-242,475	-235,319

Table 8.14: Continuation

Microregion	1970/80		
	Urban	Rural	Total
	NMB	NMB	NMB
<b>Alto-Mineradoras</b>			
Alto Rio Pardo	11,937	-57,804	-46,464
Min. Alto Jequitinhonha	2,216	-16,269	-13,660
Mineradora de Diamantina	6,393	-70,032	-64,227
<b>Pastoris</b>			
Pastoril de Pedra Azul	1,813	-67,830	-64,941
Pastoril de Almenara	-10,240	-71,147	-79,961
Jequitinhonha Valley	12,776	-283,286	-266,558

Source:<sup>9</sup>

Notes: NMB = Net Migration Balance (absolute numbers)

9. The data used in this table were kindly provided by Mr. Napoleao M. Silva who is conducting research for his M.Sc. thesis on migration in the Jequitinhonha Valley.

The figures above show that in the Alto-Mineradoras, with the exception of the microregion Mineradora de Diamantina in which the loss of rural population did not significantly change, the loss in rural population between these two decades increased. Recall from Chapter 7 it was in these two microregions - Alto Rio Pardo and Mineradora do Alto Jequitinhonha - that most of the reforestation without a final assignment was established (See Table 7.4). So, although some jobs were directly provided in these microregions in establishing those plantations employment declined since it was not followed by work in maintenance, harvesting and replanting, i.e. the cycle was not completed. Hence, these data again suggest that reforestation per se is not sufficient to avoid or diminish rural migration, but on the contrary, they suggest that rural migration tended to increase. However, it is interesting to note that this loss in rural population was not restricted to the microregions in the Alto-Mineradoras, but the Pastoris were also marked by the same characteristic. Since reforestation activity has not penetrated the two Pastoris microregions, these figures again indicate that the changes throughout the Valley as a whole are not just a consequence of the expansion of the reforestation activity, but rather something else has happened in the Valley.

Regarding the urban population, one can observe that in the period 1960/70 two microregions in the Alto-Mineradoras had a negative migration not just in their rural population but in their urban population as well. In the following period, this negative

migration from the urban population was only present in the microregion Pastoril de Almenara. These data showed a greater increase in the urban population in Alto-Mineradoras than in the Pastoris. These data cast doubt on the usual allegation that:

... the development of forestation activities would serve to restrain this migratory flux, fixing the man to the land and eliminating the present pressure over urban areas ... (AMEF 1983: Conclusion).

In fact, all three microregions where the reforestation expanded experienced a sharp increase in their net migration balance in the period 1970/80 vis a vis the previous period (1960/70).

Actually, if some inversion occurred in this migration towards big centres such as the State's capital, it occurred in terms of creating in the urban areas of the Valley's municipalities a intermediary stage before people migrate to big centres (Kotscho, 1977). When the reforestation companies arrived in the Jequitinhonha Valley, they started to buy the land from the peasants, reversing the direction of the migratory flow. Instead of going south, the former owners became workers from these firms and moved from rural areas to cities of their own region where they created the first slums (Kotscho, 1977). In other words, the evidence does not suggest that the establishment of large scale industrial forest plantations helped stop or reverse the rural-urban migration.

The above figures showed a negative migratory balance for all microregions in both periods, i.e. there has been a migration of the Valley's population. This migration can be to other regions of

Minas Gerais and/or to other states. Hence, these figures suggest that the Valley as a whole has been, (and this did not change in the decade 1970/80) a region that expels population.

The above discussion has shown that the urban areas of these municipalities have swelled, exerting pressure on the overall infrastructure of these municipalities which is already precarious. On the other hand, as discussed above the government of these municipalities does not have enough resources to cope with this increase, leading to a decline in the overall standard of living. There has been even reference to the appearance of slums in some municipalities of the Valley which, although poor, had not known them (Kotscho, 1977, F. CETEC, 1980, Graziano & Graziano, 1982). Proponents of the first school of thought, e.g. COALBRA (1983) quoted above, did not mention whether it was the rural or urban population of the municipality that increased. However, as one could note in the above quotations, they fail to correlate the population increment to other factors, for example living conditions, health and education. In other words, in which conditions did the urban population grow and in which conditions were the rural people kept in the rural areas?

In short, the evidence presented above shows an increasing process of urbanization which challenges the generalized assumption that the expansion of the industrial reforestation is able to avoid or reverse rural-urban migration.

### 8.3.7 Basic Sanitation and Health Conditions

This is an aspect, generally neglected by the proponents. When it is raised, it is restricted to noting that one or other firm established a medical service (Neves 1979). However, the critical school have drawn attention to the general living conditions of the Valley's population. Data on mortality and sanitation can be used as proxies to examine the impacts developments on health.

The mortality coefficient associated with the causes of death and distributed according to age groups provide an estimation of health. Given that the data available do not attend to all of these conditions their presentation would not allow a thorough evaluation of the Valley's health condition but could even lead to misinterpretation<sup>10</sup> we have opted to present the proportion of each one of the groups of causes of death in relation to the total death rate.

To do so we have selected some particular groups of causes of death whose proportions are presented in the Table 8.15 below. These causes were selected since they are associated with basic

---

10. This misinterpretation could be because the mortality coefficients are not divided by age groups, and the number of deaths is presented according to the locality where the person dies. However, since regions like the Valley have little medical assistance, people move to other regions, especially the State's capital, in order to get better medical assistance. But some of those people who moved die there and consequently, this leads to a significant increase in the number of deaths there. This can give the wrong impression that the health conditions in the Valley, for example, are better than for the rest of the State. There is also the deficiency in data collecting in the most remote areas.

sanitation, immunization, economic conditions and living standards in general. Hence, any change in their coefficients can suggest an overall improvement or otherwise of these aspects.

Table 8.15: Group of Causes of Death as a Proportion to the Total Number of Deaths

Group of Cause of Death <sup>1</sup>	Unit: %							
	Valley				Minas Gerais			
	1950	1960	1970	1980	1950	1960	1970	1980
A	14.0	10.0	11.8	7.2	18.0	12.9	10.8	9.9
B	0.9	0.8	1.9	1.7	0.8	0.8	2.5	3.1
C	9.9	7.9	7.8	14.3	13.9	12.2	16.4	24.8
D	1.6	1.6	2.0	3.0	1.6	2.5	3.9	7.3
E	2.3	4.0	2.5	6.5	2.8	3.5	4.0	8.2
F	54.6	64.5	61.9	49.5	45.5	53.9	43.4	19.3
G	16.7	11.2	12.1	17.8	17.4	14.2	19.0	27.4

Source: Personal calculations from data published in SEI, 1983

Note: 1. Groups of cause of death: A - Infectious and Parasitic;  
 B - Malnutrition and Anaemia;  
 C - Cardio-vascular;  
 D - Neoplasias (Cancer, etc.)  
 E - Accidents, Violence and Suicides  
 F - Not defined  
 G - All other causes

These data could lead one to assume that the situation in Minas Gerais is far worse than in the Valley. However, this comparison requires attention due to the constraints referred to above and in the footnote 10.

Despite some decline in mortality due to causes A and B (characteristic of underdeveloped regions) the levels are still high and provide little evidence of any true improvement in health conditions. Actually:

according to information of local medical doctors and from the regional health centres, there is a considerable increase in cases of diseases, especially diseases caused by worms (F. CETEC 1980: 600).

This is born out by the data for group F, all deaths for which the cause could not be defined. This lack of definition can be attributed to, for example, lack of medical assistance. Mortality in this group had its peak in 1960 but a closer view reveals that in 1980 about 50% of the total deaths in the Valley were still in this group which is almost the same proportion as observed in 1950. This suggests that there was almost no improvement in the health conditions in the Valley, including a better medical assistance. This view is reinforced when the figures are compared to those for the State as whole, which after also having a peak in 1960, significantly declined.

Groups C, D and E typical of more urban and industrial centres, have considerably increased (Rodrigues, 1981). This suggests that development in the Valley did not solve the Valley's basic health problems, but added others typical of more urban and industrial centres. Within this context:

mental illness and alcoholism presented a significant increase which is supposed to be caused by the rupture of the traditional life style, work relation and by the loss of the ties with the land. Besides that as only few firms provide some sort of health care, the public health system is overloaded...' (F. CETEC 1980: 600).

There were cases in which the company's health centre was closed, for example one in the municipality of Carbonita. The company established a health centre there and then closed it and all the medical equipment was taken without any explanation. Later, the building was given to the local government which was trying to fit it out again. I could not obtain any information why this happened and even the local government and people did not know<sup>11</sup>.

One of the best indications of basic sanitation is expressed through the availability of water and sewage systems and its accessibility to the entire population. Unfortunately, data are not available which allow detailed evaluation of the evolution of these systems in the Valley through the entire period, i.e. 1950/80. However, an approximate dimension of the problem can be observed in the following table showing the number of municipalities in which these systems are available and their accessibility to the population for both the Valley and Minas Gerais.

Table 8.16: Availability of Water and Sewage Systems - 1980

	Water		Sewage	
	% of Municipalities	% of Population	% of Municipalities	% of Population
Valley	43	13	2	2
MG	34	34	6	15

Source: SEI, 1982

11. Information obtained from our visit to the health centre in Carbonita in the second semester 1983 during the field work.



From the table above we can observe that the Valley has a greater proportion of its municipalities supplied with water than the State as a whole. However, the proportion of the Valley's population served by the water system was far less than for Minas Gerais. The provision of sewage systems in the Valley is below the State's average. Despite the availability of these systems, large segments of the population do not have access to them. In my field work it was stated that the major reason for this is that most of the population cannot afford these utilities. Despite the contribution that the expansion of these systems, especially the water system, could have had on the reduction of the coefficient of mortality within the group of infectious and parasitic causes of death, most of the population is still exposed to the diseases within this group.

Data are not available to disaggregate the table above in terms of the accessibility of the rural and urban populations in the Valley. However, data are available for Minas Gerais as a whole in terms of rural and urban residences in which these systems were available in 1980. Only 2.8% of rural residences were supplied with treated water while the rest were supplied from other sources, e.g wells and springs. In urban areas 72.8% of the residences had treated water while the remaining 27.2% was supplied by other sources. In terms of sewage systems, only 1.7% of the rural dwellings were connected to a sewage system while the remainder had other kinds of facilities. In urban areas, this proportion was about 50% (SEI, 1983). Considering that most of the population of the Valley were still living in rural areas, it is fair to say, on the

basis of these data, that none or almost none of that population had access to these systems. So, it was not only economic constraints that limited greater access by large segments of the population to these systems, but also the virtual restriction of these systems to urban areas. These systems appear to be effective in reducing the parasitic and infectious diseases to a certain level. But from this level onwards, other socio-economic factors start to dominate. So, unless policies and measures are taken to change the socio-economic structure, the incidence of infectious and parasitic diseases and consequently, the number of deaths caused by them, again increase.

In short, health conditions of a region have a tied relationship to the overall development of a region. So, the above analysis suggested that the Valley's health profile is typical of any other underdeveloped region which has its roots in basic problems, such as lack of basic sanitation, malnutrition and infectious and parasitic diseases. These aspects seems to be aggravated with the disorderly occupation of the urban space as a consequence of a rapid process of rural exodus and arrival of new migrants creating a proliferation of slums in the periphery of the cities. Local government has no funds as well as technical skills to cope with the rate in which this urbanization has occurred. So, without solving the basic problems, the Valley has been faced by the new ones. Thus, a major improvement of the Valley's health conditions is unlikely to occur, at least in a short run.

#### 8.4 Conclusion

As discussed above the reforestation activity expanded throughout Brazil as a response to the fiscal incentives scheme. However, this expansion became difficult in some regions due to increasing land prices which made the establishment of forest plantations less profitable or even unviable. Reforestation like any other economic activity in a capitalist economy, is driven to reduce costs and maximize profits. So, firms started to look for regions where their costs could be minimised. Within this context, the Jequitinhonha Valley, given its socio-economic characteristics, became a focus of attention. Concurrently, government intervention encouraged entrepreneurs to establish large industrial forest plantations there.

This penetration of reforestation was perceived with a generalized euphoria by local and state officials and other people. It was perceived as the redemption of the Valley's problems which had not been solved by the paraphernalia of governmental and private agencies and their respective policies. One of the basic assumptions underlying this euphoria was that the establishment of these plantatations would unleash a process of industrialization, a common assumption in forestry circles. This expansion would also be the means to link the Valley's economy into the Brazilian process of development.

Given the dimension of this expansion and the short period of time in which it occurred, as reviewed in Chapter 7, there is no

doubt that the penetration and the expansion of these plantations in the Valley led to major socio-economic transformations. Hence, this expansion has been object of a debate. The first school of thought sees these transformations as positive and consequently, argue that this expansion helped promote the Valley's development. The second school of thought sees most of these transformations as negative and argues that this expansion contributed more to retaining the Valley's underdevelopment than to promoting its real development. This analysis has been conducted in the context of this ongoing debate. However, it was impossible to develop a comprehensive model which enabled a complete explanation of all causative factors and could trace all likely influence of the expansion of these large scale forest plantations. Despite this limitation some specific aspects of the process were analysed which led to the following conclusions.

The analysis regarding land use showed that the incorporation of new lands into the productive process, in the Valley as whole, was intensified from 1970 onwards. This incorporation was much greater in the Alto-Mineradoras where the reforestation expanded. The data suggest that this process of incorporation passed through stages, first from 1970/75 when most of these new tracts of land were acquired and kept as grazing and fallow and the land used for planted forests was small proportionally to the total productive area. The second stage occurred from 1975 to 1980 when the actual establishment of the forests on a large scale occurred. These figures do not suggest any major takeover of agricultural lands, at least those lands which were already incorporated into the productive

system. In this sense they seem to agree with the argument that the reforestation occupied vacant land. However, that these lands were officially vacant, does not necessarily mean that they were not used at all. It is likely that these lands were used by peasants and small farmers for uses, such as pasture, collection of firewood and medicinal plants, i.e. more primitive forms of land use, less capitalist and therefore not taken into account. This conclusion is also supported when one bears in mind that many peasants and small farmers did not have legal possession of the land, despite living there for generations. In short, it is fair to conclude that the process of land appropriation led to significant transformations in the habits of the local population which would have made them worse off instead of being better off.

Parallel to these changes in land use, changes in the land tenure structure also occurred. The land tenure structure in the Valley has been characterized by its concentration. Although an increase in land tenure concentration could be observed in the Pastoris, in the Alto-Mineradoras it was slightly greater just in the same period in which the reforestation occurred. The Gini coefficient for land tenure concentration in the Alto-Mineradoras became greater than the Gini coefficient for the Valley as a whole. Hence, this leads one to conclude that the expansion of reforestation played an important role in this process of concentration of land ownership. Since this expansion of reforestation was a response of the one of the policies dictated by the Brazilian model of development and that the model in itself has contributed to concentrated wealth (see

Chapter 3) it is not surprising that the expansion of the reforestation in the Valley has led to increasing concentration in the land tenure.

The changes in land use and land tenure structures influenced agricultural production. The analysis showed the predominance of the Alto-Mineradoras over Pastoris as an agricultural region, since Pastoris has been traditionally a grazing region. However, no major change in the agricultural production of those selected foodstuffs could be observed; production of some even increased from 1970 to 1980 in both Alto-Mineradoras and Pastoris, but more in the former than in the latter. However, despite these increases the quantity of these crops produced in 1980 was not significantly greater than the quantity in 1950. Indeed, the quantity per unit of area was equal to or smaller than it used to be in 1950 (see Table 8.13). This decline cannot be attributed to the expansion of the reforestation since even before it expanded this decline could be already observed. What can be suggested is that the expansion of the reforestation may have pushed the agricultural activities to less fertile lands and consequently, contributed to part of this decline. So, these data do not suggest a major interrelationship between the expansion of the reforestation and decline in food production.

These overall changes have been reflected in employment patterns. There was an increase in permanent workers, both absolutely and proportionally. This increase was more significant in the Alto-Mineradoras, especially from 1975 to 1980 when the number of

permanent workers more than doubled, coinciding with the actual establishment of most of the plantations. This suggests a new work relationship. Although this process has been more intense in the Alto-Mineradoras one can observe that a similar trend also occurred in the Pastoris. Thus, some facets of the reforestation activities are common to other segments of the primary sector. Casual employment increased from 1970 onwards, especially between 1975 and 1980. Again this increase was greater in the Alto-Mineradoras than in Pastoris. This seems to confirm the argument used by the critics of the reforestation. In fact, reforestation like any other agricultural activity, is subject to seasonality and consequently, promotes casual work. So unless the establishment of a large plantation is followed by maintenance, harvesting and re-planting, i.e. the whole cycle is completed, reforestation favours casual employment. Since many areas reforested in the Valley have no defined final destination, as discussed in Chapter 7, it is likely that this activity contributed to this increase in the number of casual workers.

These new labour relationships can be also observed in terms of the distribution of the total population occupied through the three sectors of the economy. The number of people occupied in the primary sector, in the Valley, has decreased. This decline seems to be greater in the Pastoris. On the other hand, the Pastoris experienced an higher increase in the number of people employed in the secondary sector vis a vis the increase observed for Alto-Mineradoras. This casts doubt on the argument commonly used by those

who advocate reforestation as being able to promote or stimulate a process of industrialization. If some process of industrialization occurred in the Alto-Mineradoras it seems that it was smaller than what happened in the Pastoris, at least as far as job creation is concerned.

One of the more visible aspects of the changes in the Valley is the demographic movements - one of the key points always raised by both schools of thought. However, the data clearly showed that a process of urbanization has been taking place in the Valley as whole, and has occurred in both Alto-Mineradoras and Pastoris. The growth rate of the urban population has been high in both, but it is interesting to note that in the decade 1970/80 the rate for Alto-Mineradoras was more than double that observed for the Pastoris. In the same decade the rural population experienced negative growth in Alto-Mineradoras. However, in the Pastoris this growth was not just negative, but it was about the triple that observed in the Alto-Mineradoras. This suggests that although the reforestation could have contributed to this negative growth of the rural population in the Alto-Mineradoras, the economic activity in the Pastoris seems to promote a greater expulsion of the rural population.

Rural-urban migration has neither stopped nor decreased in the Valley, with the exception of one microrregion (Mineradora de Diamantina) which presented a slight decline in the net balance of migration of its rural population. As rural-urban migration has occurred throughout the Valley, it challenges the basic assumption put by those who advocate reforestation to avoid or reverse the



rural-urban migration. Furthermore, it is interesting to note in the Alto-Mineradoras the rural-urban migration grew just in the two microregions (Alto Rio Pardo and Mineradora do Alto Jequitinhonha) where most of the reforestation did not have final assignment (see Chapter 7) while in the Mineradora de Diamantina the migration from rural areas remained almost constant from one decade to another. This calls attention to the need for the reforestation to be assigned or linked to a defined use. These figures suggest that when the reforestation is assigned to a final use, although it may be unable to avoid a rural-urban migration, it may at least help to stabilize this flow.

Another aspect analysed was the Valley's GDP, which suggested a slight improvement of the primary sector in its contribution to the Valley's GDP. This improvement could be also observed in terms of its proportion in the primary sector of the State as a whole. However, as the data available just covered the years of 1970 and 1975 one cannot make any inference regarding the possibility that the expansion of the reforestation has contributed to this slight better performance of the primary sector. Concurrently, the share of the secondary and tertiary sectors decreased.

Finally the Valley's health conditions were analysed. The analysis suggests that the basic health conditions of the Valley as a whole have not substantially improved. Rather, the Valley started to face new problems, characteristic of the bigger centres. In other words, it seemed that the Valley became faced by what Rodrigues (1981) called a 'double pattern', i.e. without solving the basic

health problems it incorporated new ones. This cannot be attributed to the reforestation activity in itself, however, bearing in mind the way in which it expanded, it is likely that the reforestation in some sense contributed to this double pattern now present in the Valley. This analysis also showed that, in 1980, the proportion of municipalities served with drinking water was greater than that observed for the whole state. It can be expected that this system increased, in the Valley, as a consequence or by influence of the reforestation firms which moved there. However, just a very small proportion of the entire population is served by this system.

From this analysis one can conclude that the expansion of industrial reforestation played an important role in transforming the Valley. However, this expansion was a response to one of the policies dictated by the overall Brazilian model of development. As discussed in Chapter 3 this model amongst other things subordinated the social to the economic and tended to concentrate wealth. Hence, as reforestation with fiscal incentives is one of the policies derived from the general model, the impacts caused by its expansion could not be too different. It is true that the fiscal incentives scheme requires an evaluation. However the effectiveness of this evaluation will be closely tied to an evaluation of the whole model. In short, this study showed the need of a more comprehensive analysis of the fiscal incentives scheme and consequently, the expansion of the industrial reforestation, based on empirical evidence, which can allow the scheme to bring more actual benefits to the society, rather than merely relying on theoretical justifications as was usually the case in the past.

## CHAPTER 9

### CONCLUSIONS AND IMPLICATIONS

Two questions were raised in the beginning of this study. The first was 'Has the general Brazilian model of development been reflected in the industrial forestry sector?' The second was 'Have the models used to explain forestry development been adequate?' In this Chapter we will consider the answers that have been found and their implications.

#### **9.1 Forestry and the Brazilian Model of Development**

The first issue to be examined was the nature of the general Brazilian model of development and whether or how it had been reflected in the industrial forestry sector.

This study has shown that all public investments or state intervention in the economy has been done in such a way as to advance the interests of private investors. Policies were designed to create the necessary infrastructure to support the modernization and industrialization processes. On the other hand, little attention was given to the social problems. This overall process intensified from 1964 onwards when the major national political goal became to transform Brazil into a major world power.

Within this context, and along with many other measures, the fiscal incentives system was introduced, part of which was the

fiscal incentives scheme for industrial reforestation. Virtually all of the expansion of industrial reforestation which has occurred in Brazil, was a response by investors to the concession of very generous tax deductions granted under the scheme. In its first stage, industrial reforestation expanded in regions closer to the major industrial centres. Later, certain economic factors, especially increases in the price of land constrained continued expansion in those regions and firms looked to new regions.

This search for other regions was also stimulated by the legislation of the fiscal incentives scheme which adopted differential tax deductions. Under this system, projects established in the SUDAM and SUDENE's jurisdiction were granted higher fiscal incentives. As in any other economic activity in a capitalist system the reforestation companies sought to maximize profits. Naturally, they therefore looked for regions, such as the Jequitinhonha Valley in Minas Gerais where these economic and political aspects coincided. Subsequently, this contributed to integrating the Jequitinhonha Valley into the process of development underway in the country.

In the Valley the expansion of reforestation did not occur uniformly, but was concentrated in three of its five microregions, which we called the 'Alto-Mineradoras', and scarcely occurred at all in the other two, the 'Pastoris'. This did not occur by chance, but was encouraged and facilitated by both Federal and State governments. The participation of the Federal Government was indirect since it granted higher tax deductions to projects

established within SUDENE's jurisdiction which includes two of the three microregions in the Alto-Mineradoras. The State government intervention was direct through facilitating the acquisition or leasing of large tracts of land by entrepreneurs for the establishment of these plantations. The conjunction of these facts suggests how the Brazilian model of development was reflected in the shift and expansion of the industrial forest plantations into the Valley. Both the timing and the location of reforestation activities were dictated by the fiscal incentives.

Thus, in summary, our analysis demonstrated that the industrial forestry sector is merely a reflection and continuation of Brazil's national macroeconomic and political development strategy. The fiscal incentives system and its application to the forestry sector was an integral part of that strategy. It had two broad objectives: to supply raw material which would contribute to the industrial base for Brazil, advocated in its model of development; and to develop the hinterland and integrate it into Brazil's process of development.

The same policy instrument - fiscal incentives for industrial reforestation - has been applied to both objectives, even though we have shown that in many ways these two are contradictory, as is the case of the Jequitinhonha Valley. The literature on forestry development in Brazil has not questioned whether reforestation or fiscal incentives are the appropriate policy tools, or whether the policy per se is appropriate.

## 9.2 The Adequacy of Models Used to Analyse Forestry Development.

The analysis of forestry development reported in the literature has been mainly made on financial grounds through an almost universal application of project evaluation techniques and discounting procedures. This generalized trend is apparent in the Brazilian literature on the subject.

To the extent they recognised any social costs, the authors of these studies argue that the probable disadvantages are overcome by a set of substantial economic and social benefits which they expect as a consequence of the expansion of the industrial reforestation. Among these are that: expansion creates jobs in the country and consequently can avoid or reverse the rural exodus; that it generates income and consequently stimulates an economic activity which promotes economic growth, especially in backward regions, which in turn will generate benefits that in the end will trickle-down to the whole society. Along with economic growth it promotes modernization. So, despite some of its pitfalls, the fiscal incentives scheme and industrial reforestation are considered to be fully justified. In short, these studies reflected the widespread perception and acceptance of economic growth as an end in itself and as such a synonym for development.

Instead of the very substantial economic and social benefits claimed, we found that the economic benefits can be questionable. The economic costs have been great and borne almost entirely by the Government - not by the private sector. Similarly we

found very little evidence of the many and diverse social benefits claimed by proponents of subsidised industrial reforestation by private companies.

By comparing these claims and expectations with the present reality, it has become apparent in this study that the method of analysis previously applied has been inadequate; it has been partial, sectoral and unidimensional, and it has ignored social and political interactions with economic considerations.

The evaluation methodology contained numerous omissions. It failed to consider whether the land was really wasteland or occupied; it lacked concern for the concentration of land ownership, changes in employment, urbanisation, health and welfare and the like.

A Brazilian version of the early industrialization approach to forestry in development implicitly adopted, but never thoroughly examined, its assumptions that: there would be an international shortage of wood and wood-based products and consequently, great international market prospects for Brazil's forest products; the lack of raw materials was the major constraint to industrialisation; the establishment of these industrial plantations per se would lead to industrialization and consequently substantial economic and social benefits would accrue; and finally, that without major subsidies, industrial plantations would not have been widely established.

### **9.3 The Results of the Case Study**

Seven major arguments regarding the impacts of the plantations on the Jequitinhonha Valley have been examined in this study. We can now scan the results and consider their implications.

The first argument concerned whether the plantations competed with agriculture or were established on lands which were not suitable for agricultural purposes or which were not being used. This study has shown that the expansion of industrial reforestation, coincided with the incorporation of additional, new land into production, from 1970 and mainly in the Alto-Mineradoras, where reforestation expanded. On the other hand, in the Valley as whole, during the decade 1970/80 the area used for agricultural purposes also increased but on a much smaller scale than for reforestation. This initially suggests that the expansion of industrial reforestation did not interfere with agriculture. However, the land outside the Agricultural Census that was incorporated into the productive category was far from being waste; it was used to collect medicinal plants, firewood and extensive grazing among other uses by subsistence farmers who were displaced by the plantations. However, the conventional model fails to consider this issue.

The second argument concerned the Valley's land tenure structure which has been highly concentrated. However, in the decade 1970/80 there was an increase in the land tenure concentration in both regions, the Alto-Mineradoras and Pastoris. This suggests other factors besides the expansion of the reforestation. It is hypothesised that the national development model has also encouraged concentration in the other agricultural and grazing activities which are found in the Pastoris. In the Alto-Mineradoras, where reforestation was concentrated and precisely in the period in which it expanded (1970/80), the concentration of land ownership (as



indicated by the Gini coefficient) was greater and increasing more rapidly than for the Valley as a whole. Hence, this suggests that, although it was not the only factor in the Valley which contributed to the concentration of land tenure, the expansion of industrial reforestation played an important part.

The third argument put forward by the proponents was that the expansion of plantation would stimulate industrial expansion by providing the necessary resource base. However, as shown in this study, a substantial proportion of the reforestation in Alto-Mineradoras is still waiting for the appearance of a market for their wood. The wood-based industry in the Valley is restricted to small sawmills and no new major wood-based industry has appeared. In particular a pulp and paper mill as originally envisaged, has not been built.

The expansion of industrial reforestation and consequent employment generation has been one of the principal arguments used by the advocates. It is indisputable that these plantations created jobs. During the establishment phase there was significant employment; it drops sharply during the maintenance phase; and may become very substantial in the harvesting or processing phases. Since the legislation of the fiscal incentives scheme only covers the costs of establishment plus three years of maintenance, and large reforested areas are still without final markets, this suggests that the creation of jobs has been minimal after the establishment and the initial maintenance phase has passed.

The fourth argument concerned employment. Between 1970 and 1980, the population economically active employed in the secondary sector in the Valley increased slightly. However, while in 1970 the proportion of the labour force engaged in the secondary sector was the same in both Alto-Mineradoras and Pastoris, by 1980 this increase was greater in the Pastoris! This challenges the common belief that the establishment and availability of a plantations per se is able to attract a process of industrialization and employment opportunities.

The fifth argument put forward by the proponents is that the expansion of the industrial reforestation helps to integrate the region into the Brazilian model of development, promotes economic growth, and starts a process of modernization. This analysis has shown that this occurred but had undesirable effects. For example, the introduction of new patterns of food consumption probably led to decline in nutrition. It also increased the Valley's dependence on major centres. For example, it needed to import food from major centres that used to be produced locally. Consequently, it is likely that part of the income generated with the reforestation goes out from the Valley to pay for these imports. These facts lead one to seriously doubt the real benefits of this set of events, for the majority of the population of the Valley. In short, this suggests a reproduction at national level of the dependent development argued in the Dependency theory.

The sixth argument advanced, was that one of the most positive aspects of reforestation is to help to restrain, or even reverse, rural emigration. However, this study found that the

average annual growth rate of the urban population, in the period 1970/80, in Alto-Mineradoras was greater than in the Pastoris. On the other hand, the rural population continued to decline significantly in the two microregions of the Alto-Mineradoras where most of the reforestation did not have a final market. The data also showed that the Valley has been losing population on the whole.

The seventh argument concerned the flow of benefits from industrial reforestation to increase the general standards of living of the population. Health was taken as the indicator. Due to the way urbanization occurred it was found that the living standards of most of the population declined. The municipalities did not have the financial resources to keep up with the basic infrastructure. Although the water and sewage network increased in the Valley, it served only a small percentage of the population; most of the population cannot afford to have these systems. This is reflected in the causes of mortality. Infectious and parasitic diseases still continue to be responsible for a great number of deaths and diseases typical of urban centres increased. This suggests that without having its old and basic health problems solved, the Valley had new ones incorporated with modernization.

These findings from the case study reveal how incomplete has been the analysis of the industrial reforestation in failing to consider that the whole process of development is multi-faceted. The findings have implications at different levels: to forestry in general, to Brazil, to Minas Gerais and to the Jequitinhonha Valley, which are the object of discussion in the following section.

#### 9.4 The Model and Its Implications

The model used in this study to examine reforestation in Brazil synthesised economic, political and social factors to provide a comprehensive critique of development that extended beyond the narrow financial and economic models used previously.

The model can be extended to study the expansion of other sectors - there is little in it that is unique to forestry. However, for the forestry sector in particular, the application and expansion of a comprehensive methodology of analysis and evaluation can have the following implications:

- a. The model brings into the forestry sector other concepts, disciplines and sources which are frequently ignored by forestry analysts. It can stimulate the debate regarding the need for the forestry sector to peer beyond its own boundaries and relate to national and international systems.
- b. In turn, this broader view of the role and context of the forestry sector shifted from its own boundaries implies that the evaluation of forestry development cannot be restricted exclusively to technical or biological issues, or to the design of capital investments through project evaluation techniques. There is a series of socio-economic and political interactions which, eventhough in many cases they can not be quantified in dollar terms, cannot be ignored or only listed. Ultimately, society cannot be reduced to a

single quantified economic dimension, in fact the society transcends figures.

- c. The generalized assumption that the establishment or availability of a large forest plantation per se is a necessary and sufficient condition to stimulate a process of industrialization needs to be reviewed since the forestry sector is just a part of a greater structure. It may be a necessary, but is not a sufficient, condition to promote industrialization. This implies that a revision of the concept of the integration of forestry and industry is needed;
- d. The expansion of industrial reforestation can contribute to an integration of a backward region into the world system, however this integration leads to a series of trade-offs which are not necessarily positive for the former. Thus, the region cannot be considered in isolation, but on the contrary, the trade-offs should be taken into account.
- e. Considering the social aspects, the evaluation of reforestation should not be restricted to merely considering the growing of exotic fast-growing species. They are not the only answer or panacea, but on the contrary, a wide range of native or exotic species which can provide other products, such as firewood, fodder, and medicinal products should also be evaluated.

As far as Brazil is concerned this study suggests the following implications:

- a. A careful re-appraisal of the fiscal incentives scheme is warranted, using a comprehensive and detailed analysis which goes beyond project evaluation techniques. This re-appraisal should find answers to questions, such as 'for whom?' and 'for what purpose?' is the continued expansion of industrial reforestation. In the end, it is public money that is being used for the establishment of these plantations and the government has a responsibility to see that it brings real benefits to society;
- b. This study suggests that it is no longer necessary to stimulate industrial reforestation, but on the contrary it is already time to find out what to do with those plantations already established but with no final assignment yet. These plantations are potentially a very valuable resource, if industries and markets could be developed. It seems illogical to stimulate new plantations on the basis that, for example, jobs would be created and income generated, when this study has shown that it seems unlikely that many jobs would be created unless these plantations go beyond establishment and the first three years maintenance to harvesting, processing and re-planting. In planning the forest processing industries to utilise these resources, the results of this case study could be very applicable, to ensure that advance social impacts from the forest growing phase are not continued, or magnified, in the processing phase.

- c. This availability of already established plantations without final markets suggests the need to consider more carefully the present policy of pushing industrial reforestation further away from the major industrial centres on the same old assumption that wood-based industries will also follow. Processing in the remote regions may not be viable, i.e. it is necessary to re-appraise the integration between forestry and wood-based industry.
- d. The policy of pushing reforestation further inland also deserves also attention in relation to their use as an alternative source of energy for industrial use. It seems unwise to establish new plantations at greater distances from the major industrial consumers, otherwise there is an increasing risk that the energy balance becomes negative.
- e. It seems that it is time for the private sector to assume its own risk. The forestry sector can no longer rely almost exclusively on the concession of tax deductions. If some stimulus is to be given it should be granted in terms of improving productivity and not just on an endless expansion of industrial reforestation.
- f. The native forest and its exploitation also deserve attention since it continues to face pressure, even for charcoal production. Actually, it seems unlikely that simply because there are forest plantations available native forests will have less pressure.
- g. More social perception is required for the scheme, not based on untested assumptions, for example, that plantations can be established on 'idle' lands, ultimately depriving the

local people of their natural source of medicinal plants and firewood. This social perception can avoid paradoxical situations of a region having plenty of forest stands, but at the same time the local people face a shortage of firewood. This social perception also requires that the emphasis be not just on exotic fast-growing species, but also multipurpose species for local use, such as fruits, nuts and fodder. Thus, it is argued that a 'forest industries development' project could have a 'social forestry' component, or at least, need not be anti-social;

As far as the State of Minas Gerais is concerned the implications of this study are:

- a. Since the State has no power to stop the establishment of new plantations and since large forest plantations have already been established, the State must attempt to help in answering the question of what to do with them.
- b. Given that the State has no power to stop, at least it can refrain from encouraging further industrial plantations, for example, not facilitating the lease or acquisition of large tracts of land as happened in the Valley.

The State has little decision-making power, but a region like the Valley has less yet and can only react passively. Within this context, the implication of this study, as far as the Jequitinhonha Valley is concerned, are:



- a. There is not much that the Valley can do. However, the local authorities should lobby and present suggestions to both the State and the Federal governments regarding what to do with those plantations that have been established, but which have no final market.

### 9.5 Final Remarks

This powerless situation faced by both the State and the Valley require measures which can counter the power at federal and state levels. However, this is not an easy problem to solve. The concentration of power has gradually increased since the 1930's so it has deep and strong roots. Hence, to reverse this process is not so simple. However, it is interesting to note that both States and municipalities have been struggling for this reversion which will probably occur, at least in part, in the future due to return of Brazil to a democracy.

Finally, it seems paradoxical at first that the poor people of this region, who were claimed to be the major beneficiaries of the forest based regional industrial development program, are in fact the group which has benefited least and suffered most from the program. However, if one reflects on the national macro-economic development strategy of which it is a part, and on parallel developments in other sectors in Brazil, the result is not surprising. The program was designed by and for the rich and powerful Brazilian elite and was imposed on the region and its people.

## BIBLIOGRAPHY

- Agarwal, A. 1985. 'Beyond pretty trees and tigers'. A three-part series of articles. Habitat 13(1), 12-15; 13(2), 6-7; and 13(3), 28-32.
- Arnold, J. E. M. 1974. Lessons of Experience in Planning Forestry Development. Paper prepared for the Tenth Commonwealth Forestry Conference held in September, 1974. Mimeo.
- Arnold, J. E. M. 1979. 'New approaches to tropical forestry: A habitat for more than just trees'. CERES 12(5) 71, 32-37.
- Associação Mineira de Empresas Florestais (AMEF). 1981. 0 Reflorestamento no Brasil. Belo Horizonte: AMEF.
- Aubreville, A. 1959. 'As florestas do Brasil: Estudo fitogeográfico e florestal'. Anuario Brasileiro de Economia Florestal, 11, 201-232.
- Australia Trade Development Council. 1983. Report of Trade Development Council Survey Mission to Brazil. Canberra: Australian Government Publishing Service.
- Azambuja, D. & Thibau, C. E. 1973. Diretrizes para o Problema do Carvão Vegetal na Siderurgia. Boletim Técnico No. 3. Brasília: IBDF.
- Badaro, M. (n/d). Historia da CODEVALE. Brasília: Serviço Gráfico do Senado Federal.
- Baran, P. 1957. The Political Economy of Growth. New York: Monthly Review Press.

- Baran, P. & Hobsbaum, E. 1961. The stages of economic growth. Kyklos 14, 234-42.
- Barbosa, R. 1950. 'A sesmaria e a floresta na formacao do Rio de Janeiro'. Anuario Brasileiro de Economia Florestal 3, 39-44.
- Barreto, H. L. M. 1949. 'Regioes fitogeograficas de Minas Gerais'. Anuario Brasileiro de Economia Florestal 2, 352-369.
- Bastos, A. M. 1959. 'A floresta do Amapari-Matapi-Cupixi (Inventario Florestal)'. Anuario Brasileiro de Economia Florestal 11, 255-294.
- Beattie, W. D. 1975. An Economic Analysis of the Brazilian Fiscal Incentives for Reforestation. Unpublished Ph.D. thesis: Purdue University.
- Beattie, W. D. & Ferreira, J. M. 1978. Analise Financeira e Socio-Economica do Reflorestamento no Brasil. Colecao: Desenvolvimento e Planejamento Florestal. Serie: Estudos Perspectivos para o Periodo 1975-1985. Brasilia: IBDF/COPLAN.
- Belluzzo, L. G. M. & Coutinho, R. (org.). 1983. Desenvolvimento Capitalista no Brasil: Ensaio sobre a crise. 2 Volumes. Sao Paulo: Editora Brasiliense.
- Bendix, R. 1967. 'Tradition and modernity reconsidered'. Comparative Studies in Society and History 61, 292-346.
- Berger, R. 1979. The Brazilian Fiscal Incentive Act's Influence on Reforestation Activity in Sao Paulo State. Unpublished Ph.D. thesis: Michigan State University.
- Berutti, P. A. 1974. 'O reflorestamento e a pesquisa florestal do IBDF'. Brasil Florestal 19, 3-13.

- Boer, P. 1974. 1974. 'Reflorestamento e segurança nacional'. Brasil Florestal 19, 40-44.
- Braibanti, R. D. & Spengler. 1961. Tradition, Values and Socio-Economic Development. Durham: Duke University Press.
- Brazil. 1983. 'Reaping fast rich rewards from reforestation'. Brazil Trade and Industry October, 26-30
- Brito, F. 1984. 'O estado tutelar: O INDI e a industrialização na década de 70'. Revista Brasileira de Estudos Políticos 58 (numero especial sobre a economia mineira), 241-257.
- Burns, E. B. 1970. A History of Brazil. New York: Columbia University Press.
- Calder, M. 1980. Big Timber Country. Melbourne: Rigby Publishers Limited.
- Carvalho, J. C. 1982. Reflexões sobre o Sistema de Incentivos Fiscais ao Reflorestamento. Paper presented at the IV Congresso Florestal Brasileiro held in Belo Horizonte from 10 to 14 May, 1982. Belo Horizonte: Instituto Estadual de Florestas.
- Carron, L. T. 1985. A History of Forestry in Australia. Canberra: The Australian National University Press.
- Chenery, H. B. et al. 1974. Redistribution with Growth. A World Bank Publication. New York & Oxford: Oxford University Press.
- Chilcote, R. H. 1974. 'Dependency: A critical synthesis of the literature'. Latin American Perspectives 1(1), pp. 4-29
- Comissão de Desenvolvimento do Vale do Jequitinhonha (CODEVALE). 1979. Programa de Desenvolvimento Rural do Vale do Jequitinhonha - PLANRURAL. Belo Horizonte: CODEVALE.

- Comissao de Desenvolvimento do Vale do Jequitinhonha (CODEVALE), Fundacao Joao Pinheiro (FJP) & Secretaria do Planejamento e Coordenacao Geral (SEPLAN/MG). 1983. Vale do Jequitinhonha: Subsidios para elaboracao de um plano de desenvolvimento regional. Sinteses e Diretrizes (v. 2). Belo Horizonte: CODEVALE/FJP/SEPLAN-MG.
- Coque e Alcool da Madeira S.A. (COALBRA) 1983. Alcool e Emprego: O impacto da producao de alcool de cana-de-acucar e de madeira na geracao de empregos. Cadernos COALBRA - 3. Brasilia: COALBRA.
- Coutinho, L. G. & Belluzzo, L. G. M. 1983. 'Estado, sistema financeiro e forma de manifestacao da crise: 1929-1974'. In: Desenvolvimento Capitalista no Brasil: Ensaio sobre a crise, Belluzzo, L.G.M. & Coutinho, R. (org.), No. 1 (2nd. ed.), 1983, 9-36. Sao Paulo: Editora Brasiliense.
- Covre, M. L. M. 1983. A Fala do Homens: Analise do pensamento tecnocratico: 1964-1981. Sao Paulo: Editora Brasiliense.
- De'Ath, C. 1980. The Throwaway People: Social impact of the Gogol timer project, Madanga province. Monograph No. 13. Boroko (Papua New Guinea): The Institute of Applied Social and Economic Research.
- Dean, W. 1983. 'Deforestation in southeastern Brazil'. In: Global Deforestation and the Nineteenth-Century World Economy, Tucker, R. P. & Richards, J. F. (eds.), 1983, 50-67. Duke Press Policy Studies. Durham: Duke Universtiy Press.
- Delson, R. M. & Dickenson, J. 1984. 'Conservation tendencies in colonial and imperial Brazil: An alternative perspective on human relationships to the land'. Environmental Review 8(3) Fall 1984, 270-283.

- Diniz, C. C. 1981. Estado e Capital Estrangeiro na Industrializaco Mineira. Belo Horizonte: UFMG/PROED.
- Diniz, C. C. 1984. 'Economia e planejamento em Minas Gerais'. Revista Brasileira de Estudos Politicos 58 (numero especial sobre a economia mineira), 270-283.
- Dos Santos, T. 1970. 'The structure of dependencia'. American Economic Review LX(2), 231-236.
- Douglas, J. J. 1983. A Re-Appraisal of Forestry Development in Developing Countries. Forestry Sciences, vol. 8. The Hague: Martinus Nijolff/Dr. W. Junk Publishers.
- Dreifuss, R. A. 1981. 1964: A conquista do estado - Acao, politica, poder e golpe de classe. Petropolis: Editora Vozes.
- Ettema, W. H. 1979. 'Geographers and development'. Tidjdschrift voor Economische en Sociale Geografie 70(2), 66-74.
- Evans, P. 1982. A Triplice Alianca: As multinacionais, as estatais e o capital nacional no desenvolvimento dependente Brasileiro. (2nd. ed.). Rio de Janeiro: Zahar Editores (Portuguese translation by W. Dutra from the original 'Dependent Development: The alliance of multinationals, state, and local capital in Brazil'. New Jersey: Princeton University Press, 1979).
- Fei, J. C. H. et al. 1979. Growth with Equity: The Taiwan case. A World Bank Publication. New York & Oxford: Oxford University Press.
- Fiechter, G. A. 1975. Brazil Since 1964: Modernisation under a military regime (A study of the interactions of politcs and economics in a contemporary military regime). London: The Macmillan Press. [English translation by A. Braley from the

original in French (the original title was not mentioned in the English version). 1972. Paris: Institute Universitaire de Hautes Etudes Internationales].

Fields, G. S. 1980. Poverty, Inequality, and Development. New York & Cambridge: Cambridge University Press.

Fisher, H. E. S. 1971. The Portugal Trade: A study of Anglo-Portuguese commerce: 1700-1770. London: Methuen.

Flores-Rodas, M. A. 1980. Towards a Forestry Strategy for Development in Latin America. Unpublished Ph.D. thesis: University of Washington.

Flynn, P. 1978. Brazil: A political analysis. London: Ernest Benn; Boulder: Westview Press.

Folha de Sao Paulo (newspaper). 'Reflorestamento desenvolve o Vale do Jequitinhonha'. On 28 March, 1976.

Fontes, J. G. 1978. 'As arvores dos frutos de ouro'. Silvicultura 9, 37-39.

Food and Agriculture Organization (FAO). 1969. 'Modernizing institutions to promote forestry development'. In: The State of Food and Agriculture - 1969, chapter IV, 107-136. Rome: FAO.

Food and Agriculture Organization (FAO). 1978. Forestry for Local Community Development. FAO Forestry Paper No. 7. Rome: FAO.

Food and Agriculture Organization (FAO). 1979. 'Forestry and rural development'. In: The State of Food and Agriculture - 1979, chapter 2, 2-1 to 2-35. Rome: FAO.

Food and Agriculture Organization (FAO). 1983. 1981 - Yearbook of Forest Products (1970-1981). FAO Forestry Series 16. FAO Statistic Series 44. Rome: FAO.

- Foster-Carter, A. 1976. 'From Rostow to Gunder Frank: Conflicting paradigms in the analysis of underdevelopment'. World Development 4(3), 167-180.
- Fraga, M. V. G. 1950a. 'A questao florestal ao tempo do Brasil colonia'. Anuario Brasileiro de Economia Florestal 3, 89-96.
- Fraga, M. V. G. 1950b. 'Bibliografia florestal para a questao Brasileira'. Anuario Brasileiro de Economia Floresta 3, 353-355.
- Frank, A. G. 1971. Sociology of Development and Underdevelopment London: Pluto Press.
- Frank, A. G. 1977. 'Dependence is dead, long live dependence and the class struggle: An answer to critics'. World Development 5(4), 355-370.
- Frank, A. G. 1978. World Accumulation: 1492-1789. London & Basingstoke: The Macmillan Press Ltd.
- Frank, A. G. 1984. Critique and Anti-Critique: Essays on dependence and reformism. London & Basingstake: The Macmillan Press Ltd.
- Freire, G. 1950. 'A cana e a mata'. Anuario Brasileiro de Economia Florestal 3, 57-64.
- Freire, G. 1978. Casa Grande e Senzala. 19th ed. Rio de Janeiro: Livraria Jose Olympio Edtiora. (1st ed. in 1933).
- French, J. 1962. 'Tendencias e perspectivas das madeiras na America Latina'. Anuario Brasileiro de Economia Florestal 14, 203-208.
- Fundacao Centro Tecnologico de Minas Gerais (F. CETEC). 1978. Levantamento da Formacoes Vegetais em Areas de Carvoejamento do Estado de Minas Gerais. Belo Horizonte: F. CETEC.
- Fundacao Centro Tecnologico de Minas Gerais (F. CETEC). 1980. Projeto Estudos Integrados do Vale do Jequitinhonha. 10 volumes. Belo Horizonte: F. CETEC.



- Fundacao Centro Tecnologico de Minas Gerais (F. CETEC). 1983. Levantamento das Formacoes Vegetais Nativas Lenhosas de Minas Gerais. Relatorio Final. Belo Horizonte: F. CETEC.
- Fundacao Getulio Vargas (FGV). 1980. 'Indices Economicos'. Conjuntura Economica 34(2): 103.
- Fundacao Instituto Brasileiro de Geografia e Estatistica (F.IBGE). Censo Agricolas: 1950 & 1960. Rio de Janeiro: F. IBGE.
- Fundacao Instituto Brasileiro de Geografia e Estatistica (F.IBGE). Censo Agropecuarios: 1970, 1975 & 1980. Rio de Janeiro: F.IBGE.
- Fundacao Instituto Brasileiro de Geografia e Estatistica (F.IBGE). Censo Demograficos: 1950, 1960, 1970 & 1980. Rio de Janeiro: F.IBGE.
- Fundacao Joao Pinheiro (FJP) & Comissao de Desenvolvimento do Vale do Jequitinhonha (CODEVALE). 1975. Vale do Jequitinhonha: Diagnostico preliminar. Belo Horizonte: CODEVALE.
- Furtado, C. 1982a. Formacao Economica do Brasil (18th ed.). Sao Paulo: Companhia Editora Nacional.
- Furtado, C. 1982b. Analise do "Modelo" Brasileiro. Rio de Janeiro: Editora Civilizacao Brasileira S.A.
- Furtado, C. 1982c. A Nova Dependencia: Divida externa e monetarismo. Rio de Janeiro: Editora Paz e Terra S.A.
- Furtado, C. 1983. Nao a Recessao e ao Desemprego. Rio de Janeiro: Editora Paz e Terra.
- Galtung, J. & Wirak, A. 1977. 'Human needs, human rights and the theories of development'. Reports and Papers in Social Sciences 37, 7-34. Paris: UNESCO.

- Galvao, A. P. M. & Lupatelli, S. 1982. 'O setor florestal Brasileiro'. In: The Forest Sector: Country reports, Inter-American Development Bank (IDB), Regional conference about financing of forestry development in Latin America held in Washington, DC, June 22-25, 1982. Washington: IDB.
- Gamser, M. S. 1980. 'The forest resource and rural energy development'. World Development 8(10), 769-780.
- Grayson, A. J. (ed.) 1976. Evaluation of the Contribution of Forestry to Economic Development. UK Forestry Commission, Bulletin 56.
- Gazeta Mercantil (newspaper). As novas opcoes de localizacao. On 29/12/76.
- Graziano, E. & Graziano Neto, F. 1982. As Condicoes da Reproducao Camponesa no Vale do Jequitinhonha. Mimeo.
- Gregersen, H. M. 1973. 'The role of forestry in regional economic development: An alternative view'. Journal of Forestry, 71(12), 98-99.
- Gregory, G. R. 1965. 'Forests and economic development in Latin America: A challenge for the American forestry profession'. Journal of Forestry 63(2), 83-88.
- Guerra, F. U. 1959. 'Silvicultura na Amazonia'. Anuario Brasileiro de Economia Florestal 11, 320-322.
- Guess, G. M. 1981. 'Technical and financial policy options for development forestry'. Natural Resources Journal 2, 37-55
- Griffin, K. & Khan, A. R. 1978. 'Poverty in the Third World: Ugly facts and fancy models'. World Development 6(3), 295-304.
- Hall, A. L. 1978. Drought and Irrigation in Northeast Brazil. Cambridge Latin America Studies, No. 29. Cambridge: Cambridge University Press.

- Hewlett, S. A. 1981. Dilemas do Desenvolvimento: O Brasil no seculo XX. Rio de Janeiro: Zahar Editores S.A. (Portuguese translation by A. Cabral from the original 'The Cruel Dilemmas of Development: Twentieth-Century Brazil'. New York: Basic Books, Inc.)
- Higgot, R. 1978. 'Competing theoretical perspectives on development and underdevelopment: A recent intellectual history. Politics XIII(1), May, 26-41.
- Hirschman, A. O. 1963. The Strategy of Economic Development. (first published in 1958). New Haven: Yale University Press.
- Horowitz, I. L. 1972. Three Worlds of Development. (2nd. ed.) New York & Oxford: Oxford University Press.
- Houghton, N. 1980. Timber and Gold: A history of the sawmills and tramways of the Wombat forest, 1855-1940. Melbourne: Light Railway Research Society of Australia.
- Hueck, K. 1978. Los Bosques de Sudamerica: Ecologia, composicion e importancia economica. Eschoborn (Germany): Sociedad Alemania de Cooperacion Tecnica, Ltda. (GTZ).
- Inkele, A. 1969. 'Making men modern: On the causes and consequences of individual change in six countries' American Journal of Sociology 75(2), 208-255.
- Instituto Brasileiro de Desenvolvimento Florestal (IBDF). 1967. 'Decreto-Lei No. 289, de 28 de fevereiro de 1967'. Anuario Brasileiro de Economia Florestal 18, 11-28.
- Instituto Brasileiro de Desenvolvimento Florestal (IBDF). 1968. 'Carta de Brasilia'. Anuario Brasileiro de Economia Florestal 19, 19-36.

- Instituto Brasileiro de Desenvolvimento Florestal (IBDF). 1982a. 'IBDF quer aumento da produtividade do setor florestal'. Brasil Florestal 49, 51-61.
- Instituto Brasileiro de Desenvolvimento Florestal (IBDF). 1982b. 'Brasil florestal, ano 2000: Diretrizes estratégicas para o setor florestal Brasileiro'. Brasil Florestal 50, 7-33.
- Instituto Brasileiro de Desenvolvimento Florestal (IBDF). 1985. O Setor Florestal Brasileiro 79/85. Brasília: IBDF.
- Instituto Brasileiro de Desenvolvimento Florestal (IBDF)/Departamento de Economia Florestal (DE). 1983. Inventario Florestal Nacional (Síntese dos Resultados). Brasília: IBDF/DE.
- Instituto Brasileiro de Desenvolvimento Florestal (IBDF)/Departamento de Reflorestamento (DR). 1983. Normas Legais, Administrativas e Técnicas. Brasília: IBDF/DR.
- Instituto Brasileiro de Desenvolvimento Florestal (IBDF)/Universidade Federal Rural do Rio de Janeiro (UFRRJ). 1983. Avaliação Econômica das Florestas Nativas da Região Sudeste: Disponibilidade florestal e consumo industrial. 3 volumes. Rio de Janeiro: UFRRJ.
- Instituto de Desenvolvimento Industrial de Minas Gerais (INDI). 1975. Análise do Conceito de Integração Reflorestamento-Indústria em Minas Gerais. Belo Horizonte: INDI.
- Instituto de Geociências Aplicada (IGA). 1982. Atlas Regional das Atividades Agropecuárias: Região de Planejamento VII - Jequitinhonha. Belo Horizonte: IGA
- Instituto Nacional do Pinho (INP). 1949. 'Conferência Latino-Americana de florestas e produtos florestais' Anuário Brasileiro de Economia Florestal 2, 414-427.

- Instituto Nacional do Pinho (INP). 1951. 'Reflorestamento da regio siderurgica do centro do pais'. Anuario Brasileiro de Economia Florestal 4, 247-261.
- Instituto Nacional do Pinho (INP). 1958. 'Reuniao florestal de Itatiaia'. Anuario Brasileiro de Economia Florestal 10, 247-256.
- Instituto Nacional do Pinho (INP). 1959a. 'Formacao de tecnicos madeireiros para a Amazonia'. Anuario Brasileiro de Economia Florestal 11, 233-243.
- Instituto Nacional do Pinho (INP). 1959b. 'Politica florestal Brasileira'. Anuario Brasileiro de Economia Florestal 11, 93-108.
- Instituto Nacional do Pinho (INP). 1961. 'A cultura do eucalypto no Brasil'. Anuario Brasileiro de Economia Florestal 13, 81-87.
- Instituto Nacional do Pinho (INP). 1963. 'Analise da situacao florestal Brasileira'. Anuario Brasileiro de Economia Florestal 15, 83-107.
- Johnson, H. G. 1962. 'The market mechanism as an instrument of development'. In: Leading Issues in Economic Development (3rd ed.), Meier, G. M. (ed.), 1984, XI.A.2, 711-716. New York & Oxford: Oxford University Press.
- Jornal do Brasil (newspaper). 'A floresta "blue-chip" da Acesita'. On: 25 March, 1976: 26 (Informe Economico).
- Keay, R. W. J. 1971. The Role of Forest in the Development of Tropical Countries. Paper presented at the 12th Pacific Science Congress held in August 1971. Mimeo.
- King, K. F. S. 1980. 'Forestry's contribution to social and economic development' Commonwealth Forestry Review 59(4), 515-525.

- Kotscho, R. 1977. 'O progresso chegando ao vale da fome'. A series of 7 articles. 'O Estado de Sao Paulo' (newspaper), 28/8, 30/8, 31/8, 1/9, 2/9, 3/9 and 4/9/1977.
- Ladeira, H. P. (n/d). Aspectos Sociais dos Reflorestamentos com Incentivos Fiscais no Estado de Minas Gerais - Brasil. Paper presented at the I Symposium of the Group S1.07.09 of IUFRO.
- Lagos-Matus, G. 1963. International Stratification and Underdeveloped Countries. Chapel Hill: University of North Carolina Press.
- Lall, S. 1975. 'Is dependence a useful concept in analysing underdevelopment?' World Development 3(11/12), 799-810.
- Lall, S. 1981. Developing Countries in the International Economy: Selected papers. (reprinted 1985) London: The Macmillan Press Ltd.
- Latin America Bureau (LAB). 1982. Brazil: State and struggle. London: LAB.
- Lemos, M. B. 1984. 'Natureza e perspectiva da industria de bens de capital em Minas Gerais'. Revista Brasileira de Estudos Politicos 58 (numero especial sobre a economia mineira), 121-164.
- Lenin, V. I. 1939. Imperialism: The highest stage of capitalism. New York: International.
- Lenski, G. E. 1966. Power and Privilege: A theory of social stratification. New York: McGraw-Hill.
- Lerner, D. 1958. The Passing of Traditional Society: Modernizing the Middle East. New York: The Free Press.
- Lessa, C. 1983. 15 Anos de Politica Economica (4th ed.). Sao Paulo: Editora Brasiliense.
- Lewis, W. A. 1955. Theory of Economic Growth. London: Unwin.

- MacGregor, J. J. 1976. 'The existing and potential roles of forestry in the economics of developing countries'. In: Evaluation of the Contribution of Forestry to Economic Development, Grayson, A. J. (ed.) 1976, UK Forestry Commission, Bulletin No. 56, 1-7.
- McGayghey, S. E. & Gregersen, H. M. (eds.) 1983. Forest-Based Development in Latin America. Washington (DC): Inter-American Development Bank (IDB).
- Magnanini, A. 1959. 'Area das grandes formacoes vegetais no Brasil'. Anuario Brasileiro de Economia Florestal 11, 295-303.
- Martine, G. & Camargo, L. 1982. Crescimento e Distribuicao da Populacao Brasileira: Tendencias recentes. CNRH, texto par discussao no. 05/82, versao revisada marco de 1983. Brasilia: IPEA/IPLAN.
- Martins, R. B. 1983. 'A industria textil domestica de Minas Gerais no seculo XIX'. In: Anais do II Seminarion sobre a Economia Mineira, Pimenta, H. C. (ed.) 1983, 75-94. Belo Horizonte: CEDEPLAR.
- Mendes, M. A. S. et al. 1978. Diagnostico da Participacao do Subsetor Florestal na Economia Brasileira. Colecao: Desenvolvimento e Planejamento. Serie: Estudos Perspectivos para o Period 1979 a 1985. Brasilia: IBDF/COPLAN.
- Morley, S. A. 1982. Labor Markets and Inequitable Growth: The case of authoritarian capitalism in Brazil. New York & Cambridge: Cambridge University Press.
- Moura, M. M. et al. 1980. A Reproducao do Pequeno Produtor no Vale do Jequitinhonha Mineiro. 1<sup>o</sup> Relatorio da Pesquisa 1978-1980. Rio de Janeiro: FGV/EIAP/Centro de Pos-Graduacao em Desenvolvimento Agricola. Mimeo.

- Moura, M. M. 1983. Os Deserdados da Terra. Unpublished Ph.D. thesis: Universidade de Sao Paulo.
- Mouzelis, N. 1980. 'Modernization, underdevelopment, uneven development: Prospects for a theory of Third World formation'. Journal of Peasant Studies 7(3), 353-374.
- Munoz, H. (ed.) 1981. From Dependency to Development: Strategies to overcome underdevelopment and inequality. Boulder:Westview Press.
- Muthoo, M. K. 1977. Perspectivas e Tendencias do Setor Florestal Brasileiro, 1975-2000. 2 volumes. Colecao: Desenvolvimento e Planejamento Florestal. Serie: Tecnica No. 8. Brasilia: IBDF/COPLAN.
- Nabuco, M. R. 1984. 'Agricultura, estado e desenvolvimento regional em Minas Gerais: 1950-1980'. Revista Brasileira de Estudos Politicos 58 (numero especial sobre a economia mineira), 165-239.
- Nautiyal, J. C. 1967. Possible Contribution of Timber Production Forestry to Economic Development. Unpublished Ph.D. thesis: University of British Columbia.
- Neves, A. R. 1979. Avaliacao Socio-Economica de um Programa de Reflorestamento na Regiao de Carbonita, Vale do Jequitinhonha, MG. Unpublished M.Sc. thesis: Universidade Federal de Vicosa.
- Neves, J. C. 1974. 'A Grande vocacao florestal de Minas'. O Globo (newspaper), on 16 October, 1974: 26-27.
- Nogueira, U. B. 1980. Charcoal Production from Eucalyptus in Southern Bahia for Iron and Steel Manufacture in Minas Gerais, Brazil. Unpublished Ph.D. thesis: Michigan State University.
- O Estado de Sao Paulo (newspaper). Imprevistos do Reflorestamento. on 08 April, 1976: 18.



- O Globo (newspaper). Reflorestamento desenvolve o Vale do Jequitinhonha. On: 10 September, 1974.
- O Globo (newspaper). Tecnologia garante lideranca a Minas. On: 21 September, 1976: 23.
- Oliveira, F. A. & Paixao Jr., R. M. 1983. 'As raizes do endividamento mineiro recente'. In: Anais do II Seminario sobre a Economia Mineira, Pimenta, H. C. (ed.) 1983, 337-355. Belo Horizonte: CEDEPLAR.
- Oxaal, I. et al. (ed.) 1975. Beyond the Sociology of Development: Economy and Society in Latin America. London: Routledge & Kegan Paul.
- Osse, L. 1961. 'As culturas de eucalyptos da Companhia Siderurgica Belgo Mineira'. Anuario Brasileiro de Economia Florestal 13, 102-112.
- Palma, G. 1978. 'Dependency: A formal theory of underdevelopment' World Development 6(7/8), 881-924.
- Paula, J. A. 1983. 'Dois ensaios sobre a genese da industrializacao em Minas Gerais: A siderurgia e a industria textil'. In: Anais do II Seminario sobre a Economia Mineira, Pimenta, H. C. (ed.) 1983, 17-73. Belo Horizonte: CEDEPLAR.
- Paula, J. A. 1984. 'Os limites da industrializacao colonial: A industrializacao em Minas Gerais no seculo XVIII'. Revista Brasileira de Estudos Politicos 58 (numero especial sobre a economia mineira), 63-104.
- Pereira, L. 1911. O Municipio de Aracuai. Belo Horizonte: Imprensa Oficial.

- Pereira, L. C. B. 1982. Economia Brasileira: Uma introducao critica. (2nd. ed.). Sao Paulo: Editora Brasiliense.
- Pereira, L. C. B. 1983. Desenvolvimento e Crise no Brasil (13th ed.). Sao Paulo: Editora Brasiliense. (1st. ed. in 1968).
- Pershkin, A. & Cohen. 1967. 'The values of modernization' Journal of Developing Areas 2, 7-22.
- Pettman, R. H. 1979. State and Class: A sociology of international affairs. London: Croom Helm.
- Pimenta, H. C. (ed.) 1983. Anais do II Seminario sobre a Economia Mineira: Historia economica de Minas Gerais, a economia mineira dos anos oitenta. Belo Horizonte: CEDEPLAR/FACE/UFMG.
- Pinkett, H. T. 1970. Grifford Pinchot: Private and public forester. Urbana: University of Illinois Press.
- Poore, D. 1983. 'Forests: Driving forces for destruction'. People 10(1), 14-17.
- Portes, A. 1973. 'Modernity and development: A critique'. Studies in Comparative International Development 8(3), 247-297.
- Portes, A. 1976. 'On the sociology of national development theories and issues'. American Journal of Sociology 82(1), 55-85.
- Prado, A. C. 1977a. A Contribuicao do Setor Florestal ao PIB do Pais. Brasilia: IBDF/COPLAN. Mimeo.
- Prado, A. C. 1977b. A Contribuicao do Setor Florestal ao Comercio Exterior do Brasil: 1959-1974. Colecao: Desenvolvimento e Planejamento Florestal. Serie: Tecnica No. 6. Brasilia: IBDF/COPLAN.
- Prado Jr., C. 1974. Historia Economica do Brasil (17th ed.). Sao Paulo: Editora Brasiliense.

Prebisch, R. 1962. 'The economic development of Latin America and its principal problems'. Economic Bulletin for Latin America VII(1), 1-22.

Proceedings of the 5th World Forestry Congress held in the United States of America (USA) in 1960.

Proceedings of the 6th World Forestry Congress held in Spain in 1966.

Proceedings of the 7th World Forestry Congress held in Argentina in 1972.

Proceedings of the 8th World Forestry Congress held in Indonesia in 1978.

Procopio, M. 1978. 'Jequitinhonha refletindo o Brasil'. O Estado de Minas Gerais (newspaper) on 04 March, 1984.

Reis, M. S. & Carneiro, C. M. R. 1982. Consideracoes sobre as Atividades do Setor Florestal Brasileiro. Paper presented to the 14th Period of Sections of the COFLA - Comite Florestal Latino Americano da FAO held on 15-18 November in Lima (Peru). mimeo.

Reis, M. S. 1983. O Setor Florestal Brasileiro. Brasilia: IBDF. Mimeo.

Ribeiro, H. & Machado, L. M. G. 1981. Contribuicao do Setor Florestal ao Comercio Exterio Brasileiro. Brasilia: IBDF.

Riihinen, P. 1981. 'Forestry and the timber economy in economic development'. Silva Fennica 15(2), 199-207.

Riley, D. & Young, A. 1966. World Vegetation. New York & Cambridge: Cambridge University Press.

Robock, S. H. 1975. Brazil: A study in development progress. Lexington: Lexington Books, D.C. Heath and Company.

- Rodrigues, R. N. 1981. Mortality and Morbidity in Areas of Recent Industrialization: The case of Belo Horizonte, Brazil. Contributed Paper, Formal Session F. 13 of the International Union for the Scientific Study of Population. International Population Conference, Manila, 1981. Mimeo.
- Roett, R. (ed.) 1972. Brazil in the Sixties. Nashville: Vanderbilt University Press.
- Rostow, W. W. 1956. 'The take-off into self-sustained growth'. The Economic Journal 66, 25-48.
- Rostow, W. W. 1960. The Stages of Economic Growth, A Non-Communist Manifesto. London: Cambridge University Press.
- Roxborough, I. 1979. Theories of Underdevelopment. London & Basingstoke: The Macmillan Press Ltd.
- Santos, A. C. T. et al. 1982. Analise da Balanca Comercial de Produtos Florestais. Brasilia: IBDF
- Santos, A. C. T. et al. 1983. Analise da Balanca Comercial de Produtos Florestais. Brasilia: IBDF
- Samek, V. & Pracna, J. 1980. 'Forests and forestry in Brazil'. Sivaecultura Tropica et Subtropica 7, 155-176.
- Sartorius, P. & Henle, H. 1968. Forestry and Economic Development. New York: Frederick A. Praeger, Publishers.
- Secretaria de Planejamento e Coordenacao Geral (SEPLAN/MG). 1978. Comportamento da Economia Mineira: Period 1960-1977. 18 volumes. Belo Horizonte: SEPLAN/MG.
- Sedjo, R. A. & Clawson, M. 1983. 'How serious is tropical deforestation?'. Journal of Forestry 81(12), 792-794.

- Seers, D. 1969. The Meaning of Development. Paper presented at the 11th World Conference of the Society for International Development held in New Delhi.
- Seers, D. (ed.) 1981. Dependency Theory: A critical reassessment. London: Frances Pinter (Publishers) Ltd.
- Selcher, W. A. (ed.) 1981. Brazil in the International System: The rise of a middle power. Boulder: Westview Press.
- Serra, J. 1983. 'Ciclos e mudancas estruturais na economia Brasileira do pos-guerra'. In: Desenvolvimento Capitalista no Brasil: Ensaio sobre a Crise. Belluzzo, L. G. M. & Coutinho, R., no. 1. (2nd. ed.), 56-121.
- Shepherd, K. R. & Richter, H. V. (eds.) 1979. Forestry in National Development: Production systems, conservation, foreign trade and aid. Development Studies Centre, monograph no. 17. Canberra: The Australian National University (ANU).
- Shils, E. 1965. Political Development in the New States. The Hague: Mouton & Co.
- Shourie, A. 1973. 'Growth, poverty and inequalities'. Foreign Affairs 51(2), 340-352.
- Silva, S. 1981. Expansao Cafeeira e Origens da Industria no Brasil. 5th ed. Sao Paulo: Editora Alfa-Omega.
- Simonsen, R. 1952. Historia Economica do Brasil. Sao Paulo: Companhia Editora Nacional.
- Singer, P. 1980. Dinamica Populacional e Desenvolvimento: O papel do crescimento populacional no desenvolvimento economico. 3rd. ed. Sao Paulo: Editora HUCITEC.

- Sirnivasan, T. N. 1977. 'Development, poverty, and basic human needs: Some issues'. Food Research Institute Studies XVI(2), 11-28.
- Skidmore, T. E. 1967. Politics in Brazil, 1930-1964: An experiment in democracy. New York & Oxford: Oxford University Press.
- Sol, O. F. 1981. Salto da Divisa e Outras Consideracoes. Belo Horizonte: Imprensa Universitaria - UFMG.
- Spears, J. & Yudelman, M. 1979. 'Forests in Development'. Finance & Development 16(4), 41-44.
- Stepan, A. (ed.) 1973. Authoritarian Brazil: Origins, policies, and future. New Haven & London: Yale University Press.
- Steenberg, B. K. 1972. 'The crucial forestry issues of today's world as seen from FAO'. In: Proceeding of the 7th World Forestry Congress, vol. 1, 450-458.
- Streeten, P. & Burki, S. J. 1978. 'Basic needs: Some issues' World Development 6(3), 411-421.
- Streeten, P. 1979. 'From growth to basic needs'. Finance & Development 16(3), 28-31.
- Sunkel, O. 1972. 'Big business and "dependencia"'. Foreign Affairs vol. L (April), 517-531.
- Superintendencia de Estatistica e Informacao (SEI). 1981. Agregados Regional: Produto interno bruto em Minas Gerais: 1970-1980. Belo Horizonte: SEI.
- Superintendencia de Estatistica e Informacao (SEI). 1982. Anuario Estatistico de Minas Gerais. Belo Horizonte: SEI.
- Superintendencia de Estatistica e Informacao (SEI). 1983. Minas Gerais - Indicadores Socio-Economicos: 1950-1980. Belo Horizonte: SEI.

- Tavares, M. C. 1983. Da Substituicao de Importacoes ao Capitalismo Financeiro: Ensaio sobre a economia Brasileira. (11th ed.). Rio de Janeiro: Zahar Editores S.A. (1st ed. in 1972).
- Thibau, C. E. 1983. A Energia Fotossintetica no Programa de Mobilizacao Energetica: Utilizacao da madeira como fonte energetica. Mimeo.
- Tipps, D. C. 1973. 'Modernization theory and the comparative study of societies: A critical perspective'. Comparative Studies in Society and History 15, 199-226.
- Todaro, M. P. 1981. Economic Development in the Third World. 2nd. ed. New York & London: Longman (1st ed. 1977)
- Tucker, R. P. & Richards, J. F. (eds.) 1983. Global Deforestation and the Nineteenth-Century World Economy. Duke Press Policy Studies. Durham: Duke University Press.
- United Nations. 1951. Economic Survey of Latin America - 1949. E/CN.12/164.Rev.1, Sales No. 1951.II.G1. New York: United Nations/Department of Economic Affairs.
- Valverde, O. 1958. 'Estudo regional da Zona da Mata de Minas Gerais'. Revista Brasileira de Geografia 20(1), 3-79.
- Von Maydell, H-J. 1976. 'Effective policies for simulating investments in forestry industries in countries with tropical forests'. In: Evaluation of the Contribution of Forestry to Economic Development, Grayson, A. J. (ed.). UK Forestry Commission Bulletin No. 56, 7 (summary in pp. vii-viii).
- Von Maydell, H-J. 1977. 'The contribution of forestry to regional development in Sahel'. Applied Sciences and Development 10, 164-174.

- Weisskoff, R. 1980. 'The growth and decline of import substitution in Brazil - Revisited'. World Development 8(9), 647-675.
- Westoby, J. C. 1962. 'Forest industries in the attack on economic development'. Unasylva 16(4), No. 67, pp. 168-201.
- Westoby, J. C. 1975. 'Making trees serve people'. Commonwealth Forestry Review 54(3/4), 206-215.
- Westoby, J. C. 1978. 'Forest industries for socio-economic development'. Commonwealth Forestry Review 58(2) 1979, 107-116  
(This paper was the Guest Speaker's address at the Session for Industrial Development of the 8th WFC held in Jakarta in 1978).
- Wirth, J. D. 1977 Minas Gerais in the Brazilian Federation: 1889-1937. Stanford: Stanford University Press.
- Wolfe, M. 1976. Desenvolvimento: Para que e para quem?. Rio de Janeiro: Editora Paz e Terra. [Portuguese translation by J. Maia from the original: 'Elusive Development' (the name of the original publisher was not mentioned in the Portuguese version)]
- World Bank. 1978. Forestry. Sector Policy Paper. Washington, DC: The World Bank.
- World Bank. 1984. Brazil: Economic memorandum. A World Bank Country Study. Washington, DC: The World Bank.



A P E N D I X - A

List of Microregions and Number of Municipalities of the State of Minas Gerais According to Macroregions

Macroregion	Microregions	Number of Municipalities	
	Code	Names	
<b>I - METALURGICA E CAMPO DAS VERTENTES</b>	181	- Calcarios de Sete Lagoas	17
	182	- Belo Horizonte	20
	183	- Siderurgica	27
	186	- Divinopolis	11
	187	- Espinhaco Meridional	23
	195	- Campos da Mantiqueira	24
<b>II - ZONA DA MATA</b>	188	- Mata de Ponte Nova	17
	189	- Vertente Ocidental do Caparao	15
	192	- Mata de Vicosa	22
	193	- Mata do Muriae	13
	196	- Mata de Uba	16
	200	- Juiz de Fora	30
	201	- Mata de Cataguases	14

## Continuation

Macroregion	Microregions	Number of Municipalities	
	Code	Names	
III - SUL DE MINAS	190 - Furnas		28
	191 - Formiga		24
	194 - Mogiana Mineira		19
	197 - Planalto de Pocos de Caldas		9
	198 - Planalto Mineiro		44
	199 - Alto Rio Grande		26
	202 - Alta Mantiqueira		27
IV - TRIANGULO E ALTO PARAIBA	170 - Uberlandia		12
	171 - Alto Paranaiba		12
	177 - Pontal do Triangulo Mineiro		10
	178 - Uberaba		6
	179 - Planalto de Araxa		11

Continuation

Macroregion	Microregions	Code	Names	Number of Municipalities
<b>V - ALTO SAO FRANCISCO</b>	166 - Medio Rio das Velhas <sup>1</sup>			10
	172 - Mata da Corda			10
	173 - Tres Marias			10
	180 - Alto Sao Francisco			28
<b>VI - NOROESTE</b>	157 - Sanfranciscana de Januaria			5
	158 - Serra Geral de Minas			5
	160 - Chapadoes do Paracatu			11
	161 - Alto-Medio Sao Francisco			4
	162 - Montes Claros			18
	166 - Medio Rio das Velhas <sup>1</sup>			2

Note: 1. This microregion has a total of 12 municipalities, of which 10 are comprised in macroregion V and the other 2 are comprised in macroregion VI

Continuation

Macroregion	Microregions		Number of Municipalities
	Code	Names	
VII - Jequitinhonha	159	Alto Rio Pardo	6
	163	Mineradora do Alto Jequitinhonha	4
	164	Pastoril de Pedra Azul	12
	165	Pastoril de Almenara	12
	167	Mineradora de Diamantina	17
VIII - Rio Doce	168	Teofilo Otoni	7
	169	Nanuque	10
	174	Bacia do Suacui	28
	175	Governador Valadares	17
	176	Mantena	4
	184	Mata de Caratinga	11
	185	Bacia do Manhuacu	14

Source: SEI. 1982. Anuario Estatístico de Minas Gerais - 1982

APPENDIX - B

The Macroregion Jequitinhonha and Its Municipalities According to  
Microregions

ALTO-MINERADORAS

Microregion: **Alto Rio Pardo**

- Municipalities:
1. Aguas Vermelhas
  2. Rio Pardo de Minas
  3. Rubelita
  4. Salinas
  5. Sao Joao do Paraiso
  6. Taiobeiras

Microregion: **Mineradora do Alto Jequitinhonha**

- Municipalities:
1. Botumirim
  2. Cristalia
  3. Grao Mogol
  4. Itacambira

**Microregion: Mineradora de Diamantina**

- Municipalities:**
1. Berilo
  2. Capelinha
  3. Carbonita
  4. Chapada do Norte
  5. Couto Magalhaes
  6. Datas
  7. Diamantina
  8. Felicio dos Santos
  9. Felisberto Caldeira
  10. Francisco Badaro
  11. Gouvea
  12. Itamarandiba
  13. Minas Novas
  14. Presidente Kubitschek
  15. Senador Modestino Goncalves
  16. Serro
  17. Turmalina

**PASTORIS**

**Microregion: Pastoril de Pedra Azul**

- Municipalities:
1. Andre Fernandes
  2. Aracuai
  3. Carai
  4. Comercinho
  5. Coronel Murta
  6. Itaboim
  7. Itinga
  8. Medina
  9. Novo Cruzeiro
  10. Padre Paraiso
  11. Pedra Azul
  12. Virgem da Lapa

**Microregion: Pastoril de Almenara**

- Municipalities:
1. Almenara
  2. Bandeira
  3. Felisburgo
  4. Jacinto
  5. Jequitinhonha
  6. Joaima
  7. Jordania
  8. Rio do Prado
  9. Rubim
  10. Salto da Divisa
  11. Santa Maria do Salto
  12. Santo Antonio do Jacinto