Property Rights and the Environment at the Local and Global Levels: Brazilian Amazonia and the Extractive Reserve Chico Mendes

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Abstract

There has been a tendency in research on common property to neglect the influence that national and international developments might have in resource conservation. The environmental literature, on the other hand, suggests that the creation of extractive reserves in Brazilian Amazonia in 1990 and thus the recognition of the rubber tappers' common property rights to their forests have been influenced by such developments. Extractive reserves have also been considered one of the most important initiatives of the Brazilian government to address the problem of deforestation in Amazonia. Attempts at examining their capacity to ensure resource conservation through the theory on common property have been, however, relatively scarce.

This thesis thus examines extractive reserves using the theory of common property as a theoretical framework and includes in the analysis a wider range of factors than those usually considered in the existing literature on common property regimes. The thesis reviews the evolution of national and international developments in relation to Amazonia during the 1980s and, against this background, it examines the process that led to the establishment of extractive reserves. The thesis then proceeds to explore the property rights institutions of the Chico Mendes drawing on the evidence collected through semi-structured interviews with the reserve inhabitants. The research conducted identifies local, national and international factors which have influenced the capacity of the rubber tappers to ensure the sustainable use of their resources before and after the creation of extractive reserves.

The evidence and analysis presented suggests that the capacity of the Chico Mendes Reserve to promote the sustainable use of the forest is limited. There are indications, however, that the reserve inhabitants could develop mechanisms to conserve their resources if external support continues but, at the same time, does not hinder their autonomy and interest in managing the forest. The thesis concludes by suggesting that developments in the national and international arenas can play a crucial role in relation to common property institutions.

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Abbreviations

AMOREAB	Associação de Moradores da Reserva Extrativista Chico Mendes Região de Assis Brasil (Association of Inhabitants of the Extractive Reserve Chico Mendes Region of Assis Brasil)
AMOREB	Associação de Moradores da Reserva Extrativista Chico Mendes Região de Brasiléia (Association of Inhabitants of the Extractive Reserve Chico Mendes Region of Brasiléia)
AMOREX	Associação de Moradores da Reserva Extrativista Chico Mendes Região de Xapuri (Association of Inhabitants of the Extractive Reserve Chico Mendes region of Xapuri)
BIRD	Banco Internacional Para a Reconstrução e o Desenvolvimento International Bank for Reconstruction and Development
CAEX	Cooperativa Agro-Extrativista de Xapurí (Agro-extractivist Co-operative of Xapurí)
CDEA	Commission on Development and Environment for Amazonia
CEC	Commission of the European Communities
CEDI	Centro Ecumênico de Documentação e Informação (Ecumenical Centre for Documentation and Information)
CNDDA	Campanha Nacional de Defesa e pelo Desenvolvimento da Amazonia (National Campaign for the Defence and Development of Amazonia)
CNPT	Centro Nacional para o Desenvolvimento Sustentado das Populações Tradicionais (National Centre for the Sustainable Development of Traditional Populations)
CNS	Conselho Nacional de Seringueiros (National Council of Rubber Tappers)
CNS-RVAP	Conselho Nacional dos Seringueiros – Regional do Vale Acre-Purús (National Council of Rubber Tappers – Regional River Valley Acre and Purús)
CONTAG	Confederação Nactional dos Trabalhadores na Agricultura (National Federation of Agricultural Workers)
CPR	Common Pool Resource

CTA	Centro dos Trabalhadores da Amazônia (Amazon Workers' Centre)
CUE	Comissão da União Europeia Commission of the European Union
CUT	Central Única do Trabalho (Unified Labour Centre)
CVRD	Companhia Vale do Rio Doce Vale do Rio Doce Company
ELI	Environmental Law Institute
ER	Extractive Reserve
ERCM	Extractive Reserve Chico Mendes
FAO	United Nations Food and Agricultural Organisation
FNMA	Fundo Nacional do Meio Ambiente (National Environmental Fund)
FoE	Friends of the Earth
G7	Group of 7
GoB	Government of Brazil
GTA	Grupo de Trabalho da Amazônia (Amazon Working Group)
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Renováveis (Brazilian Institute of the Environment and Renewable Resources)
IDB	Inter-American Development Bank
IEA	Instituto de Estudos Amazônicos e Ambientais (Institute of Amazon Studies)
INCRA	Instituto Nacional de Colonização e Reforma Agrária (National Institute for Colonisation and Agrarian Reform)
INPE	Instituto Nacional de Pesquisas Espaciais (National Institute for Space Research)
ITTA	International Tropical Timber Agreement
ITTO	International Tropical Timber Organisation
LPNMA	Lei de Política Nacional do Meio Ambiente Law of the National Policy for the Environment
MDB	Multilateral Development Banks
NGO	Non-Governmental Organisation
PAE	Projeto de Assentamento Extrativista (Extractivist Settlement Project)

PMACI	Programa de Proteção do Meio Ambiente e às Comunidades Indígenas (Programme for the Protection of the Environment and Indigenous Communities)
PNMA	Plano Nacional do Meio Ambiente (National Environment Program)
POLAMAZONIA	Programa de Polos Agropecuários e Agrominerais da Amazônia (Programme of Agro-Livestock and Agro-mineral Poles for Amazonia)
POLONOROESTE	Programa de Desenvolvimento Integrado do Noroeste do Brasil (Integrated Development Programme for the North-West Region of Brazil)
PP-G7	Pilot Programme for the Conservation of Brazilian Rainforests
PRODEX	Programa de Apoio ao Desenvolvimento do Extrativismo (Assistance Programme for the Development of Extractivism)
PT	Partido dos Trabalhadores (Workers' Party)
RESEX	Pilot Programme sub-project on Extractive Reserves
SAE	Secretaria de Assuntos Estratégicos (Secretariat for Strategic Affairs)
SEMAM	Secretaria Especial do Meio Ambiente (Special Secretariat for the Environment)
SUDAM	Superintendência do Desenvolvimento da Amazônia (Supertintendency for the Development of Amazonia)
TFAP	Tropical Forest Action Plan
TORMB	Taxa de Organização e Regulamentação do Mercado da Borracha (Tax for the Organisation and Regulation of the Rubber Market)
UDR	União Democrática Ruralista (Farmers' Democratic Movement)
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
WB	World Bank
WCED	World Commission on Environment and Development
WRI	World Resources Institute
WRM	World Rainforest Movement
WWF	World Wide Fund for Nature

Chapter I
Introduction

1.1 The focus and objectives of the thesis

For the last twenty years, deforestation has been particularly severe in Brazilian Amazonia (Myers, 1989; FAO, 1994; Fearnside, 1998) and some estimates suggest that by 1997 approximately 13% of the originally forested area had been cleared (Fearnside, 1998). Large-scale deforestation has negative impacts on humankind as a whole: clearing of the forest cover contributes to the 'greenhouse effect' and diminishes the Earth's biodiversity reserves (Lovejoy and Salati, 1983; Browder, 1989; WRI/UNDP/UNEP, 1990; Paterson, 1992; Biodiversity Convention in Johnston, 1993). For local populations who are dependent on forest resources deforestation is particularly harmful. Forests provide them with fruits, fuel wood and a range of other wood and non-wood products; in addition, they perform important environmental functions such as watershed protection and prevention of soil erosion. Once the forest cover is cleared, forest communities must find alternative ways of survival, which involves considerable social and economic costs. How to secure the sustainable use of forests by local communities is thus particularly relevant because the well-being of these communities largely depends on securing the conservation of their natural resources and because of the global value of forests (as seen in the 'Authoritative Statement on Forest Principles' agreed at the United Nations Conference on Environment and Development, reported in Johnston, 1993).

In the late 1980s, the Brazilian government took a number of initiatives to address the problem of deforestation in Amazonia. One of these was the establishment of 'extractive reserves', which are areas designated for the protection of the environment and the sustenance of traditional populations, who hold the forests in the reserve under a common property regime. Extractive reserves have received considerable attention among researchers (Fearnside, 1989; Danks, 1991; Cavalcante, 1993; Hall, 1996; 1997) and practitioners working with environmental issues. They are supported by several international environmental NGOs, such as the World Wide Fund for Nature (WWF), and by an initiative of the G7 countries, the Pilot Programme for the Protection of Brazilian Rainforests. The interest and support for extractive reserves stems largely from the belief that within these reserves populations can secure the conservation of their forests.

It is debatable, however, whether extractive reserves can contribute to the conservation of Amazonia. Two reasons have been put forward to support the argument that extractive reserves can ensure the sustainable use of the forests. One is that extractivism or the collection of non-wood forest products is ecologically sustainable; the other one is that forests in reserves are held in common property by its users (WB/CEC, 1991). Whether extractivism can secure the conservation of forests has been subject to considerable debate and, naturally, some scholars argue that it can (e.g. Peters et al 1989; Schwartman, 1994) and others that it cannot (Homma, 1989; Browder, 1992). The subject of this thesis, however, is not extractivism, but the common property regime of the reserves' inhabitants.

In fact, according to some researchers whether extractive reserves can secure the conservation of forests does not only depend on the environmental and economic sustainability of extractivism because other environmentally sustainable activities can also be practiced in the reserve (Allegretti, 1994). For these scholars, extractive reserves can promote the conservation of the Amazon forests because the common property rights of a traditional population, the rubber tappers, who had sustainably used their forest resources for several decades, are formally recognised in the reserves (Allegretti, 1989; 1994; Schwartzman, 1994). The process that led to the establishment of reserves is also considered important, because the strategy used by the rubber tappers can be useful for other communities in similar circumstances (Schwartzman, 1989). The creation of reserves came about after the tappers had been fighting to secure landed property rights since the early 1980s, when, attracted by government incentives for investment in Amazonia, cattle ranchers occupied the tappers' areas and cleared the forest for the creation of pasture. A violent confrontation ensued between rubber tappers and cattle ranchers and, in the mid-1980s, the tappers made alliances with international environmental organisations that were campaigning against deforestation in the region. These alliances and international concern with deforestation, which was particularly high in the 1980s, were crucial factors in the tappers' success in obtaining recognition of their common property rights (Danks, 1991; Melone, 1993; Allegretti, 1994; Hall, 1996).

The establishment of extractive reserves and the support they receive from national and international bodies suggest that 'common property' is now increasingly recognised as a viable resource management system for the conservation of natural resources. Common property of natural resources has often been associated with the 'Tragedy of the Commons', based on Hardin's seminal article (1968) explaining how a pasture that is open to all is depleted. Hardin's critics have argued that under common property the resource is not open to all to use and that

resources held in common have often been used sustainably for centuries (Ciriancy-Wantrup and Bishop, 1975; National Research Council, 1986; Berkes, 1987; McCay and Acheson, 1987; Bromley, 1991). The depletion of resources owned in common often occurs because the commoners' rights are not legally backed up by the state. Potential users outside the established community thus feel free to take over these resources as if they were in fact free for all to use - a problem that the rubber tappers, for example, had to face. Legal recognition of the commoners' rights is essential for securing the conservation of the natural resource; however, it is not sufficient. The literature on common property regimes tends to point out that for resources held in common to be conserved, co-owners must also harmonise their own use of the resource (Ostrom, 1990; McKean, 1992). The fact that the rubber tappers' common rights have been recognised through the establishment of extractive reserves may thus not be sufficient for forests to be conserved in the long term. The sustainable use of forests in extractive reserves depends also on the capacity of the rubber tappers to "collectively manage their territory" and avoid a "tragedy of the commons scenario" (Hall, 1996:99).

Research on common property institutions has examined the conditions under which common property regimes can secure the conservation of natural resources (Wade, 1987; Ostrom, 1990; McKean, 1992) and the factors that influence the development of these institutions (Ostrom, 1990; Singleton and Taylor, 1992). The literature has pointed out that the development and robustness of common property regimes depends on internal factors, i.e. the characteristics of the resource, the resource users and their institutions, and factors originating in the external context, such as government policies and arrival of outsiders in the area. The focus of existing research, however, has been geared towards internal factors (Ostrom, 1990; Field, 1990; Edwards and Steins, 1998). An examination of a common property regime taking into full consideration both internal and external factors is therefore important; especially if these external factors include those resulting from both the national and international contexts.

The framework adopted in this thesis to explore one particular regime - the extractive reserves - can be applicable to the analysis of common property institutions anywhere in the world. There are numerous examples of common property regimes which are embedded in the external context and thus influenced by a variety of external factors. The *kibbutzim* in Israel, the *ejidos* in Mexico (Yetman, 1998) and some rural institutions in Chile (Scott, 1993) interact with market forces, government policies and society in general. Whether the resources held in these common property regimes are or not conserved is likely to depend on external factors and not only on the features of the resources and the regimes themselves. Common property regimes in Sub-Saharan Africa

(Lawry, 1990) and the Chipko's regimes in India (Rangan, 1993), for example, have been affected by government policies as well as by international developments. Common property institutions in Europe and the US, such as those that regulate access to pastures in the Swiss Alps (Stevenson, 1991) and groundwater basins in California (Ostrom, 1990) have also been influenced by external factors such as changes in demand for grazing land and for water. Therefore, while the focus of this thesis is quite specific – as summarised below – it is hoped that its analysis will have wider applicability.

The objective of this thesis is thus to examine the process that led to the establishment of extractive reserves and the characteristics of one reserve using the theory on common property regimes as an analytical framework and considering factors affecting the regime at the local, national and international level. For this purpose, the thesis outlines the evolution of national and international policies in relation to Brazilian Amazonia from the 1970s to the 1990s, focusing in particular on the developments that took place between 1985 and the Earth Summit in 1992. Against the background of these developments, the thesis proceeds to examine the rubber tappers' struggle for recognition of their property rights and how this process contributed to shape their current property rights system. A detailed analysis of the property rights regime of the Extractive Reserve Chico Mendes is provided, which includes a comparison between the formal and the actual features of this Reserve, as well as an examination of both sets of features in relation to the robustness criteria developed by scholars on common property. In examining these issues, the thesis offers an assessment of the capacity of this reserve to promote the sustainable use of the forest. Furthermore, it contributes to the literature on common property regimes by providing an in-depth analysis of how internal and external factors may interact in the development and robustness of common property institutions.

1.2 Thesis Structure

The thesis is structured in seven chapters.

Chapter I presents the theoretical framework that is used to examine the formation and robustness of the Chico Mendes Reserve. After introducing the concept of common pool resources - a useful concept for understanding some of the problems involved in the joint use of forests - this chapter presents a brief evaluation of the 'Tragedy of the Commons' thesis and discusses why common property can secure the conservation of jointly used resources. The chapter then proceeds to develop a framework for examining under which conditions a resource held in common is

sustainably used over time. This framework is composed of three parts. The first reviews a set of criteria for assessing the robustness of a common property regime, that is, the regime's capacity to secure the conservation of the resource during long periods. The second part examines potentially significant factors in the development of a robust regime, focusing on those pertaining to the characteristics of the resource and the resource users. Finally, the third part brings into the analysis factors arising from the external context (e.g. government policies and socio-political changes taking place in society at large), which the literature has identified as influencing both the capacity of regimes to secure the conservation of resources and the development of robust regimes.

Chapter II sets the scene: it examines the problem of deforestation in Amazonia, paying particular attention to the link between property rights and forest clearing. The chapter begins by presenting an overview of the extent and impacts of deforestation at the local, regional and global levels. This serves not only to highlight the importance of the problem, but also to account for the inclusion of international factors in the analysis of extractive reserves. The chapter then proceeds to examine the Brazilian government policies for Amazonia in the 1970s to explain the causes of deforestation in the region and to provide an overview of the 'external context' of the rubber tappers between the 1970s and the early 1980s. An analysis of the relationship between property rights issues and deforestation in the Amazon context concludes this chapter.

The subsequent two chapters focus on the development of extractive reserves. Chapter III reviews the 'external context' over the period during which the main part of the process that led to the establishment extractive reserves took place. It examines the developments at the national and international levels in relation to Brazilian Amazonia during the 1980s based on a bibliographic review and supported by interviews with Brazilian policy-makers carried out by the author (see Methodology section). The presentation of the 'external context' before the actual description of the extractive reserves' history is necessary because a thorough examination of the national and international developments at this stage would break the narrative on extractive reserves. By separately examining the external context it is possible to present a clearer account of the extractive reserves and at the same time give sufficient information on the context in which this case study is embedded. Chapter III begins by reviewing the origins of the international community's concern with deforestation in Brazilian Amazonia and the campaign that non-governmental organisations set up in the 1980s to deal with global environmental problems. The chapter then proceeds to discuss the changes that occurred in the Brazilian government policies for the region in the late 1980s. The last part of the chapter examines the state of affairs

regarding Brazil and the international community in the 1990s through a review of the United Nations Conference on Environment and Development, and the G7 proposal for a Pilot Programme to Conserve the Brazilian Rainforests.

Chapter IV examines the process that led to the establishment of extractive reserves, taking into account the 'external context' reviewed in the previous chapter as well as local factors. It begins with an overview of the historical background of the rubber tappers, and how they developed common property regimes. This is followed by an analysis of the factors that influenced the development of collective action and the tappers' conflict with the cattle ranchers. The chapter then turns to the analysis of the interaction of the rubber tappers with the wider political setting and their alliances with international environmental NGOs. The chapter concludes with an examination of the last stages of the process that culminated in the establishment of extractive reserves.

The subsequent chapters examine the capacity of the Extractive Reserve Chico Mendes to secure the sustainable use of the forest. Chapter V reviews the legislative and formal aspects of extractive reserves, and presents a brief overview of the features of the Pilot Programme sub-project on extractive reserves, the principal international initiative providing support for the Chico Mendes reserve. Chapter VI examines the features of the Extractive Reserve Chico Mendes based on the interviews carried out by the author with the reserve inhabitants (see Methodology section). The adequacy of the formal framework to the actual features of the reserve is discussed.

The final chapter, Chapter VII, concludes the work by summarising the key research findings. It assesses the factors that influenced the development of extractive reserves and those that affect the capacity of the Extractive Reserve Chico Mendes to promote the sustainable use of forests. This chapter ends by discussing the theory on common property regimes in light of the evidence provided by the case study and suggests some areas for further research.

1.3 Fieldwork Methodology

The in-depth analysis of a case study, the Extractive Reserve Chico Mendes, is particularly useful for the type of research involved in this thesis, which involves "refining theory and suggesting complexities for further investigation, as well as helping to establish the limits of generalisations" (Stake, 1994: 245).

As the aim of this thesis involves looking at factors that arise from two different settings, the local setting and the wider setting, or external context, it was necessary to gather detailed information on both issues. Information on the local setting was first obtained via an extensive bibliographic review. This material, however, only covered the process that led to the establishment of the extractive reserves and the legal aspects of these institutions. To examine the actual property rights system of the Chico Mendes reserve it was thus necessary to carry out a set of semi-structured interviews with the reserve inhabitants and key informants. These interviews were also useful to complement the account of the process that led to the establishment of the reserve. The material obtained through the interviews is extremely valuable in the sense that it sheds light and provides useful insights into the situation of a local property rights regime which, as will be seen in Chapter VI, is substantially different from what existing documents about the reserve suggest. The interviews provided the researcher with information on the property rights structure of the reserve and on the rubber tappers' opinions on landed property rights. Information on the external context was mainly obtained through a bibliographic review. However, to complement the literature review on the national and international developments, semi-structured interviews with policy-makers in Brazil were carried out.

Semi-structured interviews present several advantages given the objectives of the present thesis. On the one hand, they require a certain structure in the form of topics researched, and they therefore force the researcher to focus on a particular area of interest. On the other hand semi-structured interviews share many of the strengths of unstructured interviewing: they allow the researcher to explore the respondent's perspective of the subject under study; they give flexibility in terms of suggesting ideas that could not have been thought of before the research; and finally they can provide considerable depth of understanding of the situation being studied (Chadwick, Bahar and Albrecht, 1984; Foddy, 1993; Bell, 1993; Fontana and Frey, 1994). An additional advantage of semi-structured interviewing for the present study is that they have been recommended for sensitive topics (Nichols, 1991), which is the case with many of the political issues concerning Amazonia in Brazil. For instance, as it will be seen in Chapter III, the international pressure on Brazil to cut down deforestation in the region has been often seen as interference in Brazilian domestic affairs.

The Extractive Reserve Chico Mendes and interviews with rubber tappers

At the time of the fieldwork, 1995, there were nine federal Extractive Reserves (ERs) in Brazil, eight of them in Amazonian states. The Extractive Reserve Chico Mendes (ERCM), in which the fieldwork was carried out, was one of the first extractive reserves to be established, and its main economic activity is rubber collection. The ERCM is the largest reserve, covering an area of nearly ten thousand sq. km and with the largest population, 12 thousand inhabitants (Murieta and Rueda, 1995). The other eight ERs have approximately between 15 and 5 sq. km and their population is at most 6 thousand people. Five ERs have less than one thousand inhabitants.

The choice of the Extractive Reserve Chico Mendes as a case study for the local common was based on a combination of theory-laden and practical factors. The process that led to the establishment of extractive reserves began in an area that is now part of the ERCM. However, many tappers living now in the area of the ERCM did not participate in the fight for landed property rights. The study of this reserve thus provided a larger variety of situations than it would have been possible with fieldwork in smaller and more homogenous reserves. At a more practical level the ERCM also presented advantages. It was more accessible than other reserves and it was easier to establish the initial contacts - accessibility and contacts being two decisive factors in the choice of location of the study (Shipman, 1967; Burgess, 1984)

Having selected the extractive reserve, a second level of sampling was necessary concerning the choice of former rubber estates that were to be visited. The ERCM comprises approximately 50 former rubber estates. Each rubber estate presents different characteristics in terms of area, population, recent history, vegetation, proximity to a commercial centre and the nature of that commercial centre. As will be seen in Chapter VI, all these factors influence the socio-economic characteristics of the rubber estate, and therefore the possible responses from the interviewees. All rubber estates being so different, it was not possible to choose a standard one. The choice of the rubber estates was based on the opportunities to enter the reserve (e.g. someone from the rural workers' unions going into a certain rubber estate[1]). Within the available possibilities, rubber estates were selected according to their accessibility: the objective was to have rubber estates with different levels of accessibility and, a correlated feature, 'development'. 'Development' was assessed according to the criteria used by the key interviewees: rubber estates were considered more or less developed depending on whether the families on the estates met regularly to do work

[1] For a fuller discussion see Appendix 1.

in common and on the facilities they had (e.g. schools, health posts). The rubber estates visited were São Pedro, Floresta, Dois Irmãos, Icuriã and Guanabara.

The choice of interviewees within each estate followed a quota sample method (Babbie, 1986). Once inside a rubber estate, the itinerary for the visit was chosen with the help of one or more tappers living there, taking into account the number of days to be spent in the area, and aiming at visiting the largest number of households possible (there is approximately one hour walk between households). The intention was to interview both tappers who participated and those who did not participate in communal activities. Interviews were aimed at the head of the household, since he was the one most likely to know about the subject of study. If he was not available the wife, or the family, would be interviewed instead. In total 100 rubber tappers were interviewed.

The interviews with the tappers were complemented by interviewing key informants (Nichols, 1991; Burgess, 1984). Some of the key informants were former tappers now working full time for one of the rubber tappers' organisations such as the rural workers' unions (see chapters IV to VI) and who go regularly into the reserve. The other key informants were people who had never lived in the forest but who worked in the reserve and so had a good knowledge of the area - e.g. academics who had done social research concerning the rubber tappers, people who had followed the process of formation of the ERCM, or technical staff working for development projects inside the reserve. The choice of key informants was based on snowball sampling and chance opportunities; 10 key informants were interviewed.

Interviews with policy-makers

Although semi-structured interviewing was also used for policy makers, interviewing the latter (elite interviews) was a totally different experience from interviewing local populations (field research). Policy-makers, i.e. people who participate in and/or influence the political decision making process concerning Amazonia as a whole, fell into two groups: government officials and non-governmental agents. The former are either from elected members of state governments and of the federal government, and public servants (often working in the Environmental Ministry); the latter were members of NGOs and academics. Deputies and senators who play a leading role in the environmental and/or Amazonian policy making were also interviewed. There is a certain overlapping, as well as a flow, between governmental and non-governmental agents. For instance, one of the NGO directors interviewed is now a Secretary of State, and another Secretary of State

– who was interviewed in his official position - was previously the director of one of the most important research institutions specialising in the Amazon region.

Given the lack of a definite list of 'policy-makers responsible for Amazonia' the interviewees were chosen using a non-probabilistic, snow-ball sampling method (Burgess, 1984; Babbie, 1986). Many interviewees were individuals whose present position - in the state or federal government, as directors of NGOs and at the head of academic institution - involved decision-making concerning Amazonia. There were also interviewees who although their present position was not related with Amazonia, had a deep knowledge of the region because they had played a role for many years in Amazonian and/or environmental politics. On the whole, 38 policy makers were interviewed: eighteen (18) respondents from the government (federal and state level), seventeen (17) respondents from non-governmental organisations and academic institutions and three (3) senators and members of parliament.

Analysis of interviews and methodological limitations

The analysis of both sets of interviews was a process that took place both in the field and in the writing up stage, and it involved a permanent interaction between the observations and the theoretical concepts reviewed in this thesis (Bechhofer, 1974; Bryman and Burgess, 1994). In reading the data and writing about it, a number of methods were used, such as comparison, contrast, noting of patterns and themes and, for validation of the preliminary conclusions, triangulation and looking for negative cases (Babbie, 1986; Huberman and Miles, 1994). The analysis of material involved both inductive and deductive analyses and the following quotation accurately describes the process: "When a theme, a hypothesis or pattern is identified inductively, the researcher then moves into a verification mode, trying to confirm or qualify the finding. This then keys a new inductive cycle" (Huberman and Miles, 1994:431).

The methodological limitations of this work are similar to the ones that have often been mentioned in relation to qualitative studies and semi-structured interviews regarding generalisation, reliability and validity (Chadwick, Bahr and Albrecth, 1984; Babbie, 1986; Bell, 1993; Foddy, 1993). Concerning the analysis of the Extractive Reserve Chico Mendes, it should thus be kept in mind that the ERCM cannot be considered representative of all the reserves. As mentioned before, other extractive reserves are much smaller, both in terms of area and population[2]. The examination of the Chico Mendes Reserves provides, nevertheless, an insight

[2] See Apendix 1 for a fuller discussion on this issue.

into which internal and external factors can influence the development and robustness of other extractive reserves and of common property regimes in general.

Chapter II

'Common property' - the conceptual framework

Introduction

Forests belong to a class of resources denominated 'common pool resources'. The defining feature of common pool resources (CPRs) is that several individuals can use a CPR in common but only as long as their joint use does not cross a certain threshold of use; once that threshold is crossed the resource may be depleted. The central issue regarding CPRs is thus how to secure that the resource is used sustainably. Broadly speaking, there are two lines of thought regarding this matter. One claims that to prevent the depletion of a CPR, there are only two solutions: state control or privatisation of the resource. The other argues that CPRs can also be used sustainably if held as 'common property'. Taking this second view, the aim of this chapter is to develop a framework for examining the factors that influence the sustainable use of CPRs held as common property. First, however, we present a brief evaluation of the arguments put forward by the advocates of privatisation and state control.

2.1 Common Pool Resources

The term common pool resources originates from economic theory, however, it is also widely used in the environmental literature by scholars from a variety of backgrounds. A CPR can be defined as:

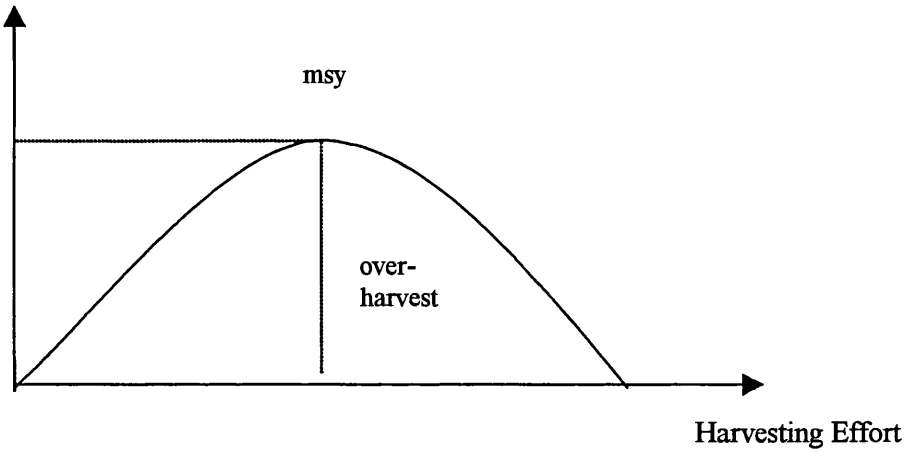
> "a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use. To understand the process of organising and governing a CPR it is essential to distinguish between the resource system and the flow of resource units produced by the system, while still recognising the dependence of the one on the other" (Ostrom, 1990:30).

Resource systems are, for example, forest ecossystems, pastures and fisheries; the resource units are, for instance, the fruits that can be taken from the forest, the grass that each animal eats and the fish that is caught. The resource system, or resource base, can be used in common, but the resource units cannot. A forest can be used by one person without this interfering with the use of the forest by somebody else; by contrast, once a fruit is eaten it cannot be eaten by anybody else. In the terminology of economics, the resource units are 'private goods' because consumption is

rival and exclusion is easy, whereas the resource system is, up to a certain extent, a 'public good'.

'Public goods' are goods which are non-rival in consumption, thus "each individual's consumption of such a good leads to no subtraction from any other individual's consumption of that good" (Samuelson, 1954:387). Exclusion from the benefits of public goods is generally impossible or prohibitively expensive (Musgrave and Musgrave, 1973). The problem with public goods lies in the provision of the good. People do not have incentives to contribute to the provision of the public good because they know that once it is provided no one can be excluded from its benefits. However, if no one provides the public good everyone will be worse off.

Figure 2.1 Relationship between extraction of resource units and sustenance of the resource system



Source: Grima and Berkes, 1989:48

The use of a CPR is, like that of a public good, non-rival but only up to a certain level of use. To understand the limitations that exist in the use of a CPR it is helpful to use the concept of maximum sustainable yield[1] (see Fig. 2.1). The maximum sustainable yield (msy) is the maximum yield or harvest that can be obtained from year to year without depleting the natural resource stock (Grima and Berkes, 1989). If more is harvested, that is if the number of units taken from the resource falls to the right side of the msy, the resource cannot replenish itself, up

[1] Common pool resources are not necessarily 'renewable resources', they can also be what are usually termed 'stock resources' such as oil pools. However, to simplify the analysis and also since this thesis deals with renewable resources (forests) the explanation of the maximum sustainable yield focuses on resources that do not have a limited stock, that is, resources that can be used indefinetely as long as the threshold of use is not reached.

to the point where is totally depleted[2]. The sustainable use of the CPR, i.e. the use of the resource which allows for the conservation of the resource system, thus requires that the appropriation of resource units does not go beyond a specific threshold during a specific period of time.

Up to a certain level of use or up to the maximum sustainable yield, and under certain conditions, several individuals can jointly use a common pool resource without this imposing any costs on fellow users (Oakerson, 1986; Ostrom and Ostrom, 1978). For instance, in the case of a fishery the resource may be jointly used as long as only fish above a certain size is caught. In the case of a forest, a 'rest' period may be necessary to replenish the resource but otherwise several families may collect fruits and other products from the forest. Exclusion from a common pool is difficult and often costly but not impossible as in the case of a public good. One of the factors that make exclusion difficult is that CPRs in general are not easily divisible. For example, a lake cannot be divided among the several fishermen who use it and it may be difficult to monitor the fish caught by each boat. Excluding users from a CPR like the atmosphere is also extremely difficult because of the indivisibility of the resource and the fact that there is not a limited group of potential users.

The conservation of a common pool resource used by several individuals presents problems that are similar to those involved in the provision of a public good. The conservation of a CPR depends on the harmonisation of the actions of the different users of the resource. If all users act independently, that is, not considering the actions of fellow users, the total use of the resource may be above the regenerative capacity of the resource. When deciding, for instance, how many units to take from the resource system, each individual must take into account that although his or her use may be relatively small, when the units taken by him or her are summed up with those taken by all other users of the forest, the total amount of units may be higher than the threshold level of use indicated in Fig. 2.1. To secure the sustainable use of the resource, users must agree to restrict their own use of the CPR.

However, in the same way that people generally have an incentive not to contribute for the provision of a public good because once the good is provided they cannot be excluded from its benefits, users of a CPR have an incentive not to contribute to the conservation of the resource because they cannot be easily excluded from the use of the common pool. Each user of a common pool can potentially free-ride on the conservation efforts of other users. Each individual may thus either fear that the others will free-ride on his or her efforts to conserve the resource, or may think

[2] The notion of the msy is a schematic explanation of the functioning of natural resources, which does not take into consideration the variations in maximum yield from year to year due to variations in other factors, e.g. climate; it focuses on one product only and ignores the variety of products that can usually be extracted from a natural resource system and the complexity of ecosystems. However, the msy is useful to explain the basic notion that there is a threshold of use of the natural resource, after which the resource will be depleted.

that s/he will be able to free-ride on the conservation efforts of the other users. To secure that the resource is conserved it is thus necessary to find a means of securing that none of the users free-rides on the efforts of the others; otherwise, the resource may be depleted leaving everybody worse off (Runge, 1986; Ostrom, 1990).

Scholars, who claim that the only solution for securing the sustainable use of CPRs is to privatise them or to state manage them, consider that the joint users of a CPR cannot overcome the free-rider problem. This argument was epitomised by Hardin (1968) in his seminal article 'The Tragedy of the Commons'.

2.2 The 'tragedy of the commons', state control and private property

The tragedy Hardin (1968) refers to in his article is the supposedly unavoidable depletion of a common pasture in spite of the fact that this is not in the interest of the herdsmen. Each herdsman when deciding how many cattle to take to the pasture will take into account the full benefits he accrues from it, but consider only part of the costs his cattle imposes on the pasture because the latter are shared with all the other herdsmen. Therefore, all the herdsmen together will use the resource beyond the sustainable rate, and the pasture will be depleted, a negative outcome to them all. According to Hardin, this rationale is overpowering: although the herdsmen may know that taking this approach will lead to the depletion of the resource they will not be able to stick to any agreement involving a limitation of their use of the pasture. Although all the herdsmen will be worse off by using the resource too much, 'each man is locked into a system that compels him to increase his herd without a limit - in a world that is limited' (Hardin, 1968:20).

The system that supposedly compels each herdsman to overuse the resource has been compared to the one faced by the individuals in the prisoner's dilemma model, taken from game theory (Axelrod, 1984; Runge, 1986). In this model there are two prisoners, A and B, who are interrogated separately and given a pre-determined set of rewards and punishments that will lead them both to confess the crime. The prisoners know that if neither of them confesses to the crime (that is, if they co-operate) they will both get suspended sentences of one year each (see table 2.1). However, if one defects and confesses to the crime, s/he will be paid and released while the other one will receive a two years prison sentence (2, -2). If both confess to the crime, each prisoner will get one year in prison (-1, -1). Each prisoner, concerned only with his/her own benefit will consider the choices available and defect. If prisoner A assumes that the other prisoner will co-operate and deny the crime, h/she is better off confessing the crime because then s/he will get a suspended sentence rather than one year in prison. If prisoner A assumes instead that the other prisoner will defect, s/he is also better off defecting and getting one year in jail

because if s/he denies s/he will get a longer sentence The result of the game is that both prisoners confess the crime and they are both worse off than if they had both denied it: pay off (-1, -1) instead of pay off (1, 1).

Figure 2.2 The Prisoners' Dilemma

	Prisoner B denies/co-operates	**Prisoner B Confesses/defects**
Prisoner A denies/co-operates	(1, 1)	(-2, 2)
Prisoner A Confesses/defects	(2, -2)	(-1, -1)

Source: Runge, 1986:626

If the Prisoners' Dilemma represents the situation of the herdsmen, the latter will indeed overuse the pasture. Herdsman A knows that the conservation of the pasture depends not only on how many animals he feeds but also on how many cattle herdsman B takes to the pasture. Herdsman A will think that if B takes too many animals to the common pool he may as well do the same because the pasture risks being depleted in any case. It is not in A's interest to restrict his use of the pasture if the benefits of doing so are shared with B but the costs are born by him, herdsman A, alone. If herdsman A thinks instead that B will restrict his use of the pasture to secure the conservation of the resource, he will consider taking more animals to graze, that is, A will free-ride on the conservation efforts of B. Herdsman B thinks the same as herdsman A and together they will overuse the resource.

It has often been assumed that the models of the 'tragedy of the commons' and of the 'Prisoners' Dilemma' apply to all CPRs that are jointly used. From this follows that all CPRs will be necessarily depleted unless the state intervenes or the resource is privatised.

Some scholars argue that intervention by an external agency should take the form of government control of the resource. The individual behaviour of each user of a common pool resource "adversely affects social welfare, generating a demand for governmental intervention" (Baden, 1977:137). Without government control "overgrazing and soil erosion of communal pastures" result (Carruthers and Stoner, 1981:29). That is, as in the case of public goods, the state should provide for the common good which in the case of conservation of CPRs involves setting up limits to the use of the resource and monitoring compliance with the established regulations (Ophuls, 1973; Ehernfeld, 1972).

Establishing state control over common resources has been a widely followed policy, especially in the developing world. However, there is ample evidence that state control does not always prevent the depletion or destruction of CPRs (Bromley, 1985). For instance, in Africa, according to Lawry (1990), direct state management of common forests and pastures "has rarely worked well" (1990:419); state ownership and management of irrigation systems in various parts of the world has not secured their effective operation and maintenance either (Hilton, 1992). The depletion of natural resources under state control has also been observed in Latin America, where centralisation policies have been an important factor behind deforestation in the region (Richards, 1997).

One of the reasons why state management has often failed to conserve CPRs is that the conservation of natural resources will not necessarily be a priority for the government, which may have other objectives – objectives which are not necessarily compatible with the sustainable use of the CPR (Turner, Pearce and Bateman, 1994). However, even if the government's aim is indeed the conservation of the common pool, the cost of doing so may be prohibitively high (Tullock, 1977). To secure the sustainable use of a CPR, the state must perform the following tasks: first, in order to set up appropriate rules of resource use it must gather information on the specific characteristics of the resource and its carrying capacity as well as on the existing use of the CPR; second, it must monitor resource users' compliance with the rules established; and, third, it has to monitor the state agency itself (Ostrom, 1990; Turner, Pearce and Bateman, 1994). On account of the costs involved in these tasks "most state property regimes are examples of the state's 'reach exceeding its grasp'" (Bromley and Cernea, 1989:25).

Some of the critics of state control of natural resources argue that the most efficient way of preventing the 'tragedy of the commons' is through market mechanisms. There are two market approaches: one advocates the privatisation of all resources used in common (market environmentalists[3]); the other the creation of artificial markets (neo-classical economists). Both approaches aim at securing the most efficient use of the resource rather than its conservation; that is, the resource should not be depleted if this is not the specific aim of its owners but the depletion of the resource may in some cases be the most efficient alternative.

"The first suggestion by market environmentalists is the privatisation of government-owned land and common areas" (Taylor, 1992:28). According to Lewis (1992:10) "resources are most often misused when they are owned in common. This is rightly called the 'tragedy of the commons'.

[3] This is the overall approach of market environmentalists, since some of them acknowledge that full private property rights are not always the best solution for CPRs.

Those who use what everybody owns shoulder only a tiny proportion of the social costs of their actions". After reviewing the case of Hardin's pasture, Kwong (1992:16) advocates the privatisation of the common pasture because "where private ownership of range land is established, the owners will be encouraged to calculate the optimal carrying capacity that will yield the maximum stream of benefits since they will be the sole beneficiary of these actions". The destruction of the pasture will only occur if this is an efficient result for the herdsman, that is, if his costs of taking one more animal to the pasture are inferior to the benefits of this action. By privatising the resource, the 'externalities' of using the common pool beyond the regeneration capacity of the resources are thus internalised as the owner carries the full costs and benefits of using the resource (Demsetz, 1967).

The rationale for advocating privatisation of common pool resources is based on the perception that resources used in common are not owned[4]: anyone wishing to take units from the resource is free to do so and there are no regulations limiting the exploitation of the common pool (Johnson, 1972; Smith, 1981; Welch, 1983; Anderson and Leal, 1991). Establishing private property rights solves this problem because when "property rights are defined, individuals have a clear idea of what actions they can take regarding the resource, i.e. what they can and cannot do with their property. A complete specification establishes both the rights to ownership, the restrictions to these rights and the penalties for violation" (Kwong, 1992:15). Defining private property rights will thus reduce uncertainty. Security of, for instance, continuous access to the resource is an incentive for pursuing economically efficient actions because if the agent knows that the resource will be there in the future s/he does not need to rush to take full advantage of it today, at the expense of the long term condition of the CPR.

The privatisation of natural resources as an environmental policy has been severely criticised. One criticism is it that the interest rate in the market may be higher than the rate of regeneration of the resource; if this is the case, the efficient solution for the owner of the pasture will be to take as many animals as possible to the pasture and invest the earnings in something else. For society as a whole, however, this may not be the most efficient solution (Grima and Berkes, 1989). Another common criticism is that privatisation of common pool resources is not always feasible or may be prohibitively expensive. Some market environmentalists themselves caution that "privatisation is an effective solution only if the costs of enforcing property rights are not prohibitive" (Taylor, 1992:36).

[4] And on a strong aversion to state control.

The difficulties of enforcing private property rights may result from the excludability characteristics of the CPR; for example, the atmosphere or the oceans cannot be divided into separate portions. In developing countries, the difficulties of establishing private property rights may also apply to other resources, such as pastures, forests and water. If the productivity of the resource is low and varies spatially and over time, privatisation of the resource may leave some individuals with a portion of the resource that is not sufficient to meet their needs (Lawry, 1990; Singh, 1994). The transaction costs involved in the case of each user having rights over one portion of the resource only, that is, private property rights over a small area, may be too high for poor communities. "Well defined and enforced property typical of the West may be too great for a subsistence economy to bear" (Runge, 1986: 49). Privatisation of CPRs used in common would thus carry very high costs in two cases. First, if the resource is not divisible because of its physical characteristics and the available technology. Second, if the value of the resource varies spatially and/or over time and the transaction costs of dealing with this through the market are too high for the resource users.

An alternative to privatisation, within the market mechanism's framework, is that of 'artificial markets', which takes into consideration both the difficulties of privatising certain CPRs and the limitations of existing markets in promoting the 'efficient' use of the environment. According to the neo-classical school, natural resources perform certain environmental 'services' that are not valued in the market, that is, they are considered to be free. For example, forests prevent soil erosion but this 'service' does not have a price in the market. The lack of a price for the forests' 'services' leads to a sub-optimal (inefficient) rate of deforestation (Barbier, 1991). To correct this bias, markets should be created for environmental services or markets should be modified "by centrally deciding the value of the environmental services and ensuring that these values are incorporated into the prices of goods and services" (Pearce, Markandya and Barbier, 1989: 155).

The neo-classical approach has been criticised on a number of grounds (e.g. see Jacobs, 1994); here, only the shortcomings of this approach in relation to common pool resources in developing countries will be briefly discussed. In many ways, these shortcomings are similar to those encountered in both state control and privatisation of CPRs. First, according to the neo-classical school, in order to secure the efficient use of a natural resource it is first necessary to carry out a valuation study to decide 'how much should be conserved'. Apart from the inherent problems of valuation techniques[5], to carry out such a study may be beyond the capacity of many state

[5] Valuation techniques have been criticised on both moral and procedural grounds. It has been argued, for example, that environmental resources can not be given a monetary value because the environment is not a commodity. Valuation has also been criticised because the 'willingness to pay principle' does not always take sufficient account of the difference capacity to pay that different agents have. For a more detailed critique of valuation techniques see, for example, Jacobs (1994).

agencies. Second, even if the conservation of the resource is taken as a basic requirement (thus if the neo-classical tools are applied only to secure the conservation of the resource, not to decide how much should be conserved) it will be necessary for the state agency to gather a substantial amount of information in order to calculate the number of use-permits that should be released into the market to achieve the established objectives. Third, once the permits have been granted, the state agency will still have to secure the harmonisation of the use of the resource by the different permit owners, since their actions are interdependent. Fourth, the use of individual permits for the use of a CPR involves transaction costs similar to those involved in the privatisation of the resource, costs that may not be affordable to communities in developing countries.

Having said this, there are cases of CPRs, e.g. fisheries, where the application of market mechanisms has yielded some positive results. In addition, an (arguable) advantage of the neo-classical school is that it takes into consideration the valuation of a resource by different agents. For example, in the case of tropical forests, it would take account of both the interests of the direct users of the forests as well as the conservationist interests of the international community. The objective of this chapter, however, is not to evaluate whether CPRs are better off under private or state ownership. The argument put forward here is that independent of the advantages and disadvantages of these two solutions, they are not the only solutions to prevent the depletion of a CPR and, sometimes, they are not the best solutions. A CPR can also be conserved if held as 'common property', defined as a property rights institution in which only a limited group of users (owners) has access to the resource and all non-owners are excluded from the use of the CPR.

2.3 Common property regimes

A CPR held as common property can be conserved because the resource is not free for all to use, as the pasture in the 'Tragedy of the Commons'. Hence, users do not face the problem that if they forfeit their immediate gains for the long-term conservation of the CPR any potential user can take advantage of their efforts. The idea that users of a CPR cannot overcome the free-rider problem has been central to the view that all CPRs that are not privately owned or managed by the state are free for all to use as they wish. However, contrary to what Hardin (1968) argues co-owners can develop mechanisms to overcome the free-rider problem. Moreover, if only a restricted group of individuals has access to the resource, free-riding is not a dominant strategy, though potential free-riding is nevertheless an issue that co-owners of a CPR must address.

The free-rider problems assumes that individuals are primarily self-interested and thus when deciding on their level of use of the resource they will put their individual interest above the community's interest. However, the welfare of the community may also be part of each user's

individual welfare, in which case the incentive to free-ride will not be dominant (Runge, 1986). Even if indifferent to the community's interest, users of a CPR can also co-operate with each other in spite of their incentive to free-ride because, contrary to the situation in which the prisoners are, they are unlikely to be in a system that compels them to defect.

The situation of the prisoners and of users of a CPR differs in at least two ways. First, the prisoners cannot communicate to decide what is the best strategy for them both, whereas users of a common pool are unlikely to be unable to talk to each other. Second, the set up of the prisoners is such that even if they could communicate, they would still have a dominant incentive to defect but this is only because they meet only once. Users of a CPR, on the contrary, are likely to meet regularly over the years as they all use the same resource. In repeated Prisoner's Dilemmas, the prisoners will not necessarily confess the crime because they know they have been in this situation before and know that they will meet again. For instance, prisoner A, when considering which strategy to follow, may remember that last time they were caught by the police, prisoner B did not confess. In addition, A may think that if he denies the crime now, prisoner B will be more likely to co-operate and deny the crime next time they find themselves being interrogated at the police station (Taylor, 1992). The assumption that users of a CPR cannot co-operate is thus not correct. Even if resource users are primarily self-interested, they are in a system that provides them with incentives to co-operate as much as to defect[6] and, consequently, they can overcome the free-rider problem.

Ample empirical evidence on CPRs that have been conserved for long periods, ranging from decades to centuries (National Research Council, 1986; Berkes, 1989; McCay and Acheson, 1987; Stevenson, 1991; Jodha, 1992), confirms the argument that joint users of a CPR can secure its conservation. Hardin himself acknowledged this in a later article (1991), where he specifies that the depletion of jointly used CPRs only occurs if the resource is scarce and if individuals do not manage the resource. "Clearly, the background of the resources discussed ... by myself was one of non-management of the commons under conditions of scarcity" (Hardin, 1991:178).

Jointly used CPRs can thus be in two different situations: they can be held as common property or alternatively, they can be free for all to use, in which case we will say that the resource is in an open access situation. Whereas a CPR held as common property can be used sustainably even if there is a certain level of scarcity, in an open access situation the CPR can only be conserved if there is no scarcity. The pasture Hardin (1968) examines in the 'Tragedy of the Commons' was

[6] See Section 2.6 for a more detailed examination of the factors that can encourage co-operation between joint users of a CPR.

in an open access situation. Resource users will not necessarily maintain the open access situation and deplete the resource; they can also develop co-operation and set up a common property regime, which can ensure the sustainable use of the CPR. However, if they do not develop a common property regime and there are conditions of scarcity the resource may be easily depleted.

To ignore the distinction between CPRs held as common property or in an open access situation leads to the dismissal of efficient common property regimes (Bromley, 1991; Stevenson, 1991). Jointly used CPRs that had been sustainably used for long periods have been put under state control or privatised. Given the shortcomings of these two alternatives, the CPRs, that until then had been conserved, were depleted. Apart from the belief that co-users cannot overcome the free-rider problem, two other factors have given rise to the idea that all CPRs jointly used are in an open access situation and to the dismissal of common property as a potential solution for securing the conservation of CPRs.

First, the assumption that 'property' is synonymous with 'private property' (MacPherson, 1978). This leads to the belief that if a resource is not private property there are no property rights involved, which is the equivalent of an open access situation. Private property, however, is only one type of property. Although lawyers, economists and political scientists use the term 'property' differently, some points are generally agreed on. One is that property refers to a social relation with respect to things and resources (Bromley, 1991). This social relation is composed of rights; property refers to rights over things or resources rather than to the things or resources themselves. Property rights can include the right to use the resource, to rent it, to change the look or subsistence of it and to transfer those property rights (Pejovich, 1995). Private property is when all these rights are concentrated in one single owner, but these rights may also be spread out between different owners.

The use of the term 'property' as a synonym of 'private property' stems from historical developments which cannot be generalised across time and space. In fact, the meaning of property is cultural and time specific. In the Middle Ages, for example, landed property rights meant some rights to that piece of land, but not all rights to the land. The owner of the manor had the right to an income from the peasants living in the land, but the latter had the right to cultivate 'their' land, a right that could not be taken away arbitrarily by the lord of the manor. In 17th century England, landed property was also limited to certain uses only, and in general, it did not include the right to transfer the landed property rights either by selling them or by bequest. With the rise of capitalism, the concentration of all rights in one individual or corporation became more widespread. As landed property rights began to be transferred all in one block, the term

'property' started to be used to refer to the thing or resource that is the object of these rights (Mac Pherson, 1978). Hence, the term property, especially in the Western world, became to be used often as a synonym of private property.

> "Inevitably for us westerners [our notions of property] are rooted in our own particular historical experience. Broadly speaking, our attitudes to property are associated with the development of capitalism and with the notion of commodity. Property for us is based on the idea of 'private ownership' which confers on the individual the right to use and disposal ... these concepts are historically and culturally situated in the western tradition" (Hirshon, 1984:2).

Property can thus take a wide range of different forms. "Policy analysts who would recommend a single prescription for commons problems have paid little attention to how diverse institutional arrangements operate in practice" (Ostrom, 1990:21-23). A common property regime includes a combination of common and private rights to the CPR. Resource users usually have private rights over the resource units and common rights over the resource system. However, which rights are common and which rights are private vary from case to case. Some rights may be held in common by all the co-owners, others may be held only by some of the community members.

Second, the dismissal of common property as a potential solution for the conservation of CPRs, arises from the use of the term to refer to 'everybody's property'. Free market environmentalists argue that 'everybody's property' means that everybody has the right to use the resource as he or she wishes. If this is the case, no one has security of access to the resource. However, by definition property rights include security of access to the resource and the existence of duties as well as rights (Bromley, 1991). A property right represents a secure claim to use or benefit from the object of property. For a claim to be secure and to be a right, the claim needs to be enforced by the state, by society, by custom or by law. "A right is the capacity to call upon the collective to stand behind one's claim to a benefit stream. Notice that rights only have effect when there is some authority system that agrees to defend a rights holder's interest in a particular outcome" (Bromley, 1989:16). In other words, the authority system must decide who has the right to the benefit stream and who has the duty to respect this right. For a right to exist there must always be a correspondent duty. Thus property is formed by a bundle of rights and duties: the right of the property holder to use the resource and the duty of all non-owners to respect that right.

If everybody's property means that everybody has the right to use the CPR as he or she wishes, there are no duties involved. If everybody has all and the same rights to use the resource, then no one has the duty to respect those rights – because the duty to respect another user's right would interfere with the person's own rights. Hence, there is no security of access to the resource and by

definition there are no property rights involved. Everybody's property to be 'property' must thus involve some type of limitations. Everybody can have the right to use a park, for example, but each person's right is limited by his or her duty not to interfere with the other rights' holders. For everybody to have indeed property rights over a resource it is thus necessary that the state or another entity secures these rights in which case most scholars would agree the resource is state or public property. If the state or another entity does not secure 'everybody's rights' then there are no property rights involved and we are in an open access situation (Stevenson, 1991). For the sake of clarity it is thus better to use the term common property to refer exclusively to a property rights regime where there is a limited group of owners and non-owners are excluded from the use of the CPR.

Issues of terminology have been central in the debate on common property. For example, scholars who acknowledge that common property as defined above can secure the sustainable use of a CPR, use nevertheless the expression 'common property resources' to refer to open access resources. The term 'common property resources' often serves not only to define two different institutional arrangements, but also to designate the class of resources, independently of the institutional arrangement under which they are held (Buck, 1988; Berkes and Farvar, 1989; Hooker, 1994). The use of the same term to refer to different phenomena is naturally the source of considerable confusion (Ciriacy-Wantrup and Bishop, 1975; Ostrom, 1986; Bromley, 1991). To avoid this, the present thesis uses the term common property to refer exclusively to an institutional arrangement that involves a restricted group of owners. As pointed out already, the type of resource is designated here by the term common pool resource, which is abbreviated as CPR. (To avoid confusion, the acronym CPR is never used in this thesis to refer to Common Property Regime or to a resource held under common property, Common Property Resource).

A resource management regime is "a structure of rights and duties characterising the relationship of individuals to another with respect to that particular environmental resource" (Bromley, 1991:22). A common property regime is when "the management group (the 'owners') has right to exclude non-members, and non-members have duty to abide by exclusion. Individual members of the management group (the co-owners) have both rights and duties with respect to the use rights and maintenance of the thing owned" (Bromley, 1991:31). A common property regime is thus a socio-economic institution, either legally established or in the form of a customary arrangement, in which non-owners can only use the resource with the owners' permission. Common property regimes often exist in 'state lands', in which case the resource users must comply with state regulations, however, most of the decision-making rights over the resource are held by the co-owners. Property is rarely absolute; for example, the private owner of a plot of land may have the

right to use and transfer his or her rights to the resource, but not the right to build on the area. Property is the right to use a resource "in any way that is not prohibited" (Reeve, 1986:12) and the rights of co-owners' of a CPR are also naturally limited by the legal framework where they exist.

The specifications of the property rights vary from case to case and involve, for example, who has access to the CPR, under which conditions, which rights are individual and which rights are held in common. However, the co-owners have the right to use the resource whether they actually use it or not and thus, they do not need to extract units from the CPR to establish ownership (Ciriacy-Wantrup and Bishop, 1975). Although co-owners have the right to extract units from the CPR, they cannot dispose of the resource system because the CPR belongs to the group. The property rights to the resource system is held in common and thus management decisions cannot be taken individually. Each co-owner privately owns the units that he or she or the family extracted, and takes all decisions concerning the resource units extracted, as long as they do not conflict with the resource system rules[7].

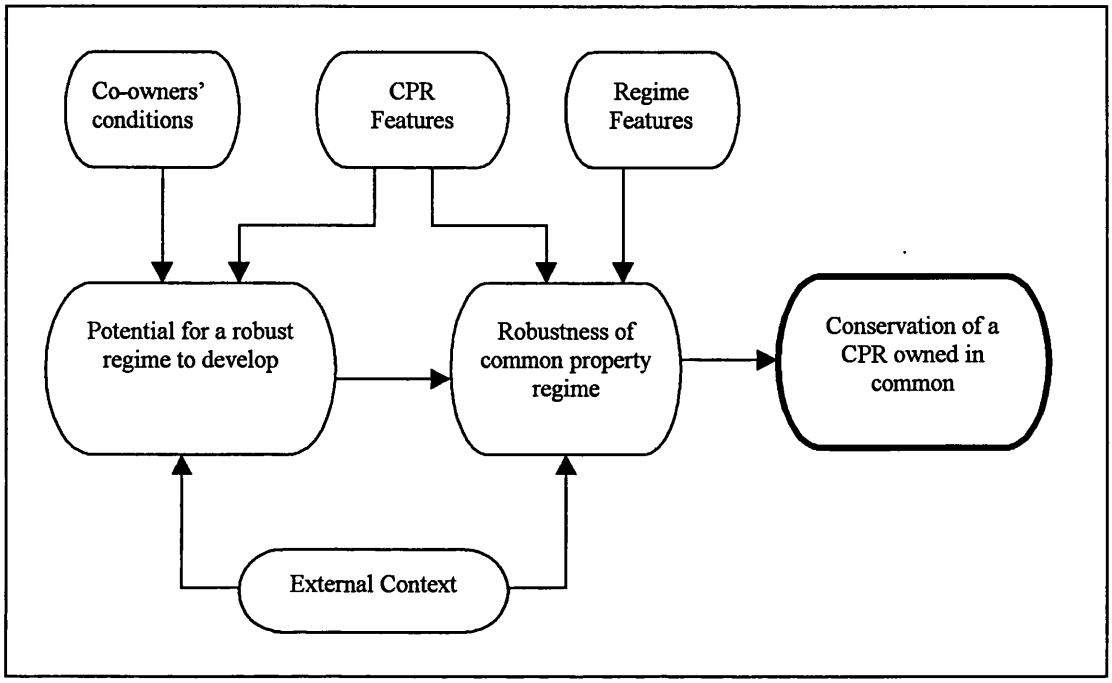
So far, it has been argued that for securing the sustainable use of CPRs private and state property are not the only solutions: resources owned in common can also be used sustainably. However, it does not follow from here that all resources held as common property are conserved. The three next sections develop the framework for examining the conservation of CPRs commonly owned that will be used in this thesis. A preliminary outline of this framework can be observed in Figure 2.3.

The conservation of a CPR owned in common depends largely on the features of the common property regime, which in turn are related to the jointness and exclusion conditions of the CPR. Section 2.4 reviews these conditions and proceeds to discuss the features that regimes that have secured the sustainable use of CPRs over time – robust regimes - tend to share. If a common property regime does not share the 'robustness features', this is not necessarily an indication that the CPR has to be privatised or put under state control. Co-owners of a CPR are not likely to set up a robust regime until the need for doing so arises, that is, until the resource becomes scarce. Section 2.5 examines several factors that, according to the literature, need to be looked at when examining the potential of a common property regime becoming a robust one. The features of a

[7] Common property is thus different from the case of several individuals owning something as an artificial person, since under common property there is a combination of common and individual rights. It is not the same as corporate property either, in which case the shareholders have rights over part of the resource only, the shares, whereas in the case of common property the owners have rights over the whole resource (Reeve, 1986).

regime as well as the potential for a robust regime to develop also depend on the external context where CPR and co-owners are embedded, which is the subject of Section 2.6.

Figure 2.3 Common Property Regimes and the Conservation of CPRs (I)



Source: author

2.4 Robust common property regimes

The term 'robust' common property regime stems from a review of the literature and, especially, from the works of Oakerson (1986), Ostrom (1990) and McKean (1992). Oakerson (1986) defined a framework to examine jointly used CPRs in which he indicated that the researcher should pay particular attention to the features of the resource in terms of jointness and excludability and to the institutional arrangements under which the CPR was held. Loosely based on this framework, Ostrom (1990), McKean (1992) and others have examined empirical evidence on the success or failure of common property institutions in conserving CPRs and identified the factors that made it possible to overcome the 'tragedy of the commons' scenario and conserve the resource over long periods of time. The concept of 'robust' regimes is similar in part to these scholars' concepts of 'successful' regimes and 'long-enduring' regimes. However, in defining 'robust' regimes the paragraphs below stress a different set of issues from those of the other scholars. First, the focus of the definition is on the need for common property regimes to address two different sets of problems: depletion of the resource by non-owners and overuse by co-owners. Second, the term robust is defined in static and dynamic terms; that is, a regime is considered robust when it is adequate to the local circumstances and when it can deal with changes in the circumstances. Though these issues are also mentioned in the work of both Ostrom

(1990) and McKean (1992) they are not always made explicit nor form the principal criteria for selecting the factors that ensure resource conservation. Finally, the collection of factors that characterise a robust regime differs from the those sets defining both 'successful' and 'long-enduring' regimes, because it brings these last two sets of features together and it also includes elements from the work of other scholars (e.g. Singh, 1994).

The first requirement that a robust regime must meet is to address the difficulties arising from the jointness and exclusion conditions of the CPR. These difficulties differ from case to case, and so each group of co-owners will have to devise mechanisms to tackle the specific problems of the resource they use. Depending on the physical features of the CPR – e.g. whether it has well defined boundaries and how large the resource system is - the main difficulty may reside in harmonising the co-owners' use of the resource or in restricting access to the CPR by other individuals or groups. The case of a lake mentioned in Section 2.1. exemplifies the first situation: it is easier to exclude people from outside the fishing village from fishing in the lake, than to monitor how much fish is caught by each boat from the village. For inhabitants of a hunting village, on the contrary, it is easier to monitor hunting by each villager than to control hunting in far away areas where animals migrate. Similar difficulties are faced by users of a groundwater basin to which the inhabitants of several villages have access, depends on the exclusion conditions in each village, and on jointness and exclusion conditions for the set of villages. For the inhabitants of Village A, for example, it may be relatively easier to harmonise their use because they can extract water from one well only. However, they also need to harmonise their use with that of the other villages, which is likely to be more difficult than harmonising their own use.

The degree of jointness of a CPR depends on the available technology. For instance, in the case of a fishery the resource may be jointly used as the technology available is not sufficiently powerful to support large catches of fish. Once resource users have access to more powerful technology, the jointness conditions of the resource require the development of institutional mechanisms to prevent the overuse of the CPR. The excludability conditions of the CPR are as well related to existing technology. For example, the exclusion conditions of pastures in the Middle Ages were different from what they are at present because at the time barbed wire did not exist. Hence, the resource was not as easily divisible as it is now (Oakerson, 1986).

The socio-economic context of the area where the CPR is located will also influence the exclusion conditions of the resource. For example, the exclusion conditions of pastures in developed countries are different from those in the developing world. For many communities, barbed wire is

an expensive commodity and thus the divisibility of their pastures is more costly than for herdsmen in developed regions of the world. The existence of a strong police force may also make excludability easier than in areas where the police is hardly present (Oakerson, 1986). Finally, the difficulties involved in securing the sustainable use of a CPR are related to the use that is made of the resource (Messerchmidt, 1986). For example, collection of fuel wood has a higher degree of jointness than harvesting of timber. If a resource is used for different purposes, these various uses may not be compatible; e.g. a forest may be used for both collection of fuel wood and extraction of fruits, but harvesting of timber is, in most cases, not compatible with fruit extraction.

Apart from addressing the specific difficulties involved in the sustainable use of a CPR, a robust regime is one that can cope with a certain level of change in the circumstances. 'A change in the circumstances' may refer to natural disasters (e.g. a drought), an increase in the population (due to an increase in the fertility rates of the resource users), changes in the technology available to the co-owners of the CPR, a change in access to markets, or alterations in the wider legal framework where the resource users are embedded. 'A certain level' of change in the circumstances is difficult to define because what can lead to the disruption of a regime in one case, may only result in a change of the regime in another case. For instance, one of the factors that is usually held responsible for disruption of many common property regimes is the state taking control over the resource. However, there are cases of co-owners of a CPR who, when faced with state regulations, either ignored them and continued following their own rules or campaigned to obtain state recognition of their management systems. Whether or not a common property regime will secure the conservation of a CPR when changes in the circumstances occur depends on a combination of factors, however, a 'robust' regime is more likely to tackle these difficulties than a 'weak' regime.

A robust regime can thus be defined as one that has the necessary mechanisms for preventing the destruction of the CPR by both outsiders and co-owners, and for coping with a certain level of change in the circumstances. The specific mechanisms of each regime vary according to the characteristics of the resource and the socio-economic context. Nevertheless, studies comparing different regimes that have succeeded in conserving CPRs over the years suggest that these institutions share some general features. First, the boundaries of the CPR and of the group of users are well defined; second, there are rules governing the use of the resource and a diversity of mechanisms for securing compliance with the established rules and; third, the co-owners of the resource have sufficient autonomy to manage their own resources (National Research Council, 1986; McCay and Acheson, 1987; Berkes, 1987; Wade, 1987; Ostrom, 1990; McKean, 1992; Ostrom, Gardner and Walker, 1994).

"Devising boundary rules is a challenging task, given that one of the defining characteristics of a CPR is the difficulty of excluding potential beneficiaries" (Blomquist, Schlager, Tang and Ostrom, 1994:302). Users of common pools have devised various ways of limiting the boundaries of the resource and of the group of co-owners so that it is clear to the users what they are managing and who is allowed to use the CPR. In the case of fisheries, for example, the fish itself is mobile but there are well defined territories, e.g. up to 15 km from the coast, where only the members of the group are allowed to fish (Berkes, 1987).

Exclusive property rights and the capacity of the group to expel outsiders are, however, not enough to secure the conservation of the resource (Ostrom, 1990). Because the joint use of CPRs is non-rival only up to a certain level of use, robust common property regimes usually have rules for harmonising the co-owners' use of the CPR. In general, when CPRs have been conserved for long periods, these rules were specifically designed for conserving the resource. "There is in all these cases [robust regimes] a trend toward detailed regulations to restrict use when environmental health of the commons begins to suffer" (McKean, 1992:272). All property rights regimes involve a certain degree of specification, e.g. who has access to what, but the purpose of such rules will not necessarily be the conservation of the CPR; the rules can be related to inheritance or social harmonisation instead. In such cases, the conservation of the resource is often due to favourable circumstances rather and a change in the circumstances, e.g. increased access to commercialisation of the resource units, is more likely to have a negative impact on the CPR (Hames, 1987; Carrier, 1987). The rules of robust regimes are thus aimed at protecting the environment, e.g. by restricting harvest, but, as several anthropologists have pointed out, it is not always easy for the researcher to differentiate when the rules are aimed at protecting the resource or have other objectives (Hames, 1987; Carrier, 1987).

McKean (1992), in her examination of a wide range of case studies (contemporary commons in Japan, Middle Ages English Commons, the Swiss mountain commons, and common property institutions in the developing world) highlights some of the features shared by common property regimes that have lasted for decades and sometimes centuries and have not, as Hardin's paper suggested, led to the destruction of the resource base. In all these cases the rules aimed at protecting the resource were clear, easy to enforce and highly specific, that is, appropriate to the local conditions of the resource. In the case of pastures, there were, for example, limits on total size of grazing herds or on the period of time the common grassland was open to use; co-owners of forests regulated the products that can be taken from the commons and the tools that can be used. Users of common property CPRs also tended to choose rules that were easy to enforce; for

example, instead of setting up a rule stipulating that during a certain period only one type of product can be collected from the common, they preferred to close the commons completely during that period - it was easier to monitor entrance into the commons than to verify which products each co-owner collected from the CPR.

In most robust regimes, compliance with the rules is monitored because otherwise resource users may be tempted to free-ride on their fellow users' efforts to conserve the CPR. In the case of small communities, social pressure may prevent users from free-riding, but this is not the case when groups are larger and/or when given the characteristics of the resource one can defect without being noticed. In robust common property regimes, there are explicit monitoring mechanisms, such as the presence of appointed guards and detectives (McKean, 1992; Ostrom, 1990). Monitoring can be performed by the users themselves or by contracted agents. Some communities prefer to have external agents monitoring the rules rather than controlling each other's actions but these agents are, in the final instance, accountable to the co-owners of the resource (Martin, 1979). Monitoring mechanisms can also be embedded in the rules, as in the case of closure of the commons referred above.

In case of defection there should be some penalty: monetary penalties (Ostrom, 1987; Arnold and Cambell, 1986), destruction of equipment (Acheson, 1987); withdrawal of access rights (Easter and Palanisami, 1986). Successful regimes usually have gradual penalties (Ostrom, Gardner and Walker, 1994). The application of a small penalty for a user who breaks a rule for the first time will be sufficient to remind the co-owner that the regime mechanisms to prevent free-riding are efficient; this in turn increases reliance on the system and, by extension, compliance with the established rules. On the contrary, imposing a large penalty may create resentment and unwillingness to conform with the rules in the future.

The existence of rules and enforcement mechanisms will not, however, prevent conflicts from arising among users. Rules can be interpreted differently, which also gives rise to free-riding. For example, to conserve the resource the co-owners have agreed that each household should contribute one individual to work one day in some common task (e.g. cleaning the canals of an irrigation system); however, households may send a child or an old person to do this work. If all other households send a working adult, the family sending the child is free-riding on the others' efforts. The remaining families will have less interest in contributing to the common work if they see that they are carrying a higher share of the cost involved in providing the common good than the free-rider family. If all families send their less productive members to do the common work, the rule 'each family must send one member to do one day's work' may not secure the

conservation of the CPR. Robust regimes also have low-cost conflict resolution mechanisms, such as arenas for solving conflicting interpretation of rules, and decision-making systems for dealing with these issues, e.g. in case of conflict the elders in the village will decide which interpretation of the rules is correct (Ostrom, 1990).

Finally, in most robust common property regimes, co-owners of the CPR have sufficient autonomy to manage their own resource and the state recognises the rights of the co-owners to manage their CPR (Berkes, 1986; Thomson et al, 1986; Easter and Planisami, 1986; Bromley and Cernea, 1989; Lawry, 1990; Chopra et al, 1990; McKean, 1992; Hilton, 1992). If the co-owners do not have autonomy to manage their CPR, it will be difficult (but not impossible) for the group to enforce compliance with the rules. Additionally, to restrict outsiders from using the resource may be difficult if common ownership of the CPR by the group of informal co-owners is not legally recognised and the use of the resource by people outside the community is supported by the law.

A common property regime is thus considered robust when the boundaries of the CPR and the group of resource users are well defined, the co-owners have exclusive rights, there are rules specifically designed for ensuring the conservation of the resource and enforcement mechanisms to secure compliance with these rules (see Table 2.1). .

Table 2.1 Features of Robust Regimes

Boundary rules	**Harmonisation rules**	**Monitoring and Enforcement mechanisms**	**Autonomy**
• CPR boundaries well defined • Group of co-owners well defined	• Aimed at conservation • Locale specific • Clear • Easy to monitor	• Co-owners responsible for monitoring • Gradual penalties • Conflict resolution mechanisms	• Exclusive rights of co-owners respected • Co-owners' rights to manage CPR respected

Source: author drawing on Oakerson, 1986; National Research Council, 1986; McCay and Acheson, 1987; Berkes, 1987; Wade, 1987; Ostrom, 1990; McKean, 1992.

In addition, resource users should have sufficient autonomy to manage their CPR and their rights supported by the state. A regime meeting these requirements is more likely to secure the conservation of the CPR in the long term than one where, for example, co-owners have exclusive rights to the resource but do not regulate their own use of the common pool. In the latter case, a change in technology may lead co-owners to extract too much from the resource system whereas in the case of a robust regime co-owners will probably tighten their rules. The chapter now turns

to review the conditions usually present when users of a common pool develop a robust common property regime.

2.5 The development of robust common property regimes

For users of a CPR to develop arrangements to conserve the resource, it is necessary first that they perceive the need for such an arrangement. In most cases, the limitations of joint use of the CPR only become apparent once the resource is used at its limit. The need to establish an arrangement to conserve the resource will only arise if the resource becomes scarce, that is, when the demand for the resource exceeds the supply or regenerative capacity of the CPR. A resource may be sustainably used under open access if the group of potential users is small, or if the available technology imposes restrictions on how many resource units can be extracted. In this case, the demand for the resource does not exceed the supply. However, if the demand increases, e.g. due to new technology, the resource may become scarce and it is then necessary to establish mechanisms to limit the extraction of units from the CPR by all potential users (Bromley and Cernea, 1989; Easter and Palanisami, 1986).

However, as Lawry (1990) notes, scarcity of the resource will not necessarily lead to the establishment of common property arrangements. "Resource scarcity can lead to co-operative management or grater competition and individual action to privatise the resource" (1990:412). This scholar comments that, for example, in East Africa there are enclosure movements taking place on rangelands partly because of increased scarcity of resources (Lawry, 1990). The Tigray in Ethiopia also alternate between almost-private property when population increases (and thus the CPR becomes scarce) and common property when demand for the common lands is less strong (Bauer, 1987). Scarcity of the resource is thus one of the factors usually present when common property arrangement develop but it is not a determinant factor.

It is generally agreed in the literature that if users of a common pool are highly dependent on the resource base they are likely to establish arrangements to prevent the destruction of the CPR (Easter and Palanisami, 1986; Bromley and Cernea, 1989; Ostrom, 1990; Lawry, 1990). A study of villages in the south of India by Wade (1986), for instance, showed that the villagers tended to develop common property arrangements for the management of water to meet intensively felt needs that could only be met through co-operation. The examination of Indian common lands by Chopra et al (1990) showed similar results. In general, regulations for securing the conservation of the resource were established for those resources that were especially important for the community, such as water in arid and semi-arid environments and forests in situations where people's livelihoods depend on them.

Second, apart from the need to develop a common property regime, whether or not users of a common pool will set up such an institution depends on the potential of the resource for being managed under a common property arrangement. That is, a resource may be scarce and users may be highly dependent on the common pool but, for instance, it may not be possible to exclude outsiders. The potential for setting up a regime varies in relation to the clarity of the resource boundaries and the excludability conditions of the CPR (Wade, 1987; Bromley and Cernea, 1989; Lawry, 1990; Ostrom, Garden and Walker, 1994). For example, given the same levels of scarcity and dependency on the CPR, users of a pasture are more likely to set up a robust common property regime than users of a fishery because in the first case the resource boundaries are clearer and exclusion of non-owners is easier. The technology available for restricting access to the CPR will also influence the development of common property. Depending on the excludability features of the resource, users may decide on private or common property or leave the CPR under open access. If individual exclusion is easy, private property may be the preferred solution; if the cost of exclusion technology (such as fencing) is very high a common property regime instead is likely to develop (Wade, 1987); and if exclusion is quasi-impossible (as it is the case with most global CPRs such as the atmosphere) the resource may be left under open access.

A third set of factors that will influence the likelihood of users of a CPR setting up a common property regime concerns the capacity of the users to establish such a regime. Their capacity for setting up rules for conserving the CPR will depend on their knowledge of the resource, on their access to information, on the size of the group and homogeneity of the members, and on their autonomy from higher political bodies such as the national state.

One of the advantages of common property over state property which scholars usually point out is that users of a common pool have an intimate knowledge of the resource whereas state technicians have to acquire this knowledge before being able to design rules for the use of the CPR. Several case studies highlight the importance of ecological knowledge in resource conservation. For example, when discussing the sustainability of the CPRs of the Cocamilla Indians of the Upper Amazon, Stocks (1987) considers that they "have enough experience and perhaps the right kind of theories to be conscious of the limited capacity of the lake to support exploitation for market exchange" (Stocks, 1987:118).

Users of a CPR, due to their long-term use of the resource, are indeed likely to have good knowledge of the ecological characteristics of the common pool. However, not all resource users have the same degree of information on the features of the CPR. For instance, if changes in the

quality of the resource are related to mythological factors the relationship between human use and resource depletion may not be established quickly enough to prevent the deterioration of the CPR (Hames, 1987). The higher the ecological knowledge of the resource users, the higher the chances that they will set up a robust common property regime, and, as Wade (1987), comparing various successful regimes, points out: "the better their knowledge of sustainable yields the greater the chances of success" (1987:104).

Apart from information on the ecological features of the CPR, to begin the process of establishing a common property regime, users of a CPR need also information on the expected costs and benefits of the proposed change. Information on the range of opportunities that may or may not be available to them outside a particular situation will influence their decisions, as well as the users' knowledge of the norms shared by other relevant actors. Which information the users of the resource have access to, how they obtain information, whether their information is biased or not will all affect the decisions of the users. The availability of information depends in turn on a number of interrelated factors, such as the size of the community, the complexity of the CPR and the support users of a common pool may receive from outside specialists (Ostrom, 1990).

It is generally agreed in the literature that the smaller and more homogenous the group of CPR users is, the more likely it is that the resource users will endogenously set up the necessary mechanisms for the conservation of their common resources (Wade, 1987; Bromley and Cernea, 1989; Lawry, 1990). However, it should be noted that this does not mean that large and heterogeneous group cannot develop robust common property regimes.

Olson (1971), when discussing the limitations of collective action, considered that the 'common good' could be provided if the group "does not have so many members that no one member will notice whether any other member is or is not helping to provide the collective good" (Olson, 1971:50). Hardin, in his 1991 revisionist article, shares this opinion and argues that small communities of up to 150 people can manage their resources and that free-riding incentives are checked by 'shame', whose effectiveness depends in turn on face-to-face confrontations. This argument has been further elaborated Singleton and Taylor (1992). These scholars argue that only those groups that form communities can develop endogenous solutions for the conservation of CPRs. In their article they define 'community' as "a set of people (i) with some shared beliefs, including normative beliefs, and preferences, beyond those constituting their collective action problem, (ii) with a more or less stable set of members, (iii) who expect to continue interacting with one another for some time to come, and (iv) whose relations are direct (unmediated by third parties) and multiplex" (1992:315). In addition the members of the group should be "mutually

vulnerable actors" (1992:315), in the sense that "each of whom values something which can be contributed or withheld by others in the group and can therefore be used as a sanction against that actor".

The argument that only small communities can endogenously manage their common pool resources has been strongly refuted by Ostrom (1992). She argues that the existence of a community is an important factor in the solution of CPR problems, but that it is neither a sufficient nor a necessary condition for the development of common property arrangements. She bases her argument on the examination of several case studies of groups using CPRs. One is the case of agricultural communities in Spain, which were not able to maintain their irrigation systems from being depleted although they met all community features described by Singleton and Taylor (1992). On the other hand, there are cases of large and heterogeneous, which have set up mechanisms to secure the conservation of their CPRs. For instance, the users of underground water basins in California established a common property arrangement to avoid the depletion of the water supply although they were numerous (800 – 12 000 users) and did not meet any of the community characteristics, such as homogeneity, described by Singleton and Taylor (1992).

There are other examples in the literature of common property regimes that developed among large and heterogeneous groups. Gadgil and Iyer (1989), for instance, described the case of commonly used resources in seven villages in India where there are strong differences among the users because of the Indian caste society. In their case study, there are different groups using the resource, each belonging to a different caste group. There are no social relationships among the groups, e.g. there is no inter-marriage. Some resources can be used by all groups, others are secured for one group only, and there are rules for the management of the resources as a whole – this common property regime was sustainable until some breakdowns occurred resulting from the centralisation process of British colonial rule[8]. Hilton (1992) also examines the case of large groups that have set up common property arrangements to manage common pool resources, namely irrigation systems. She presents the case of two sets of villages, each set sharing an irrigation system. One set is formed by seven villages and the other by five villages. The inhabitants of each village do not necessarily communicate with those of the other villages sharing the same irrigation system; discussions to set up arrangements for using the systems take place between the representatives of each village. These two irrigation systems are successful in the sense that there is a high level of participation of the community in the conservation of the CPR, which has been indeed well maintained.

[8] See Keohane and Ostrom (1995) for a more detailed examination of heterogeneity and common property.

The development of common property arrangements in larger groups of users usually takes place in the form of 'nested enterprises' (Ostrom, 1990). When the resource is complex, its sustainable use may require rules at different levels, but these rules need to be harmonised. The description of a nested enterprise in the case of an irrigation system exemplifies this situation:

> "There are two distinct levels in the Philippines' federation of irrigation systems. The problem facing irrigators at the level of a tertiary canal are different from the problems facing a larger group sharing a secondary canal. Those in turn are different from the problems involved in the management of the main diversion works that affect the entire system. Establishing rules at one level, without rules at the other levels, will produce an incomplete system that may not endure in the long run (Ostrom; 1990: 102).

For a common property regime to develop, the most relevant feature of the group of users of the CPR is thus not likely to be the size of the group. In fact, for a complex CPRs such as the one described by Ostrom, the development of a robust common property regime may require a rather large group of co-owners. Ostrom (1990; 1992) considers that users of a CPR are most likely to develop a robust regime if they share generalised norms of reciprocity and trust (given that all other factors are equal). Although small groups may be more likely to meet this requirement than large groups, the latter may also develop relationships of trust. In some cases, norms of reciprocity and trust may in fact develop out of the common endeavour to develop a robust regime, as long as all users perceive the need to manage their CPR and all other factors for the development of common property arrangements are met.

Finally, the development of common property regimes is related with the level of autonomy resource users have. In the case of jointly used CPRs which are managed by the state, direct users may not take any initiative to reverse a potential depletion process because they see this as the responsibility of the state (Ostrom, 1990). Developing institutional arrangements to secure the conservation of a CPR involves considerable effort. Resource users must take time to discuss the problem, find information on what they can do to solve the problem, define rules and monitoring mechanisms and finally, enforce compliance with the rules established. If they believe that an external agency can provide the common good, which in this case is the conservation of the CPR, they are likely to leave the state to carry the costs of it. The shortcomings of state control of CPR have already been reviewed in Section 2.2. Autonomy, like all the other factors conducive to the development of robust regimes, is not, however, a *sine qua non* condition. If resource users consider that state management is not effective in ensuring the conservation of the CPR, they may engage in action to develop institutional arrangements in spite of state control or in direct opposition for it (Cordell and McKean, 1986; Acheson, 1987). Different groups fishing lobster in

the USA, for instance, prevented access to their fisheries to any potential fisherman who was not a member of their group although legally anyone who had a licence to fish could use the fishery. Potential fishermen have to leave from the harbours in the area and the established communities stop all outsiders from doing so (Acheson, 1987).

To summarise the development of robust common property arrangements among users of a CPR will depend on the interaction of several factors (see Table 2.2). Co-owners of a CPR develop institutional arrangements to ensure the conservation of the CPR when they perceive the need for it, which is likely to occur when the CPR becomes scarce and if the resource users are highly dependent on the resource. Given the jointness and exclusion conditions of the CPR common property is a feasible solution and more advantageous than alternative property rights institutions. Resource users who have sufficient autonomy to manage their CPRs are also more likely to develop robust regimes than those whose autonomy is hindered by a controller state. Finally, if all other factors are similar, a small group of resource users, whose members are homogenous and have direct and multiplex relationships, and who expect to continue interacting over time are more likely to develop a robust regime than groups who do not meet any of these features. However, if the resource is large and complex, a small group who has control over only part of the CPR will not be able to secure the sustainable use of the resource. Large groups whose members are heterogeneous can also develop robust regimes, in which case the regime may take the form of nested enterprises.

Table 2.2 Factors influencing the development of robust regimes

Need for regime	Characteristics of the CPR	Characteristics of the users	Autonomy
• Perceiving need • Scarcity of the CPR • Dependency on CPR	• Jointness conditions • Exclusion conditions	• Small group • Homogeneous group • Knowledge of CPR • Information	

Source: author drawing on Easter and Palanisami, 1986; Wade, 1987; Stocks, 1987; Hames, 1987; Bromley and Cernea, 1989; Ostrom, 1990; Lawry, 1990; Ostrom, Garden and Walker, 1994.

So far, we have examined how the characteristics of the CPR, the features of the regime, the characteristics of the group of co-owners and the autonomy they have from the state, influence the sustainable use of the resource. However, the role of the external context in relation to common property regimes is not limited to the level of autonomy it leaves to resource users. In

the next section, the influence of the external context in the development and robustness of common property regimes is examined in more detail.

2.6 The external context

In general, the role of the external context in affecting the choices of users of CPRs has received less attention than the internal factors mentioned in the previous sections. However, "in a globalizing world, ecological, economic, social and political interdependencies have but reinforced the impact of external factors on socio-cultural entities defined as geographically bounded wholes" (van Ginkel, 1998:2). A recent paper by Edwards and Steins (1998) has defined contextual factors remote from the CPR as those that "have an indirect influence on the situational variables of the CPR and are usually outside the control of the user community" (Edwards and Steins, 1998:4). These factors will affect what is politically, physically, economically and socially feasible in the context of CPR management (Edwards and Steins, 1998). The external context however also has direct effects on CPR users, e.g. government policies which support the colonisation of areas held under common property, will result in a direct confrontation between the co-owners of the resource and the new comers. The term 'external context' as used in this thesis thus refers to all those issues that may influence the development and resilience of a common property regime but that do not result directly from either the physical characteristics of the resource or from the characteristics of the group of users and over which users of CPR do not have complete control.

Including the external context in the examination of a common property regime poses a difficulty, which is finding a theoretical framework to analyse the role of external factors in the conservation (or depletion) of jointly used CPRs. Within the theory on common property regimes, there are scarce analytical tools to examine the external context. Existing frameworks address almost exclusively internal factors (Oakerson, 1986; Ostrom, 1990; Singh, 1994) and about the only external factor considered is the role of the state and the autonomy it leaves to the commoners.

The literature on 'environmental action' and local-level participation in resource management (e.g. Ghai and Vivian, 1992; Friedmann and Rangan, 1993; Collinson, 1996) also addresses issues relating to common property institutions. This body of research tends to pay considerably more attention to the external context than the theory on common property regimes; however, scholars in the area tend to ask a different set of questions from those examined in this thesis. This thesis' subject of inquiry, is the influence that external factors may have on the institutional arrangements to conserve the CPR. By contrast, writings on environmental action focus on the political and social aspects of sustainability and common property regimes. External factors are

examined in relation to issues of power, social justice and conflict, rather than their influence on the capacity of the commoners' institutions to ensure the conservation of the CPR. This body of literature is, however, used in this thesis to identify some of the factors that may influence commoners and their sustainable use of the CPR.

Regime theory is often considered the counterpart of common property theory at the global level (Keohane, 1995; Keohane and Ostrom, 1995; Vogler, 1995), but not because it examines local management of CPRs from a global perspective. The two bodies of theory share similar assumptions (e.g. institutions matter) and analyse dilemmas which are alike. Like joint users of a CPR, national governments must find means to harmonise their actions with those of other actors without the help of an external agency at a higher hierarchical level (Keohane and Ostrom, 1995). This means that theorists on both international regimes and common property regimes examine ways of addressing the free-rider problem and ensuring compliance with established rules. However, whereas common property theory examines local issues, international regime theory, as the name indicates, focuses exclusively on international matters and it does not provide any framework to examine resource management at the local level.

Given the similarities between the theory on common property institutions and international regime theory, a potential method of analysis could have been to use common property theory to examine local factors and regime theory to examine the external context. Arguably, a framework integrating the two bodies of theory could have been developed and used to examine the interaction between internal and external factors. This approach, however, presents two important problems. First, the utility of regime theory to examine the developments in relation to Amazonia during the 1980s is limited. Regime theory focuses on developments in the international arena whereas, for the joint users of a CPR, developments within the national arena are also likely to be important. Moreover, regime theory tends to assume that states are monolithic entities. However, it is not possible to explain the developments that occurred in Amazonia during the 1980s without considering the dynamics between a range of different actors within Brazil. Second, to adapt international regime theory to the analysis of local CPRs is beyond the scope of this thesis. Research examining the similarities and differences between common property and international regime theories is at a very early stage (Keohane and Ostrom, 1995). There are thus no indications that it is possible to design a framework grounded on the two theoretical bodies specifically geared towards the examination of global factors' impact on local CPRs. If such a framework could be developed, it would require substantial work.

Given the absence of a well-defined theoretical framework for examining the external context, it is not easy to define which external factors we should include in the analysis. Van Ginkel (1998) argues that in a "minimal framework, attention should be devoted to ecological, demographic, infrastructural, technological, economic, political, legal, social, cultural and religious factors impinging from the external world on localised systems of common pool resource use and the adaptive responses of the users (van Ginkel, 1998:11). The problem with this approach, however, as Van Ginkel himself recognises, is how to set the boundaries to the external context: "we should take account that the blurring of boundaries is part of the problem we are dealing with" (van Ginkel, 1998:2). Edwards and Steins acknowledge the same problem: "Clearly, there is a limited extent to which the researchers of a specific resource system can analyse the 'external world' of the common in terms of contextual factors" (Edwards and Steins, 1998:8). Identifying the external factors that scholars have most often referred to as having an impact on the conservation of jointly used CPRs can partly help to address this difficulty. The review of external factors provided below highlights some of the factors that the examination of the external context should look at.

External factors can affect the conservation of jointly used CPR in two ways: they can provoke a change in the circumstances and they can influence the capacity of resource co-owners to deal with any such change. A change in the circumstances can provoke three types of outcome. First, the development of alternative property rights institutions, e.g. private property, which, given the change in circumstances, may become more appropriate to the use and conservation of the CPR than common property. For instance, some of the Japanese commons examined by McKean (1992), became uneconomical because of changes that occurred in the external context, leading to their disappearance[9]. The villagers had used the commons to obtain fodder and fertiliser to their fields but now, by selling their crops, they could buy these products from the market, and this was a better option than working in the commons. Some villagers thus sold their commons although others maintained their access to them (McKean, 1992). Second, resource users may adapt the rules and enforcement mechanisms of their regime to the change in circumstances and in this way secure the conservation of the CPR. This is more likely to occur if the regime is robust than if it is weak, however, a change in the circumstances may also trigger the development of a robust regime. Third, a change in the circumstances may disrupt the common property regime and lead to a situation of open access and the depletion of the CPR. The last two outcomes are the ones that concern us here.

[9] The 'successful' commons that have lasted for long periods (described in section 2.3) were those "that had not experienced drastic changes in the local economy that made non-traditional and easily individualised uses of the commons even more efficient than collective uses" (McKean, 1992:254).

The four most frequently mentioned changes in circumstances which are provoked by external developments are: arrival of outsiders, changes in the demand for the resource units, increased access to a market economy and new government policies. Outsiders taking over the CPR is one of the most frequently mentioned causes of CPR depletion (Thomson et al, 1986; Cruz, 1986; Pinkerton, 1987; Goodland, Ledec and Webb, 1989; Bandyopadhyay, 1992). As more individuals compete for the use of the resource, the CPR becomes scarce. If the boundary rules are not effective, the arrival of outsiders may lead to the development of an open access situation, in which neither co-owners nor new comers have secure access to the CPR. The arrival of outsiders may be provoked by a number of factors, such as the construction of a road which facilitates access to the CPR, the state encouraging migration into the area or increase demand for the resource units. In most cases, however, threats to the boundaries of a CPR result from a combination of factors. Blauert and Guidi (1992) refer to the case of two local communities in Mexico, which had to face a threat to their CPRs' boundaries caused by the implementation of irrigation projects, granting of logging concessions and colonisation programmes in the area. A community of fishermen in Kerala had also problems with outsiders who had been attracted to the fishery on account of changes in fishing technology, increased international demand for prawns and new state incentives for fishing (Kurien, 1992).

A change in the demand for the resource units may change the free-riding incentives for the resource co-owners and if the enforcement mechanisms are not effective, the co-owners themselves may deplete the CPR (Cruz, 1986; Durrenberger and Palson, 1987). Initially, if the demand for the product increases, the price of the resource unit will increase too and individual resource users may consider the option of selling as much as possible of the resource units today while the price is high. A change in the demand may occur, for example, because the price of the resource units in the international markets increase due to an increase in overall demand or a decrease in the supply of the product from other sources. A decrease in the demand for the product with a correspondent lower price may also be an incentive for resource users to extract more units, to obtain the same income. Finally, changes in the external context may trigger demand for a new product, a resource unit that was not exploited before. As outlined in Section 2.4, the jointness conditions of a CPR depend on the use that is made of the resource system. If demand for a new product develops, the jointness conditions of the CPR can thus change and the existing harmonisation rules may no longer be able to secure the sustainable use of the CPR.

Many robust common property regimes exist in the context of market economies (Ostrom, 1990; Berkes, 1987; McElwee, 1994). However, if commoners living in a subsistence economy have suddenly access to a market economy, this can threaten the conservation of the CPR. The

possibility of commerce may be an incentive to extract more from the common pool and the rules in place will have to be altered to deal with an additional incentive to free-ride. Besides, the market economy promotes the extraction of one product only whereas many common property regimes are based on the use of several products, an arrangement that is in general more sustainable (Goodland, Ledec and Webb, 1989). If the rules for using the CPR are in the form of traditional values, the development of the market may lead to the depletion of the CPR, since several examples have shown that market values tend to be stronger than the former (Goodland, Ledec and Webb, 1989). Alternatively, if the existing rules have been specifically designed for securing the conservation of the CPR, resource users are likely to adapt to a market economy.

Government policies can trigger changes in the circumstances by provoking any of the above mentioned changes. For example, the arrival of outsiders in a commonly owned area often occurs because of national government migration policies. A study of Latin American forests by Richards (1997) shows that state policies are strong causal factors of CPR depletion. After observing that several groups of commoners in the region had successfully adapted to the market economy, new technology and population pressures, Richards (1997) concludes that the breakdown of common property regimes in Latin America is rather related to the role of state policies than simply to the effect of any of the other pressures. Apart from centralisation policies, the state has contributed to the disruption of these regimes through tacit or open encouragement of colonisation of areas held under informal common property regimes, policies supporting vested interests groups in the same or contingent areas and failure to uphold basic law and order.

The state can also have a direct impact on commoners by attempting to take over the management of CPRs held in either weak or robust common property regimes. In Morocco, for example, several tribes had for centuries sustainably managed their common lands until in the 1950s, the state took control over their CPRs (Artz et al, 1986). The state, however, did not have the necessary power to monitor sustainable grazing in the pastures and, as the traditional management regimes had been undermined, the pastures started to deteriorate. A similar case is described by Cruz (1986), in relation to a traditional fishery managed by local communities. Once the state nationalised the fishery, the CPR began to suffer. The problem with this system is that while the apparent control of the fishery resource use is assigned to government policy-makers, "the *de facto* system of exploitation of offshore fisheries is closer to open access. The coastal fishery rules are difficult to enforce with the limited resources available to most municipalities" (Cruz, 1986:130).

The theory on common property suggests that robust regimes are more likely than weak regimes to deal with the changes in the external circumstances described above. However, such changes can also trigger the development of robust regimes. Threats to local communities' livelihoods can often trigger concerted community action (Blauert and Guidi, 1992). For example, community may use a CPR with no boundary rules because the resource has also been abundant. Likewise, they may not have designed rules specifically aimed at the conservation of the CPR because technological limitations or rules regarding, for example, inheritance have so far secured the conservation of the resource. However, a change in demand for the product may change this situation and users will need to develop mechanisms to deal with the new threats. Whether resource users will develop robust regimes or adapt the institutional arrangements of their robust regimes to changes in the circumstances, depends not only on the factors described in the previous two sections but also on the characteristics of the external context where they are embedded.

The influence of the socio-political setting on the capacity of co-owners of CPRs to deal with changes has been referred to by several scholars. Egger and Majeres (1992), for example, hold that the capacity of communities to deal with outsiders who try to take over their resources has been affected by the overall political setting of each country, which determines the ability of the poor to organise freely. Lack of political rights such as the right to organise politically and access to the media can curtail local communities' range of options when devising strategies for regaining control over their resources. The influence of the political context in the development of common property regimes is also mentioned by Pinkerton (1992), who examined the decade-long process that led to the establishment of a co-management arrangement between Amerindian tribes and the US federal government. These tribes had to face two problems: outsiders taking over their CPR and an incipient process of resource depletion. Although their CPRs had well defined boundaries, lack of legal recognition of their rights made them vulnerable to other agents. Apart from legal back up for their rights, they also needed help to secure the sustainable use of the CPR in a changed environment. The Amerindian tribes resorted alternatively to the courts or to political strategies depending on the overall political climate at different points during their campaign.

The economic context at any particular point in time also influences the capacity of co-owners to deal with a change in circumstances. For example, given an endogenously triggered increase in population, co-owners may more easily solve the problem by promoting migration if there are employment possibilities outside the CPR. If the overall economic situation is poor, it would be more difficult to convince fellow users to migrate to secure the resource. Also, in a favourable

economic context (all other factors such as public interest being equal), co-owners are more likely to obtain financial support for activities in the CPR.

The capacity of co-owners to attract public interest, which can play an important role in commoners' struggles against outsiders or attempts by the state to take control of the CPR, is also influenced by the socio-economic and political context. In the case examined by Pinkerton (1992), for example, general public interest in the issue of the tribes helped them to obtain recognition and support for their management system. A well-known case of the environmental literature is that of the Chipko movement in India (Bandyopadhyay, 1992; Rangan, 1993), whose (initial) success in obtaining control over their forests was related to the fact that their plight was perceived as an environmental issue that attracted public interest in the west. Public interest in the Chipko movement and the American Indigenous tribes was in turn related with society's level of concern with environmental and Indian rights issues in general.

Establishing alliances with specific external agents has also frequently helped commoners to successfully address changes in the circumstances. Access to free media and the possibility of voicing their needs can help finding external actors such as NGOs or other agencies with complementary resources and interests, which are in tune with those of resource users. The active help of external agents other than the state (and often in opposition to the state), such as NGOs, environmental activists, members of a Church, unions and universities has often been mentioned as important in the struggle of communities for their resources (Vivian, 1992; Friedmann and Rangan, 1993). McDonald (1993), for example, describes the case of how local communities in Brazil, in their struggle against the impacts of the construction of a dam in the Uruguay River Basin, counted on the help of different Churches, rural unions and universities to obtain control over their resources. The Chipko cause was also greatly advanced by the help of environmental activists and intellectuals (Bandyopadhyay, 1992; Rangan, 1993). External actors can help with information on self-organisation, leadership training, provision of information, as well as with access to media and international organisations In addition, they can provide advice on tactics, help with coalition building, and financial assistance (Friedmann and Rangan, 1993).

The legal setting also plays an important role in enhancing or hindering the capacity of co-owners of a CPR to address changes in the circumstances. As mentioned in Sections 2.4 and 2.5, a robust regime and the capacity of users to develop such a regime is affected by whether the common rights of the users are legally recognised (Ostrom, 1990). Co-owners may have autonomy to manage their own resources but their right to manage their CPR may not be enshrined in the law. There are however a large range of other legal stipulations affecting each particular CPR. For

example, users of a common pasture may be affected by the laws concerning rights to minerals in the land. Laws on logging and environmental conservation can also affect the options of co-owners of a forest when dealing with a change of circumstances. If their sustainable use of the forest is supported by legal mechanisms, they will more easily be able to impose new regulations that secure the conservation of their forests.

The state plays a crucial role, either hindering or enhancing the capacity of co-owners to deal with changes in the circumstances. There has been some debate on the role of the state in relation to common property regimes. As a backlash to the earlier view that CPRs had to be managed by the state and given the disastrous results this policy usually had, the literature on common property tends to emphasise more the importance of autonomy for CPR users than state support for commoners. In recent years, however, scholars have pointed out that state support does not imply state management of the CPR and that commoners often need such support. Singh (1994) states that "government intervention does not, however, necessarily imply direct action: it may include such indirect measures as enactment of necessary legislation, provision of funds, technical information; guidance and training, establishment of new institutions and organisations, creation of basic infrastructure, etc." (Singh, 1994:312). The same argument, that state intervention was necessary but should mean state ownership of the resource was made more recently by Yadav et al (1998), who argued that the responsibility of conserving natural resources should not be left to local communities alone. Lawry (1990:403) argues that "while state management is ineffective, incentives for individuals to participate in local management activities are weak, and local institutions are usually unable to generate sufficient sanction locally to enforce rules". Although the abundant evidence of successful common property regimes does not wholly support this statement, the author's argument suggests that local communities may need external help although not external management of their resources.

In general terms, there are three main areas in which the state can support common property regimes. First, to secure commoners' boundary rules against outsiders. Common property regimes, like property rights in general, need the state to secure their rights against other potential users. A facilitative legal framework that recognises the common rights enhances the commoners' capacity to deal with other potential users of their resource. However, apart from legal rights, property rights' holders also require that the state actively protects their rights. Second, the state can help commoners to harmonise their use of the CPR by providing access to arenas for conflict resolution, such as tribunals. The owners of the Japanese commons examined by McKean (1992), for example had access to state courts to solve disputes. The provision of arenas for conflict resolution can also help robust common property regimes to develop. Let us consider the example

of the groundwater basin used by several villages. If the villages have access to neutral arenas for discussion (e.g. courts set up by the state) and information on the capacity of the basin, it will be easier for them to overcome the exclusion problems of the basin than in a case where the villagers are totally left to their own devices. The users of the Californian underground basins examined by Ostrom (1990), for example resorted to state tribunals to solve their problems and co-operated with state organisations in obtaining detailed information on the characteristics of the basins.

Third, the state can promote the conservation of CPRs by providing small scale infrastructure, such as communication or processing technologies to the co-owners, establishing data collection and monitoring procedures, mechanisms for communication of the views of the users of CPRs, and build an administrative capacity of the co-owners of the resource (Peters, 1986). State agencies (and other actors) can moreover engage in co-management with the direct users of the CPR. By co-management is meant more than only leaving the CPR users sufficient autonomy to manage their resources, recognition of their property rights institutions, and providing them with information and arenas for decision making and conflict resolution. Co-management means that communities and the state together manage the resource or some project for the improvement of the users' livelihood or CPR. "Co-management can be generally defined as power-sharing in the exercise of resource management between a government agency and a community or organisation of stakeholders" (Pinkerton, 1992:331).

Co-management is appropriate when the resource users are not prepared to undertake all the necessary tasks to secure the conservation of the CPR. For example, the resource may be close to depletion and restricted use by the commoners may not be sufficient to replenish the CPR. Also, co-management can help to overcome some of the problems faced by users of CPRs whose jointness and exclusion conditions make the development of a robust regime difficult. Taking again the example of the water basin shared by several villages, the state (or another external agent) may help the villagers to harmonise their use. The state can set up arenas for discussion among the representatives of the villages, provide neutral information on the use of water by each village and help in monitoring compliance with the rules. Co-management may also be an appropriate solution if the conservation of the CPR depends on factors that are beyond the jurisdiction of the community of direct users. Acheson (1989) presents the case of a group of lobster fishermen in Maine. Besides legislation to regulate the national lobster fishery, the fishermen in the area examined by the author had set up their own rules to secure the sustainability of the CPR. Developments in the industry and in the legislation, however, have caused increased fishing by all fishers in the area, threatening the conservation of the fishery. One group of fishers has thus lobbied for stronger regulation from the state in order to affect not only

their own group but also other groups whose fishing they cannot control. A similar case was reported by Langdon (1984) in Alaska, where an Aleut community not only controls access to territories within its local lagoon fishery, but has also made the state limit fishing in adjacent territories, where the local stocks might be intercepted by outsiders.

A facilitative state, however, does not take over the control of the resource, since the CPR users keep their property rights over the resources (Ostrom, 1990). In the cases of co-management described above the responsibility for the design of rules and for monitoring compliance rests in the hands of the local users of the resource. A controller state is one that attempts to manage CPRs through state agencies whereas a facilitative state is one which leaves the responsibility of managing the CPR to the co-owners yet supports their common rights in a number of ways. Research has shown that the latter approach gives better results. Hilton (1992), for example, compared a set of irrigation systems that had received direct help with another set that had received indirect external help. The author concluded that in those cases where users had a higher degree of responsibility over their resources, the irrigation system had been better maintained and co-owners contributed more to the sustainable use of the CPR.

When examining the sustainable use of resources owned in common it is thus necessary to look at the external context as much as at internal features. When examining the exclusion and jointness conditions of the CPR it is necessary to look at the context where the CPR is located, and not only at the physical features of the resource and its use by the co-owners. The external context can also trigger changes in the circumstances, to which the resource users must adapt to. Developments in the external setting can lead to the arrival of outsiders in the common area, changes in the demand for the resource units of the CPR, access to a market economy, and state agencies taking control over the CPR or promoting policies that indirectly affect the resource users. Third, external factors can hinder or enhance the capacity of co-owners (who have either robust or weak common property regimes) to deal with any changes in the circumstances (triggered either internally or externally). The socio-political, economic and legal setting can play a role in this respect. Moreover, direct help by external agents can also help resource users to address their problems. The state can also play a crucial role in promoting the conservation of commonly owned resources by securing the commoners' rights against outsiders and providing an institutional framework that facilitates discussion and conflict resolution among resource users (especially when they form large groups). The state can also provide the co-owners with information and material help. If resource users form a large group or the resource is beyond their jurisdiction, the state or other agencies can engage in a co-management regime of the CPR.

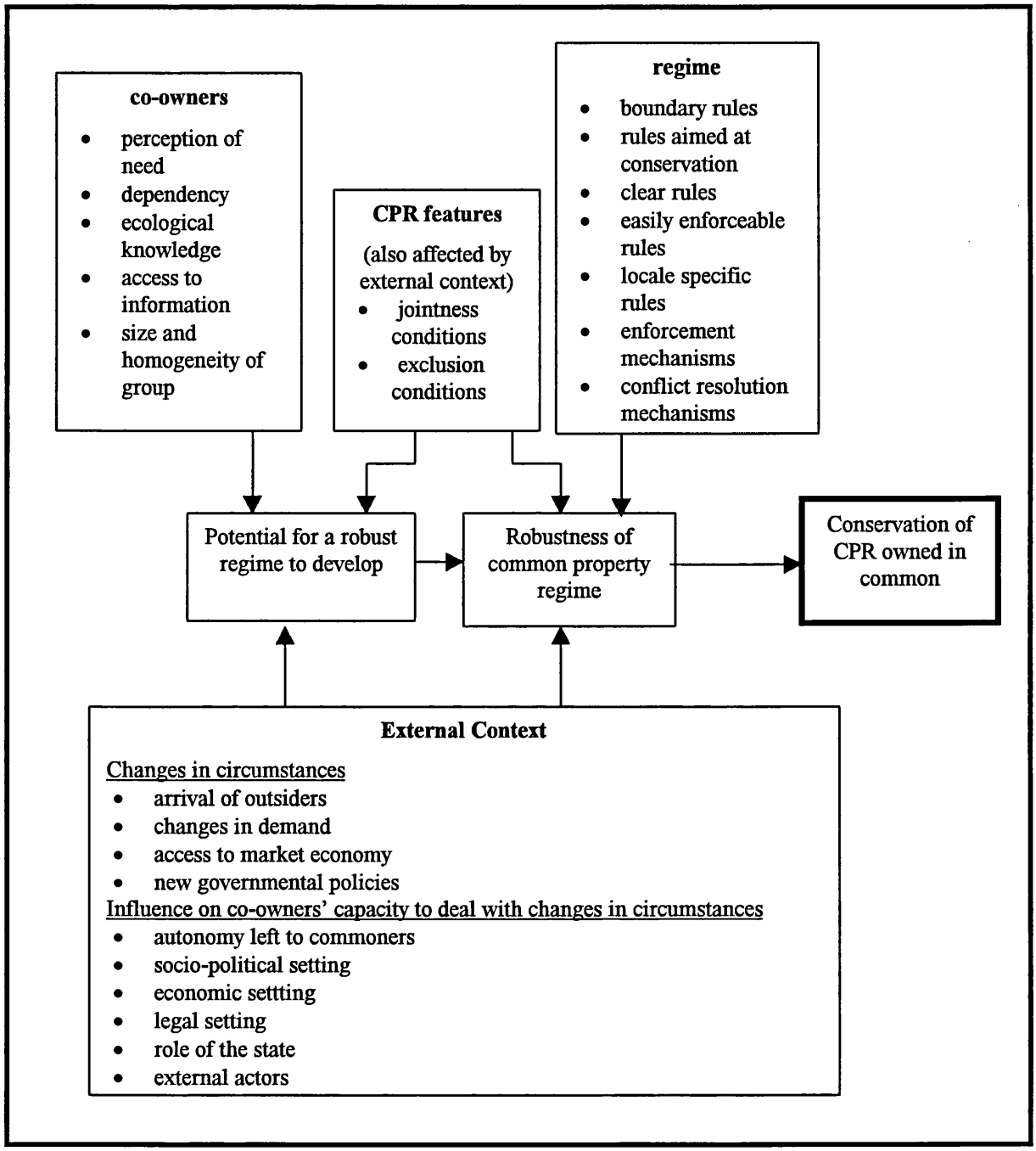
Finally, when examining the role of the external context in relation to a common property regime it is necessary to examine how they affect the boundary and harmonisation rules.

2.7 Conclusion

This chapter has argued that under certain conditions a common property regime can secure the conservation of a jointly used CPR. The theory on common property regimes suggests that the specific features of the resource, of the group of co-owners and of the regime under which the CPR is managed need to be examined in order to assess whether the CPR can be sustainably used on a long term basis. In addition, the theory suggests that external factors also play an important role in relation to jointly used CPRs. References to external factors, however, tend to focus on the role that external shocks have had in disrupting traditional regimes. The dynamic interaction of internal and external factors in relation to CPRs held in relation to common property regimes has not yet been fully examined in the literature. "Without doubt, we need to study common-property regimes from a more dynamic perspective. Not just situations where new 'outside' forces have wiped out local natural resource commons, but more in-depth cases of how particular commons governance procedures were adapted, or not, to changing situations" (Field, 1990:251). This thesis does not pretend to be the first work addressing the interaction of internal and external factors, as important work in this area has recently been done by Edwards and Steins (1998), van Ginkel (1998) and Buck (1998). However, the examination of the extractive reserves will provide a more detailed insight on this issue; moreover, the external context in the case of the reserves includes not only developments at the national level but also at the international level.

A preliminary framework of how the conservation of jointly owned CPRs can be examined was depicted in Fig. 2.3. A more sophisticated version of this framework is presented in Fig. 2.4. The conservation of a CPR owned in common depends on the robustness of the common property regime or on the potential for such a regime to develop. The robustness of a regime depends on the jointness and exclusion conditions of the CPR and on the features of the regime. A robust regime must have clearly defined boundaries, rules aimed at the harmonisation of the co-owners use of the CPR and mechanisms for securing that these rules are followed. Whether a robust regime can develop if the need for it arises depends on the jointness and exclusion conditions of the CPR, on the users perceiving the need, on their dependency on the CPR, their knowledge of the resource, access to information, and the size and homogeneity of the group. The external context influences the conditions of the CPR, the robustness of any regime and the potential for a robust regime to develop.

Figure 2.4 Common Property Regimes and the Conservation of CPRs (II)



Source: author

The review of external factors suggested by the literature on common property regimes and summarised in Figure 2.4 provides an indication as to which factors tend to be important in the context of common property regimes. To carry out the research on extractive reserves, however, two other steps have been taken to include the external context in the analysis of the common property regime in question. First, based on the literature on extractive reserves, the main external factors that influenced them were identified. This follows a suggestion by Edwards and Steins who write that "having identified a change in outcome to the CPR, the researcher can attempt to

trace it back to a local or remote contextual factor by focusing on the choice sets available to individual users of the resource" (1998:8). However, it is not always clear which remote external factor determined a particular change in outcome. Often, changes occur because of a combination of factors and the researcher, having identified one of them, may not be aware of other external factors equally important. To secure a more comprehensive, although by no means exhausting, analysis of external factors, the thesis includes a review of the evolution of national and international policies in relation to the Brazilian Amazonia. The external factors identified in the theoretical and case study literature served as a starting point for this review, which is the subject of the next two chapters.

Chapter III

Brazilian Amazonia

Introduction

Chapter II argued that the conservation of jointly used CPRs is influenced by the external context in which resource and resource users are embedded. The external context influences the jointness and exclusion features of the CPR, can lead to changes in the circumstances and affects the resource users' capacity to deal with such changes. External factors, however, have received less attention than internal ones and, as outlined earlier, the objective of this thesis is to examine a common property regime taking into consideration both sets of factors and including external factors arising not only from the national setting but also from international developments.

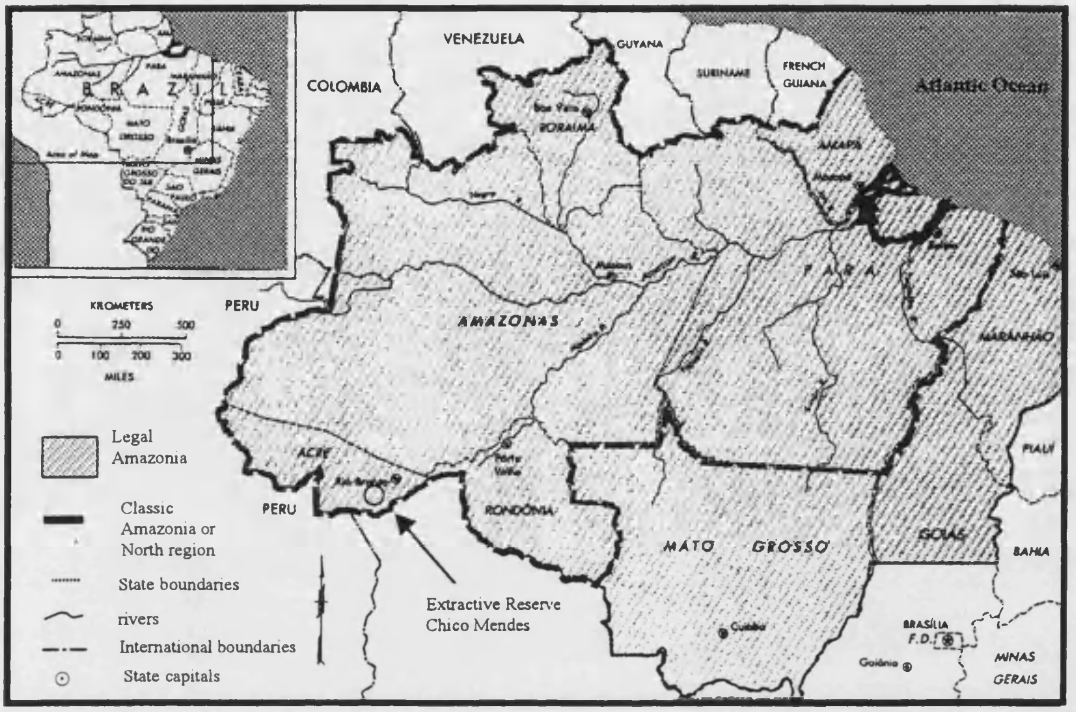
The objectives of the present chapter are to examine some of the factors that justify the inclusion of the international context in the analysis of extractive reserves and to review the 'external context' of the rubber tappers from the 1970s to the 1980s. The chapter begins by outlining the extent of deforestation in Amazonia and then proceeds to examine the various impacts of deforestation, focusing on the global ones. The second part of the chapter reviews the causes of deforestation, focusing on the relationship between state policies, property rights and deforestation.

The Amazon region is formed by the Amazon River basin and adjacent areas with similar ecological conditions, stretching over an area of 7.2 million sq. km, including 5.5 million sq. km covered by tropical moist forest (Jaenicke and Flynn, 1992). Amazonia is under the sovereignty of nine countries[1] and Brazilian Amazonia, which is the only part of the region examined in this thesis, consists of approximately 4 million sq. km of tropical forest. In the remainder of the thesis, the terms Amazonia and the Amazon region are used to refer exclusively to Brazilian Amazonia. In Brazil, the rainforest forms the larger part (74%) of Amazonia Legal, a region created for administrative purposes which in total covers an area of 5 million sq. km. Amazonia Legal is constituted by seven states: Acre, Rondônia, Amazonas, Pará, Amapá, Roraima, Mato Grosso, parts of Tocantins and Maranhão; Tocantins and parts of Mato Grosso and Maranhão are not Amazonian Ecosystems.

[1] Bolivia, Peru, Equator, Colombia, Venezuela, Guyana, Suriname, French Guyana and Brazil.

The process that led to the establishment of extractive reserves originated in the state of Acre, which is also where the Extractive Reserve Chico Mendes is located (see Map 3.1).

Map 3.1. Legal Amazonia



Source: Mahar, 1989, Page 4.

3.1 Deforestation in Brazilian Amazonia

Large-scale deforestation in Brazilian Amazonia began in the late 1970s. 'Deforestation' can refer only to the removal of the forest cover, or include the deterioration of the ecosystem, even if the trees are still standing. The deforestation figures presented here refer only to the former, complete destruction of the forest cover, but they can also serve as an indication of the total ecological damage that has occurred in Amazonia for the last twenty years (Myers, 1989; FAO, 1994). In 1975, as can be observed in Table 3.1, deforestation in Amazonia Legal amounted to 29,000 sq. km or approximately 0.6% of the region (Mahar, 1989). By 1980, the extent of deforestation had increased to 125 000 sq. km (2.5%) and in 1988 some of the deforestation figures indicated that 600 000 sq. km of rainforest had been cleared or 12% of Amazonia Legal (Mahar, 1989). As can also be noted in Table 3.1, however, deforestation figures vary according to source. Whilst Mahar (1989) estimates that 12% of the region had been cleared by 1988, Myers' (1989) figures point to 8% of Amazonia Legal, and calculations by Fearnside (1997) suggest that by 1988, deforestation amounted to 9.5% of the region. Estimates of deforestation

by FAO (United Nations Food and Agricultural Organisation) suggest that during the 1980s, approximately 205 000 sq. km had been cleared (FAO, 1994). On the other hand, according to Myers' figures (1989), until 1988 already 275 000 sq. km of forest had been destroyed.

The discrepancy in deforestation figures results from the use of different definitions of forest, different methodologies for estimating deforestation rates as well as from lack of accurate and up to date data. For example, the National Space Research Institute (INPE), the Brazilian government agency responsible for presenting deforestation data, does not provide regular images of the whole region and sometimes uses images from previous years when they do not have current images (Fearnside, 1990). In addition, INPE uses remote sensing techniques, Landsat images, which do not distinguish between primary and secondary forest[2], or notice small clearings. According to Myers, remote sensing techniques are considered nevertheless the most appropriate method for calculating deforestation because it "constitutes a methodical and comprehensive form of documentation" but local verification of data is necessary, which does not always happen (Myers, 1989:9).

Table 3.1 Cumulative Deforestation in Amazonia Legal from 1975 to 1991 (sq. km)

Years	Sources				
	Mahar, 1989	**Myers, 1989**	**INPE, 1992**	**FAO, 1994**	**Fearnside, 1997**
1975	29 000 (0.58%)				
1980	125 000 (2.5%)	125 000			
1988	600 000 (12%)	400 000 (11%)	377 600		378 300 (9.5%)
1989			401 400		402 100 (10.1%)
1990			415 520	(from 1981) 205 102	416 000 (10.4%)
1991			426 400		427 100 (10.7%)

The political agenda of organisations presenting the data also influences the levels of deforestation claimed. According to Kolk (1996) there are three generic groups. Those who want to highlight the problem, such as some northern environmental NGOs and radical activists; national governments, which may provide figures showing low levels of deforestation to avoid

[2] Primary forest is considerably richer than secondary forest in terms of, for example, variety of species.

international criticism or because of technical deficiencies; and international organisations such as FAO. The latter are more likely to present accurate data because they have a higher level of resources and expertise than national governments and because presenting reliable information improves the image of the organisation. However, their 'reliance on certainty is likely to underestimate the actual degree of forest loss because figures should be confirmed from various sources before being accepted" (Kolk, 1996:64). The presentation of deforestation values by the sources in Table 3.1 confirms Kolk's argument. Myers (1989) for example, in his report for Friends of the Earth gives the percentage of deforestation in relation to the tropical forest, which amounts to 11%, instead of referring to Amazonia Legal, in which case the percentage of deforestation is only 8%. Values presented by INPE, on the other hand, refer only to Amazonia Legal, which makes percentages of deforestation appear lower than if calculated in relation to the forested areas only.

Although it is not possible to present exact deforestation figures for Brazilian Amazonia, there is virtual consensus that from the late 1970s onwards, and especially during the 1980s large scale forest clearing was taking place in the region. The percentage of deforestation in relation to the entire rainforest was still low by comparison with other tropical regions. However, the rate of deforestation was particularly worrying because it was exponential rather than linear (Fearnside, 1985) and certain states were very badly affected. For example, whereas the state of Amazonas has remained essentially intact, 14% of Rondônia and 47% of Maranhão were cleared by 1990. In Acre, the state where the rubber tappers' struggle took place, deforestation was also particularly high; during the 1980s, the annual forest cover area change rate for this state amounted to 45% (FAO, 1994). Most clearing in Amazonia occurred along the highways that were opened in the region during this period (1970s and 1980s) such as the Belém-Brazilia highway, the Cuiabá -Porto Velho highway (BR-364) and the TransAmazonia (Mahar, 1989; Myers, 1989).

After a peak in 1987, deforestation rates decreased between 1988 and 1991 and from that year onwards they increased again. Figures released by INPE in 1998 show that in 1995, 29 000 sq. km of rainforest were cleared (Fearnside, 1997; 1998). The latest figures on deforestation indicate moreover that average deforestation rates per year for the period between 1988 and 1997 have been higher than what they were between 1978 and 1988; 20 400 sq. km for the more recent years and 17 000 sq. km between 1978 and 1988 (Fearnside, 1997; 1998). Most deforestation in the 1990s has concentrated in Mato Grosso, where 26% of the total deforestation for 1991 took place. By contrast, the area of forest cleared in Acre in 1991 corresponded to only 3% of the total area cleared in that year (Fearnside, 1998).

The destruction of the rainforest affects primarily the direct users of the forest, such as the rubber tappers and other local populations of the region. Although over half of the Amazon population is urban, there are still approximately 2 million people who depend on the standing forest for their survival (Hall, 1997b). Once a large track of forest is cleared, this threatens the neighbouring areas and the forest resources of populations living nearby the cleared patch. Moreover, the impacts of high levels of deforestation are not only felt by the direct users of the forest but also by the regional and global population, which appears to be the main reason for the inclusion of international factors into the analysis of extractive reserves.

3.2 Impacts of deforestation

The core of the problem of deforestation lies in the poverty of the Amazon soils. Because the Amazon soils are extremely poor, activities involving clearing are not sustainable in the medium to long term. On the other hand, the richness of the rainforest is concentrated in its vegetation. The standing forest harbours a wide variety of products on which local people depend upon and which amounts to one of the highest biodiversity pools of the Earth. In addition, the standing forest plays a significant role in the global climate.

The Amazon soils are very poor because most of them are of very old geological origin and many of the essential nutrients have been leached due to the impact of heavy rains and high temperatures. The soils in the region have also high concentrations of aluminium and hydrogen and thus their capacity for retaining nutrients from decomposing matter is low; in addition, the soils' high acidity reduces the availability of nutrients to the plants (Jordan, 1985). Contrary to what happens in temperate regions - where nutrients tend to be harboured in the soils - in Amazonia the nutrients are concentrated in the vegetation and a tight nutrient cycle prevents any nutrient loss from the system[3]. In the Amazon rainforest, the thick canopy tree absorbs all nutrients dissolved in rainwater and from atmospheric particles, while at the ground level, there is a large and diverse number of organisms, fauna and litter communities, that recycle the nutrients from dead plants and animals (Fearnside, 1986). The roots of trees, which form a dense layer at the surface of the floor, absorb nutrients directly from the litter, in this way avoiding the possibility of nutrients left in store in the ground being lost (Junk and Furch, 1985; Furley, 1990). The above ground biomass also reduces the impact of rainfall, that could carry away the

[3] The nutrient cycle is "the distribution of a given mineral nutrient among the various compartments usually distinguishable in a forest (i.e. stems, roots, leaves, fruits, flowers, soil, micro-organisms, herbivores, and carnivores) and the amount of the same element that moves in and out of the same compartments per unit time" (Herrera, 1985:95).

nutrients, retains the moisture and absorbs and conserves the nutrients; the remaining nutrients are conserved by mycorrhizae, a type of fungus (Sioli, 1985).

A small clearing of 1 or 2 hectares does not upset the nutrient cycle of the forest. The nutrients from the cleared area go into the next patch of forest and small animals or the wind transport then seeds from the forested area to the cleared ones, allowing the regeneration of the forest. However, with activities involving the clearing of large areas of the forest - such as large-scale agriculture and cattle ranching - the natural regeneration of the forest no longer occurs because the nutrient cycle is destroyed and the ecosystem looses its nutrients. Some go into the crop or pasture and leave the system with the harvest or the selling of the animals; the majority of the nutrients leave the system because of the poor retention capacity of the Amazon soils. Once the land is left bare, the heat and lack of vegetation protection gives way to a decrease in the infiltration rates and porosity of the soil and as the capacity of the soil to absorb rain decreases, the runoff increases, carrying the remaining nutrients away. The impact of the tropical rains, which are particularly strong and thus more difficult for the soil to absorb than if they were small drops, in a soil that does not absorb water, combined with the heat, and the existence of slopes in much of the region, then creates the problem of erosion. Erosion takes away the superficial layers of the soil, which in the Amazon, as opposed to other regions of the world, are more fertile than the deeper ones (Fearnside, 1985; Sioli, 1985; Herrera, 1985).

Activities involving clearing in large scale are not only unsustainable, but also threaten the conservation of the areas surrounding the clearing partly because of changes on the hydrological cycle of the region brought about by deforestation (Fearnside, 1989b). Whereas in most areas of the world rain is mainly generated through vapour coming from the ocean, in the Amazon rainforest over 50% of the rain come from evapotranspiration from the forest (Salati, 1985; Fearnside, 1985). Deforestation, by changing the leaf structure of the vegetation responsible for the process of evapotranspiration, is thus likely to have a considerable impact in the rainwater levels of the region. Moreover, deforestation destroys the root mat in the surface of the floor, which absorbs a high proportion of water that can be recycled in the atmosphere through evapotranspiration (Sioli, 1985). As the bare soil absorbs water at much lower rates than under forest cover – e.g. under pasture conditions they absorb water at less than a tenth of the rate (Lovejoy, 1985) –, clearing the forest cover increases the amount of water which is recycled in the atmosphere.

Given the large amount of water in Amazonia – the Amazon River alone represents 20% of all the fresh water flow of the world (de Onis, 1992) – changes in the hydrological cycle not only can

degrade remaining forested areas but can also affect the regional and global climate. Deforestation may lead to droughts and damage harvest in neighbouring regions such as the rich agricultural regions of Brazil and the Central Plateau (Salati, 1985; Fearnside, 1990; 1998). At the global level, some models have shown that potential changes in the Amazon hydrological cycle may lead to a decrease in rainfall levels in temperate regions. A large reduction of the forest cover would lower heat absorption, decrease evapotranspiration and diminish the heat flux; all of these can weaken global air circulation and thus reduce rainfall (Fearnside, 1985). Others scholars have mentioned the possibility of global implications "deriving from reduced cloud formation. Smaller amounts of water vapour must be lifted higher before a cloud will form, and cloud formation provides a major form of heat transfer, thereby playing a significant role in global heat balance" (Lovejoy and Salati, 1983:215).

The influence of the Amazon forests on the global climate, however, is mainly related to the process of global warming of the Earth or the 'greenhouse effect'. The increased concentration of gases such as CO_2, methane, CFCs, and nitrogen oxide in the atmosphere raises the average temperatures of the Earth, the so-called 'greenhouse effect', and this leads to a number of changes in temperature. A change in the world climate, especially since it is likely to involve sudden changes in temperatures, would have various effects on humankind, ranging from impacts on agriculture to flooding of coastal areas (Brack and Grubb, 1996; Paterson, 1992). Forests, together with oceans, play an important role in the greenhouse effect because they act as carbon dioxide sinks, thus absorbing CO_2 from the atmosphere. Given the sheer size of the Amazon region, the destruction of the rainforest would thus deprive the world of an important carbon sink and thus contribute to the warming of the Earth. In addition, deforestation releases CO_2, into the atmosphere, the gas which contributes most to the greenhouse effect[4].

Total world deforestation contributes approximately 14% to the greenhouse effect, the remaining 86% resulting from burning fossil fuel and cement production (WRI/UNDP/UNEP, 1990). The contribution of deforestation in Brazilian Amazonia to the greenhouse effect has been estimated to be of approximately 4% of total CO_2 emissions (World Bank, 1991c: 36). These estimates are based on calculation of the amount of carbon stored in the biomass of the forest. The burning of one hectare of tropical Amazon forest generates the emission of an estimated 90.8 to 233 tons of CO_2 per hectare, according to the biomass in the forest (CDEA, 1992). According to Fearnside (1997), the deforestation that occurred in Legal Amazonia in 1990 released

[4] Each greenhouse gas has a different warming potential, according to its atmospheric lifetime and capacity to absorb infrared radiation (WRI/UNDP/UNEP, 1994).

335 - 346 · 10^6 tonnes of $C0_2$ equivalent, representing approximately 5% of the total global emissions from both deforestation and fossil fuel sources[5].

Apart from the role of the forest for the global climate, Amazonia is also important for humankind as a whole because it harbours one of the richest, if not the richest, biodiversity reserves of the world. Biodiversity is the variety of all living organisms on Earth, including the ecosystems where they live, "variability among living organisms from all sources, including, *inter alia,* terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and ecosystems" (article 2, definition of biological diversity, Biodiversity Convention, in Johnson, 1993). There are between 5 and 10 million plant and animal species on Earth, and of this number one tenth is believed to be in the Amazonia (Browder, 1989). Other studies estimate that the global number of species may be as high as 30 million, and that more than half of this biota is in the Amazon region (CDEA, 1992). Already identified, there are 60 000 plants and 2 million insects and microscopic forms of life in the rain forest (De Onis, 1992). There are several explanations for the extraordinary biodiversity of Amazonia. One is that distance between members of the same species helps to insulate against pests and diseases, more easily spread in hot climates (Janzen, 1970; Fearnside, 1986). Another explanation is that the existence of a large number of species is a device to cope with the poverty of the Amazon soils: different species have different nutrient requirements and different capacities for absorbing the small quantities of available nutrients (Junk and Furch, 1985).

Considering only a homocentric and utilitarian perspective, biodiversity is of paramount importance for humankind as a whole because it is "the common immunisation system of global life and of life connected industries" (Liepietz, 1995: 121). The diversity of species and the genetic information that exists in each living organism can allow scientists to discover new antidotes to pests and diseases, as well as to develop new crops. As it has been estimated that we only know a tenth of the different living organisms there are on Earth, by destroying unknown species valuable information is lost and cannot be retrieved. Moreover, the information stored in all the species already classified is not yet known. The sustainable use of the forest at the local level thus also allows for the global population to benefit from biodiversity of the region.

[5] Although the role of deforestation in contributing to the greenhouse effect can not be underestimated, it needs to be put in context. While deforestation in Brazilian Amazonia in the 1980s contributed 4-5% to the total of CO_2 emissions, the US in 1987 contributed 17.6% of total emissions, followed by the USSR with 12%. In the third place came Brazil, considering the country's emissions from industrial processes as well as from deforestation in the Amazon region (WRI/UNDP/UNEP, 1990).

This rich variety of species can be easily destroyed for a number of factors, in particular their endemism: most species are limited to particular areas, and they only exist in specific ecosystems within the rainforest. Furthermore, they can not live in isolation: although they tend to be concentrated in small clusters they need large extensions of forest and the existence of other species, in order to be able to perform the necessary ecological functions, such as polinisation, and to have protection against pests and diseases. The latter are very common in Amazonia because of the humidity and heat of the region, and the lack of a winter season as in temperate regions (Fearnside, 1986, 1990). Apart from the endemism, some regions of the Amazonian rainforests have clusters with very large number of species. The clusters or *refugia* are small areas with a very large number of endemic species, limited in distribution (Lovejoy and Salati, 1983). Both the endemism and the existence of clusters means that large numbers of unique species can disappear with relatively small levels of deforestation (Fearnside, 1990).

Chapter II postulated that in an interdependent world external factors have an impact on common property regimes defined as geographically bounded wholes (van Ginkel, 1998). For regimes located in the Amazon rainforest this argument appears particularly relevant because of two motives. First, given the interdependency of the ecological system that constitutes the rainforest, the conservation of local CPRs is influenced by the use of the forest in neighbouring areas. The boundaries of a local CPR can thus never fully match the ecological boundaries of the resource, since the resource (from a strictly ecological point of view) is too large. Second, actors from the regional and global populations are likely to have an interest in how co-owners manage their resources because they are also affected by the destruction of the forests. For example, the south of Brazil can benefit from the rainfall generated by the forest and the international community can benefit from the role of the rainforest as a sink for carbon dioxide and from the rich biodiversity of the region.

If international actors attempt to assert their interest in the conservation of Amazonia the external context of commoners in the region will thus be influenced by international developments. International interest in the sustainable use of the rainforest, however, only began in the mid-1980s, which suggests that the global ecological importance of the Amazon rainforest is not the only factor that determines the inclusion of international developments in the external context of commoners. In the 1970s, as the next section shows, the external context of the tappers was mainly defined by developments in the national sphere, in particular by the approach of the state to the Amazon region.

3.3 Causes of deforestation

Government policies and (lack of) property rights

Deforestation in Amazonia can be explained as the result of an intense struggle to obtain and secure landed property rights. This struggle was a 'tragedy of the commons' in the sense that clearing the forest was often the best strategy for individual actors, but not for society as a whole – society in this case being humankind. However, it should be noted that, first, clearing the forest was not the best individual strategy for all actors. Whereas some benefited from deforestation, e.g. cattle ranchers, others only suffered from it, especially traditional populations who depended on forest resources for their survival. The 'tragedy' in Amazonia was thus not so much an issue of individual strategies versus the common good, but rather of different groups having different interests. Second, the struggle for resources did not take place because resources were held as common property but rather the existence of an almost 'open access' situation, in which resource users did not have secure property rights. Thirdly, 'open access' was not the 'natural' state of affairs among resource users in the forest. Open access resulted from the impact that external developments, in particular a change in the government approach to the region, had on the traditional property rights of the region. On the other hand, the traditional property rights system of Amazonia had also been shaped by a combination of internal and external factors.

The economy of Amazonia has always been based on the extraction of different products from the forest, such as *pau-brazil* in the 16th century and rubber, from the late 19th century until the 1920s when international demand for Amazon rubber declined because of the development of rubber plantations in Southeast Asia. The extractivist nature of the Amazon economy together with the abundance of land in the region, resulted in a structure of property rights in which the value of land was based on the resources of the land (Cardoso and Muller, 1977; Schmink and Wood, 1992; Sawyer, 1984; Santos, 1984; Branford and Glock, 1985). This perception of rights cut across different groups, including peasants, rubber tappers and large private landowners, such as the rubber barons, whose estates were defined according to the number and quality of the rubber trees rather than to land surface.

Another characteristic feature of the property rights structure of Amazonia was that there was a high proportion of holdings without legal property titles (Martins, 1980; Schmink and Wood, 1992). It was not uncommon, to find the owners of the rubber estates where the tappers initially worked, without legal tittles to their lands (Branford and Glock, 1985). The delimitation of an estate was given by rivers and neighbouring estates (Duarte, 1986; Basilio, 1992). Much land in

Amazonia was public (*terras devolutas*), however, these areas were not managed by the state, and peasants and extractivists had sometimes established themselves there or in land abandoned by their former owners when the rubber boom ended. There were also arrangements, like the *aforamentos*, perpetual leases to exploit forest resources, that fell into "a nebulous realm between private and public property" (Schmink and Wood, 1992: 64). The abundance of land in the region, partly due to its isolation from the rest of the country because of lack of transport connections, and the fact that the land in Amazonia was hardly integrated in the national land markets, can partly explain the frequent absence of titled property rights.

Between the end of the rubber boom and the 1960s, the government was largely indifferent with regard to the use of natural resources in the Amazon region (Nuggent, 1993; Schmink and Wood, 1992; Allegretti, 1989). According to Nuggent (1993), local populations in the region developed institutions based on the physical and social characteristics of the region, rather than on development patterns from temperate regions or on international demand for certain products. These institutions had hardly any legal support and their existence was ignored by the federal state. Peasants and extractivists were in general *posseiros*, untitled occupiers of their plots. According to Brazilian Law, *Estatuto da Terra*, 1964, law 4504, the person or family who has lived in a plot of land for over a year and a day using the resource productively has usufruct rights to the land. The size of the plot must be of at least 0.5 sq. km depending on the number of family members able to work in the plot and on the quantity of land they need to make a living (Martins, 1991; Basilio, 1992; Schwartzman, 1992). *Posseiros*' rights applied however only to individual or family ownership of land, although many traditional populations in the region had land tenure systems which involved also common rights to the resource system; the latter were not recognised by Brazilian law (Ianni, 1979; CDEA, 1992). Until the late 1960s, to early 1970s, however, it can be assumed that lack of legal and state support was not a problem for the functioning of these regimes. Because of the isolation and sheer size of the region, the co-owners' rights were seldom threatened by non-owners attempting to take over their resources.

To exclude non-owners was thus not an issue for commoners in the region because resources were abundant. All this changed drastically when from 1964 onwards the Brazilian government started a set of new policies for the region, aimed at the integration of the Amazon in the national economy. The state was still 'indifferent' regarding common property regimes, in the sense that it did not attempt to take control over jointly owned resources, the existence of common property regimes was simply not acknowledged. However, the new government policies included the construction of highways and promotion of colonisation and investment in the region. These policies led to a radical change in the external setting of commoners and the population of

Amazonia in general, and triggered a competition for land and resources which resulted in the levels of deforestation presented in Section 3.1.

The government plans for developing Amazonia began with the construction of the new capital, Brasilia, closer to Amazonia than to the traditional centres of development in the coast and with the opening of the Belém-Brasilia highway that provided for the first time a terrestrial link between the region and the rest of the country. In 1964, the government set up Operation Amazonia, which involved the establishment of the Manaus Free Zone to boost industrialisation and commerce in the area, and the creation of SUDAM (Superintendency for the Development of Amazonia), a public agency for the administration of fiscal incentives for investment in the region. Operation Amazonia included the construction of a vast network of roads, airports, and other transport infrastructure, which by facilitating access to the region changed the exclusion conditions of the forests in Amazonia.

In 1970, the government set up a new plan for the region, National Integration Programme (PIN), aimed at encouraging migration into the region, especially along the newly opened TransAmazonian highway. Most migrants came from the Northeast of Brazil, where a very severe drought had increased tensions among landless peasants and posseiros on the one hand, and large landowners on the other. As Amazonia was sparsely populated and many of the existing property rights arrangements were not legally registered, the region was considered 'empty'. The colonisation of an empty zone would provide land for landless people ('land without people for people without land' was the slogan of the government) and diminish tensions in the Northeast (Lisansky, 1990; Sawyer, 1990). Colonisation along the TransAmazon highway, however, was far from successful. The aim was to settle 100 000 families by 1976, by 1978 less than 10% of the families had been settled as originally planned. The colonists, moreover, did not have the necessary logistic support from INCRA, the government agency responsible for the colonisation plan, and they could not deal with the characteristics of the tropical environment. Apart from the incidence of tropical pests and diseases, the cleared land did not give the expected results because of the poverty of the Amazonian soils (Moran, 1981; 1990; Browder, 1988). From 1974 onwards, the government switched to a different approach for the colonisation of Amazonia, and set up POLAMAZONIA, that focused on 15 development poles largely geared towards exports so as to pay for the external debt (Hall, 1987; Diegues, 1992) and to "fuel Brazil's economic development" (Goodman and Hall, 1990:5). In the context of this new approach, capital investments in mining, large-scale farming and cattle ranching were encouraged through tax exemptions, subsidies and other facilities aimed at attracting investors to the region.

Pasture formation has been the main direct cause of deforestation in the region (Hecht and Schwartzman, 1988). By 1983, according to estimates by Browder (1988), pasture formation was responsible for approximately 70% of the deforested area in Amazonia Legal. One third of deforestation related to pasture formation occurred in livestock projects subsidised by the government through SUDAM. Cattle ranching is one of the worst land uses for Amazonia (Goodland, 1980) because it reduces the mineral stocks of the ecosystems and thus weeds occupy the area and soil compactation increases (Hecht, 1985). On account of this, the pasture carrying capacity diminishes and ranching has negative returns after approximately ten years (Hecht, 1983; Hecht and Cockburn, 1989; Fearnside, 1990).

Mining also had considerable environmental impact. A good example is the Grand Carajás Programme, established in 1980 as part of POLAMAZONIA to exploit mineral reserves in the north of the region, covering an area of 800 – 900 sq. km or 10% of the territory of Brazil (MMA, 1995). This project involves the exploitation of a range of different minerals, such as iron, copper and cassiterite; a railway linking various iron melting plants to the sea, in São Luis de Maranhão; an agricultural project; and a dam, Tucuruí, to provide energy to the industries. Although the company running the Grand Carajás Programme, Company Vale do Rio Doce (CVRD), set up some environmental programmes to mitigate the overall impact of the mining complex, the environmental destruction in the surrounding area has been considerable. For example, the construction of the dam involved flooding 2 435 sq. km of forest (Diegues, 1992); surrounding forests were cleared for the use of the melting plants (Rich, 1994); in addition, the Programme has served as a catalyst for attracting migrants to the region, resulting in levels of deforestation in the area of southern Pará and an upsurge of rural violence in conflicts over land (Hall, 1989).

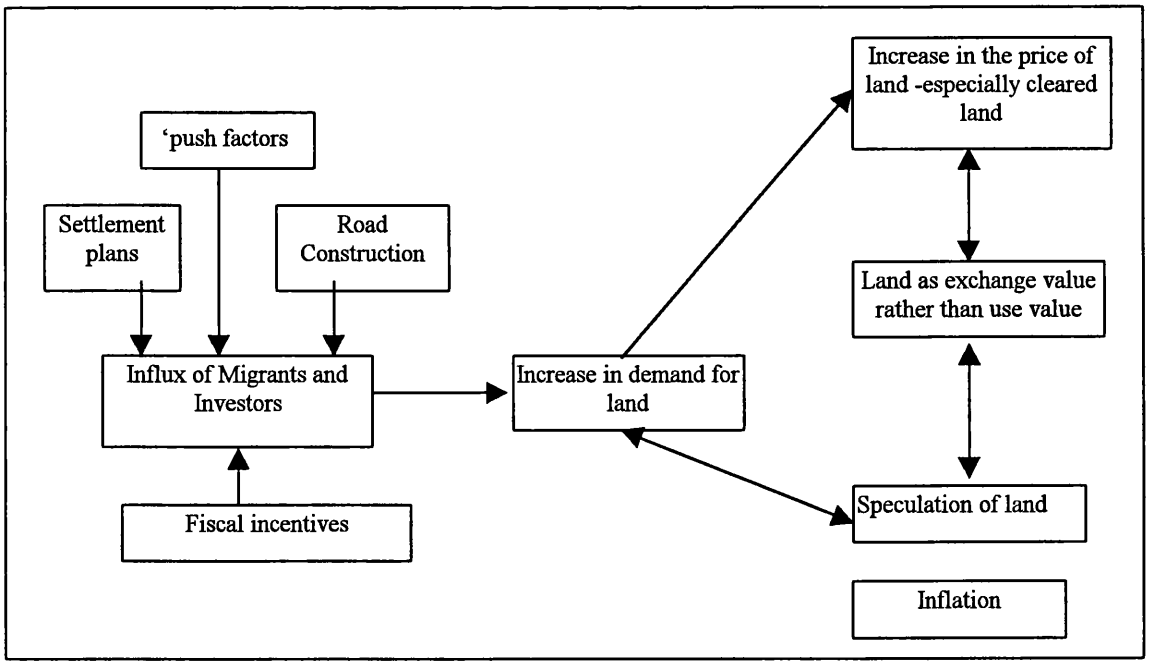
Migration to Amazonia was the second most important cause of deforestation in the region. Taking together the colonisation projects along the TransAmazonia and the Polonoroeste, a colonisation programme in Rondônia within the context of the POLAMAZONIA, by 1983 migration by small peasants was responsible for 11% of total deforestation in the region[6]. This figure represents only part of deforestation by migrants, since the latter not only arrived in colonisation projects but also, for example, in areas where roads had been opened and for mining and logging (Fearnside, 1990). Contrary to traditional populations in the area, migrants, after clearing forest for cultivation, do not leave the land fallow during a sufficiently long period that could allow the forest to regenerate; they plant shortly afterwards (obtaining lower yields) or transform the land into pasture (Fearnside, 1990).

[6] Polonoroeste will be reviewed in more detail in Chapter IV.

Resource depletion in the Amazonia, however, was not only the result of the direct impact that pasture formation, colonisation and mining had on the region. The government policies also triggered massive competition over resources and this was in itself a further cause of deforestation. The approach of the government to the region led to a dramatic increase in land demand (see Figure 3.1) and as property rights were not secure, individuals (newcomers in particular) cleared the land to obtain legal titles to their holdings. Whereas before the 1970s, land in the Amazon had been abundant and thus informal property rights institutions could exist with little or no state and legal support, this was no longer possible. The government policies triggered a change in the exclusion conditions of CPRs in the Amazon: to prevent the depletion of their resources by outsiders, commoners would have to strengthen their boundary rules.

As can be observed in Figure 3.1, several factors led directly or indirectly to an increase in land demand in Amazonia. Migrants were attracted to the region by colonisation settlements organised by the state and private investors. The influx of colonists into the region was, however, higher than the state had planned. The new highways and the hope of acquiring a plot of land in Amazonia attracted to the region vast numbers of spontaneous migrants who, landless in their regions of origin, hoped to acquire a plot of land in Amazonia.

Figure 3.1 Demand for Land in Amazonia



Sources: Fearnside, 1989b; Gross, 1990; Hecht and Cockburn, 1989; Branford and Glock, 1985.

'Push' factors operating in other parts of Brazil thus also encouraged peasants to move to Amazonia. Apart from the regular droughts and land concentration problems of the North East, in the South of Brazil, the development of agribusiness and export orientated wheat and soybean production also served as incentives for landless peasants to migrate to Amazonia (Goodman and Hall, 1990). Private investors were also attracted to the region because of the government incentives to buy land in Amazonia and because of the newly opened roads. The increase in land demand, fiscal incentives and inflation also led to land speculation, which in turn further increased the demand for land in the region. The high levels of inflation in Brazil made buying land a valuable investment since land tended to appreciate in market value at a higher rate than inflation because of government subsidies. Land became thus a secure edge and the best protection against inflation (Fearnside, 1989b; Browder, 1988). Finally, rise in land demand naturally led to an increase in the price of land, which in turn led to a further increase in demand.

The increase in land demand led to deforestation because of a combination of several factors. First, the market price of cleared land was higher than of land covered by forest. Many new owners wanted to use the area for large-scale agriculture or pasture, and if they would not buy land already cleared they would have to clear it themselves. Second, under Brazilian legislation at the time, clearing the forest constituted a productive investment of the land and thus it was often necessary to obtain a land title (Schwartzman, 1992). A legal title was necessary to be able to commercialise the land and for investors and speculators to gain access to government incentives and subsidised rural credit.

Third, property rights, especially of traditional or newly arrived *posseiros* were not secured and this led to a violent conflict over land, which catalysed further deforestation by newly arrived peasants. Large landowners did not want *posseiros,* peasants, extractivists or Indian populations living on their lands because their presence diminished the value of the land in the market. Many *posseiros* were thus expelled through legalistic means, based on their ignorance of their usufruct rights to the lands they occupied. Furthermore, even if aware of their rights, they were not always able to follow the necessary bureaucratic procedures for securing legal ownership of the land. Many of them were illiterate and they could not always afford travelling to the nearby city for registering their plots. When unable to use legalistic means, and given the fact that conflicting claims to landed property rights created substantial problems for obtaining land titles and subsidies, ranchers and speculators resorted to violence (Brock and Hesler, 1993; Martins, 1991; Americans Watch, 1991; Branford and Glock, 1985). The eviction of small peasants from their land further increased deforestation because, first, they were more likely to receive compensation when evicted from their plots if the forest cover had been removed. As they did not have legal

documents for the plot, *posseiros* were compensated for the amount of work they had put in it and the improvements they had made to the area. Second, as colonists moved further into the forest, they cleared more land in a never-ending cycle. Cases of families have been reported who moved from plot to plot four to five times (Branford and Glock, 1985).

Triggered by the various government policies, deforestation became thus the best alternative for a range of diverse actors. Clearing the forest was the best means of securing landed property rights for productive or speculative motives, or merely to receive some compensation when faced with stronger competitors for the same resource. However, it was not in all individual actors' interest to clear the forest. For traditional populations who jointly used their forests, for example, there was little to gain from clearing the forest since their means of survival lied in the standing forest. Thus the destruction of their forests occurred mainly because their boundary rules were not sufficiently strong to exclude outsiders, especially large landowners, from occupying and clearing their CPRs.

International actors

In Section 3.2 it was argued that, because Amazonia is in ecological terms globally important international factors should also be considered when examining the 'external context' of tappers and other commoners in the region. However, during the 1970s, international actors also played a role in the region, which was not related to the global ecological importance of the rainforest but to the importance of the region in economic terms in the strict sense. International actors did not voice any concern with the conservation of Amazonia but rather supported the government approach to the development of Amazonia. To what extent their support was determinant is, however, subject to some debate.

On the one hand, it has been argued that international capital was determinant in the environmental degradation of the rainforest (Cota, 1984; Kovarick, 1995). The Grand Carajas has been considered as an example of the supposedly determinant role of international capital in Amazonia (Sauthchuck et al, 1980; Pinto, 1982; Kovarick, 1995). Grand Carajás is managed by a state company (now in the process of being privatised) but has been partly financed by loans from the World Bank, the InterAmerican Development Bank and foreign private investments, especially from Japan. Another example often put forward by those who highlight the role of international capital in the destruction of the Amazon forests, is the Jari project. This project belonged initially to the North American magnate Ludwig, who in 1968 bought approximately

12,000 sq. km to develop plantation forestry, pulp processing, mining, livestock and irrigated rice cultivation.

On the other hand, according to Kolk (1996) and Hurrell (1992), who have examined deforestation in Amazonia in the context of international relations, there is not a direct link between international factors and deforestation in the region. The Jari project exemplifies this argument: although in 1982 Ludwig sold a controlling interest in the estate to a consortium of Brazilian firms ecological destruction continued throughout the rest of the decade (Fearnside, 1990; Hecht and Cockburn, 1989). Hall (1989) considers that it is "a moot point whether this [pressure from overseas interests] has actually undermined Brazilian development choices in Amazonia, or simply fitted into an existing set of national priorities" (1989:253-254). Hecht and Cockburn (1989) go further in their argument that deforestation in Amazonia cannot be pinned down to the role of international capital. They point out that most land clearing in the region has been for pasture creation, an activity carried out mainly by Brazilian capital. Demand for beef has not been from abroad either, since Amazonian beef is not exported outside the country (Hecht, 1983). Nor was external debt the triggering factor in the deforestation process. Brazil's exports amount to less than 10% of its GDP and almost 50% of these exports come from textiles and manufacturing activities. Agricultural exports come in their majority from outside Amazonia (Hecht and Cockburn, 1989:109-110). The role of international actors in the process of deforestation appears thus to have been indirect. International investors supported the government policies for the region. Many of the projects of POLAMAZONIA, for example, were partly financed by loans from the World Bank and the InterAmerican Bank, and the Banks' support was in turn an incentive to attract foreign private investments. Also, as Hagemann (1994) argues, the debt crisis has stimulated inflation, which has been one of the incentives for clearing land.

The role of international factors in relation to Amazonia during the period reviewed in this chapter suggests that it is not only the global ecological importance of Amazonia which accounts for the inclusion of international factors in the examination of extractive reserves. As will be shown in the next chapter, international interest in the conservation of the region resulted in fact from a series of developments that changed the overall approach to the environment in the international arena. However, as will also be discussed, the global ecological importance of Amazonia was at the origin of the conflicts that developed between Brazil and the international community during the 1980s; conflicts which helped to shape the 'external context' of the tappers from 1985 onwards.

3.4 Conclusion

This chapter has examined the extent, impacts and causes of deforestation in Brazilian Amazonia. In doing so, this chapter suggests that the arguments outlined in Chapter II as to why resource depletion occurs are applicable to this region. The theoretical framework highlighted the following situations as endangering the conservation of the resource. First, if the resource is in an open access situation and there is scarcity, in which case users are likely to extract as much as possible from the resource in the short term, as they have no security of being able to do so in the future. Second, if the resource is held by the state but the government does not have the capacity or the interest to secure the sustainable use of the CPR. Third, if the resources is privately owned and the efficient decision for the private owner is to overuse the CPR.

These three situations could be observed in the Brazilian Amazonia. As there was no law and order to secure the informal rights of the traditional populations and of many of the peasants who migrated to Amazonia, property rights in the region were not secure, which meant that there was a *de facto* open access situation. No one had secure rights to the land and clearing the forest was the best means of securing those rights, either for speculative motives or to obtain compensation for being expelled from the land. The state did not take over the management of the forests. However, the state was not interested in monitoring the sustainable use of the forest by its owners either, since the conservation of the forest was not part of its objectives. In fact, rather than setting up policies that encourage the sustainable use of forest resources, it set up incentives that encouraged the destruction of the natural resource base. For example, landed property rights were granted to those that had cleared the land. Third, for private owners clearing the forest cover was the most efficient solution because the rate of return on cleared land was higher than that of forested land.

According to Chapter II, a fourth situation that can lead to resource depletion is when a CPR is held in common but co-owners are not able to adapt to a change in the circumstances, which increases their own incentives to free-ride and/or attracts potential uses to the resource. The developments that occurred in Amazonia during the 1970s can be assumed to have created a change in the circumstances for all commoners living in the region. Whether and how a particular group of commoners in the Amazon region, the rubber tappers, have adapted to a number of changes in the circumstances, including the ones triggered by the government policies reviewed in this chapter, is one of the issues that this thesis addresses.

The theoretical framework of this thesis suggests that the capacity of commoners to adapt to a change in circumstances depends on internal factors (e.g. characteristics of resource and group of users) and on the external context. The review of the causes of deforestation presented in this chapter has provided the reader with an overview of the external context of the common property regime under analysis until the early 1980s. During the 19th century and until the 1920s, the main external influence in the property rights institutions of the region was international demand for rubber. The difficulties in accessing the region and the fact that land was not integrated in a market economy also influenced the specific features of the property rights systems of the Amazon. Between the 1920s and the 1970s, the role of the state in the region was virtually non-existent, and thus common property regimes during this period can be assumed to have had to deal mainly with internal factors (such as the features of the CPR and the characteristics of the users).

In the 1970s, the government approach to the Amazon region triggered changes in the circumstances which, according to the theory on common property, can threaten the boundaries established in the context of common property regimes: opening of roads and increased migration. A change in the circumstances that can change the incentives of co-owners to over use the CPR is sudden access to a market economy. Although Amazonians had always participated in a market economy regarding the commercialisation of their produce (especially rubber) the development of a market for land was a new development. Regarding the influence of the external context in enhancing or hindering the capacity of joint users to deal with the referred changes in circumstances, it appears that the legal setting was not facilitative, since it did not recognise the existence of common property. Moreover, the state did not secure law and order in the region, a factor that is likely to have increased the difficulties that commoners face with relation to non-owners.

As outlined earlier, however, this thesis includes in its analysis of extractive reserves external factors arising not only from the national context but also from the international developments. This chapter has provided a justification of why international factors should be considered in examining a common property rights regime in the region, namely the fact that Amazon rainforest plays an important role in the global climate and harbours a rich variety of species. Both, the global climate and the biodiversity of the region are valuable for humankind as a whole. The high levels of deforestation that have occurred in certain states of Amazonia are thus harmful not only for populations who depend on the forest but also for the international community. However, this chapter has also suggested that international factors should not only be considered in the analysis because of the global value of Amazonia. In the 1970s, the ecological significance of the region

was not an issue in the international arena but nevertheless international factors contributed to the developments that took place during this period. From the mid-1980s onwards, however, the role of international factors in relation to Brazilian Amazonia was largely related to the global ecological importance of Amazonia. Accordingly, the 'external context' of the tappers in the 1980s was largely shaped by the fact that their CPRs are part of a globally important resource.

Chapter IV

The 'External Context': National and international developments concerning Brazilian Amazonia during the 1980s and early 1990s

Introduction

In the previous chapter we reviewed the 'external context' of the rubber tappers until the early 1980s; the present chapter continues this task and examines their 'external context' from the early 1980s until the early 1990s. Whereas in the 1970s the role of international factors was rather minor (especially if compared with the role of national circumstances), in the 1980s international concern with the global ecological importance of the Brazilian Amazon rainforest played a significant role in the region. In reviewing the external context of the rubber tappers in this chapter, attention is thus paid to both national and international developments. Subsequent chapters will analyse how these developments regarding Amazonia interacted with internal factors in the development and creation of extractive reserves.

In Chapter II it was postulated that external factors influence common property regimes because they trigger changes in the circumstances to which co-owners must adapt and because they can hinder or enhance the capacity of co-owners to deal with these changes. A review of the literature on common property served to identify several external factors that tend to play a role in relation to these regimes. Some of these factors were already observed in the Amazon context during the 1970s, such as construction of roads and changes in government policies. Other external developments that can influence commoners' use of their forests are, for example, changes in the socio-political and economic context and alterations in the legal setting. In examining the developments concerning Amazonia during the 1980s, particular attention will be paid to these issues. However, rather than analysing each factor individually, the review of the external context is presented in a chronological form. The main reason for this choice is that the development of a common property regime is a dynamic process, which takes place over time rather than at a particular point in time. Presenting the external context in a historical form provides more scope for assessing external factors at all stages of the process of development of the regime and thus makes it possible to perceive factors which had not been identified in the theoretical literature. The review of the external context until the early 1990s thus corresponds to the period during which the development of extractive reserves occurred.

The chapter is composed of four sections. The first examines how deforestation in Amazonia became an international political issue. The second section reviews the reaction of the Brazilian governments towards the international interest in the conservation of the region and the changes in the national context that occurred during the second half of the 1980s. This includes changes in the role of the state and in the political and institutional setting of the country, factors that, as highlighted in Chapter II, can play an important role in enhancing or hindering the capacity of commoners to manage their resources. The third section focuses in the United Nations Conference on Environment and Development (UNCED). Finally, section four examines the G7- Pilot Programme on Brazilian Rainforests, an internationally funded project the aim of which is to encourage the conservation of Amazonia and that provides direct support to the extractive reserves. The chapter is based on a literature review, complemented by interviews with Brazilian policy makers[1].

4.1 Deforestation in Amazonia becomes an international political issue

International awareness of the global ecological importance of the Amazon Rainforest developed during the 1980s. This was part of the general trend during that decade, in which interest in the environment underwent a gradual shift from a focus on local issues to an increasing concern with the global character of many environmental issues. The coverage of several environmental disasters during this period, such as the nuclear accident at Three Mile Island in 1979, Chernobyl in 1986, desertification and accompanying famine in Ethiopia, as well as, by the end of the 1980s, burning of the Amazon rainforests, highlighted the importance of environmental matters outside the restricted circles of scientists and other specialists (Thomas, 1992). Growing scientific knowledge on global issues such as the greenhouse effect and the importance of biodiversity also played a role in highlighting the ecological interdependency of the Earth and in particular, the importance of conserving forests for the benefit of humankind as a whole. The actions of NGOs in publicising and campaigning for environmental issues is considered by many scholars, however, as the pivotal factor in the rise of environmental issues (Bramble and Porter, 1992; Hurrell, 1992; Thomas, 1992; Rowlands, 1992; Prince and Finger, 1994; Kolk, 1996). NGOs' role in the international politics of the environment has become increasingly important, as their participation at UNCED, both in a parallel conference during the Earth Summit and as part of the governmental representative teams, indicates.

At the inter-governmental level, a milestone in the process of recognition of environmental problems at the international level was the United Nations Conference on the Human

1 See Methodology section in Introduction and Appendix 1.

Environment, which took place in Stockholm, in 1972. Apart from several practical outcomes, such as the creation of the United Nations Environmental Programme (UNEP), it was during this conference that the link between environment and development was, perhaps for the first time, formally acknowledged at an inter-governmental level (Thomas, 1992). However, it took another 15 years and the publication of the Brundtland Report for the relationship between environmental matters and development issues to be further elaborated in a formal context. The Brundtland Report, officially entitled 'Our Common Future', was commissioned in 1984 by the United Nations and it soon became a landmark in environmental debates.

The core contribution of the Brundtland report was, probably, the political leverage that it gave to the concept of 'sustainable development'[2]: "sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future. Far from requiring the cessation of economic growth it recognises that the problems of poverty and underdevelopment cannot be solved unless we have a new era of growth in which developing countries play a large role and reap large benefits" (WCED, 1987:40). What exactly sustainable development means has been subject to some debate and to translate the concept into practical policy is problematic[3]. In spite of the different interpretations of the concept (or perhaps because of the concept's potential for different interpretations) the importance of the term resides in the consensus it created in relation to the link between environment and development. Environmental concerns are not necessarily obstacles to development, and development could and should occur in harmony with environmental conservation. In this context, the sustainable use of forest resources by local populations, as may occur in the context of robust common property institutions, becomes extremely important because it promotes not only conservation per se, but conservation for the benefit of mostly poor communities with little or no alternative sources of livelihood. At the same time, it contributes to the conservation of a recognised globally important resource, tropical forests.

The conservation of tropical forests was perhaps one of the most salient global environmental issues of the decade. Deforestation had increased dramatically during the 1970s and knowledge of the global impacts of deforestation was spreading fast. In this context, several international initiatives were taken to address the problem. The first was the Tropical Forest Action Plan (TFAP), a global forest conservation and development programme. The TFAP was adopted at the

2 The concept of sustainable development was not formulated for the first time in the Brundtland report, although it was through this report that it became widely known. The concept draws on similar ideas formulated by the International Union for the Conservation of Nature and Natural Resources in 1980, and on studies conducted by several researchers in the 1970s (Kolk, 1996).

3 For different interpretations and analyses of the concept see, for example, Pearce et al (1989), who present a neo-classical view on sustainable development; Redclift (1992) and Adams (1990), who argue that the concept is human based, and Lélé (1991), who criticises the contradictions of the concept.

World Forestry Congress in 1985 having as co-founders the United Nations Food and Agricultural Organisation (FAO), the World Resources Institute (WRI), a Washington based NGO, the World Bank and the United Nations Development Programme (UNDP). FAO was given the leading role. The objective of the TFAP was to increase the flow of forest aid to US$ 8 billion over five years, halt the destruction of tropical forests and facilitate sustainable use of forests (Thomas, 1992). The programme, however, did not meet the planned objectives: during the 1980s deforestation rates increased in most of the tropical world and, as shown in the previous chapter, in Amazonia they reached particularly high levels.

Among the various criticisms of the programme, three stand out (Humphreys, 1996). First, the focus of the TFAP was on forestry, while the causes of deforestation often lay outside the sector; second, there was a lack of harmonisation between national and international interests; and, third, TFAP projects were, according to the critics, donor-driven rather than geared towards the priorities of the local populations. The WRM and the WRI further commented on the lack of harmonisation with local interests, and WRM criticised the independent review commissioned by FAO on the basis that it treated tropical countries as

> "monolithic entities, thereby obscuring critical conflicts of interest within these countries which are a major cause of forest loss... The Review conflates the interests of the inhabitants and governments' of tropical countries ... (yet) it is the marginalization of the rural poor by the development process, and the expropriation of their lands and resources, which is one of the main engines of forest destruction" (Colchester and Lohmann, 1990:99)

This latter criticism is particularly relevant to the case of Amazonia, where, as seen in the previous chapter, a considerable extent of deforestation occurred as a result of government development plans for the region, which largely ignored the needs of both migrants and traditional populations in the region. Lack of secure property rights over their resources was a more important promoter of deforestation than logging, which only became a problem in the 1990s.

Another initiative concerning forests was the International Tropical Timber Agreement (ITTA). This is a commodity agreement on the trade of timber, administered by the ITTO, International Tropical Timber Organisation, an international organisation formed by producer and consumer countries. Brazil at the time (late 1980s) did not have an important share of world trade in timber, but it did participate in the agreement. Although the ITTO was originally planned to be only a

commodity agreement, it included a sustainable development component, and in 1991, the signatories agreed that from the year 2000 onwards they would only trade in timber from sustainably managed forests (Kolk, 1996). ITTO has been criticised by Friends of the Earth who argue that it promotes trade at the expense of conservation. However, on the other hand, it has been pointed out that by promoting trade from sustainably managed forests, ITTO contributes to diminish predatory harvesting of forests (Thomas, 1992). Apart from the controversy over logging, critics of the programme consider that project appraisal should not be done by the submitting countries but by ITTO itself and that there is lack of consideration of the environmental and social impacts of the projects (Kolk, 1996; Thomas, 1992).

In the Amazon context, the most important international initiative addressing deforestation was the campaign against the Multilateral Development Banks' project lending policy for developing countries (the MDB campaign). This campaign, although not aimed exclusively at forest conservation, played an important role in stopping environmentally destructive projects in the region. The MDB campaign also brought the issue of deforestation into the attention of public opinion, especially in the industrialised countries, and catalysed interest in the plight of local populations. It was in the context of the MDB campaign that rubber tappers developed alliances with international actors which triggered their success in obtaining legal support for their landed property rights.

The MDB campaign began in 1983 at the initiative of some USA based NGOs such as the National Wildlife Federation and the Environmental Policy Institute, and it soon could count on the participation of a wide range of NGOs also from Europe and developing countries. The objective of the MDB campaign was to show the negative environmental consequences of the existing model of development (Bramble and Porter, 1992). The NGOs' strategy involved finding partners in developing countries who were negatively affected by environmentally destructive projects. According to Kolk (1996), the emphasis of the campaign on the effect that projects financed by the MDBs were having on the local people was a way of conveying the global character of many environmental issues to the general public (Kolk, 1996).

The NGOs put pressure on the MDBs concerning several projects, such as the Grand Carajás Programme. The project that, however, caught most attention, and the one with which the MDB campaign in Brazil began, was Polonoroeste, one of the 15 projects of POLAMAZONIA (see previous chapter). Polonoroeste involved the paving of the BR-364 highway and setting up colonisation projects for small farmers who had been expelled from the South of Brazil due to land concentration (Hall, 1993). Between 1981 and 1983, the World Bank granted loans of

US $443.4 million (Rich, 1994). The paving of the highway attracted a much larger number of migrants into the region than expected and estimates indicate that approximately half a million colonists arrived between 1981 and 1985 (Martine, 1990). The infrastructure of INCRA could not cope with such a high number of colonists; the latter did not receive the necessary logistic and financial help and, in order to survive, these migrants deforested large tracks of forest. The bare soils, however, did not produce yields as expected[4]. The deforested area in the region rose from 1.7% in 1978 to 16.1% in 1991 (Rich, 1994) and conflicts over land became frequent.

In 1984, NGOs from Brazil, the USA and Europe sent a letter to the director of the World Bank setting out the serious consequences that the project was having. The Bank did not take much notice of the criticisms of the project pointed out by the NGOs and so the latter decided to lobby American congressmen. Much of the financing of the Bank comes from the USA and so by pressuring the American Congress they were indirectly putting pressure on the Bank. In this context, Mary Allegretti, an anthropologist who gave considerable support to the tappers during their struggle for the establishment of extractive reserves, and Jose Lutzenberger, who later became the director of a government environmental agency that backed up the tappers' extractive reserves, travelled to Washington to present evidence on the negative environmental and social impacts of the projects.

In 1985 the World Bank stopped the disbursement to Brazil unless and until some social and environmental precautions were taken (Revkin, 1990; Kolk, 1996). However, soon afterwards, the InterAmerican Development Bank conceded a loan for the same project, now for paving the extension of the BR-364 highway from Rondônia to Acre. There were hardly any measures in place to prevent the environmental and social problems that had already occurred in Rondônia and so a similar level of destruction could be expected in Acre. Environmental NGOs began lobbying the relevant bodies once again. By now, NGOs had made contact with the tappers and were supporting their struggle for secure landed property rights. One of the tappers' leaders, Chico Mendes, thus travelled to the US in 1987. He gave evidence at the Inter-American Development Bank meeting and at the American Congress of the impacts that Polonoroeste had already had in Rondônia and of the likelihood that the same could happen in Acre if preventive measures were not taken. In addition, he asked for support and recognition of the tappers common property regimes in the form of the Extractive Reserves proposal (see Chapter V). Eventually, the IDB loan was also suspended, subject to an agreement regarding the rights of Indians and rubber tappers in the area. As a response to this demand, the Brazilian government, since 1985 under a civilian president, José Sarney, had to ensure that the PMACI, a programme

4 For further details on the characteristics of the Amazon soils, see Chapter III, Section 3.2.

for the protection of the environment and of indigenous rights that had been requested by the IDB as a condition for providing the loan, was followed.

In 1988, international criticism of the Brazilian government policy in the Amazon reached a peak. Several coincidental events contributed to this. One was the publication of a report by the Brazilian Space Agency (INPE) showing that 80 000 sq. km had been burned in the previous year (Kolk, 1996). Taking the above figure as a starting point, and using exponential rates to estimate future levels of deforestation, some calculations suggested that if these rates continued, most of the region would be cleared by the year 2000. More recent calculations suggest that deforestation in 1987 may have been approximately half the above figure. Besides, it was also shown later that the level of deforestation in 1987 could not be used as an indication of deforestation in the future because forest clearing in that year had been the result of a specific combination of factors. The weather had been particularly dry in 1987 and expected changes in landed property rights had encouraged resource users to deforest more. 1987 was the last year in which clearing land gave access to tax credits. Also, land reform was at the time under discussion. Many landowners thus cleared the land because this was seen as a proof that it was being used and was thus not subject to potential confiscation for land reform purposes (WRI/UNDP/UNEP, 1990). INPE's 1988 report, however, contributed to highlight the gravity of the situation in Amazonia and to increase the political leverage of deforestation in the international arena. Mounting scientific evidence linking deforestation to climate change highlighted the global impacts that deforestation in Brazil could have for the rest of the world, especially as there had been a particularly dry summer in the USA that year. The combination of these factors heightened public concern with the impacts that deforestation in Amazonia could have on their lives. Finally, in December 1988, Chico Mendes - by now a well known leader of the 'forest people' in the US and Europe - was murdered and this created an international uproar over the Brazilian government's policies in the Amazon region (Goldemberg and Durham, 1990).

International concern with deforestation in Amazonia, however, was not only due to awareness of the global importance of the rainforest in ecological terms. The fate of Amazonia has always had a special place in the concerns of both environmentalists and public opinion in the industrialised countries (Hurrell, 1991; Gross, 1990; Hecht and Cockburn, 1989). This is partly explained by the fact that it is the largest remaining continuous tropical forest and that, historically, Amazonia has always been a myth in the mind of outsiders[5] (Hecht and Cockbun, 1989; Barbosa, 1993).

5 The immensity of the region, the dangers of entering it, as well as the secrecy about the region kept by both Portuguese and Brazilian governments, contributed to make of the Amazonia a myth of immensity and mystery. Initially, upon its 'discovery' by the Portuguese, Amazonia was a land of wealth, the El Dorado; it was also the 'green hell' and, at various points through history but specially during the last 20 years, it has been the 'lost Eden', the realm of nature.

Public concern with Amazonia was also related to the role of the media in presenting the plight of the 'forest people', together with the shocking images of burning forests. Deforestation, as opposed to other environmental issues, "lent itself to dramatic and extremely effective media presentation. On the one hand, there was the drama and visibility of the process itself, with huge palls of smoke, bulldozers at work, vast areas of the jungle being flooded. On the other there were seemingly clear villains... and tragic victims" (Hurrell, 1992). Lobbying against the environmental and social disaster that was seen to be taking place in the rainforest, was also made easier by the fact that this issue provided scope for doing something about it - while not suffering very much at home. Congressmen could lobby for stopping the financing of environmentally damaging projects abroad, and in this way obtain political gains without incurring domestic economic costs (Kolk, 1996).

Independent of the motives for campaigning against deforestation in Amazonia, during the 1980s, local populations saw their 'external context', expand from the national to the international sphere. Correspondingly, there was a gradual shift of focus from local to global aspects of deforestation, local populations' utilisation of forest resources acquired renewed importance: their use of the resource base, if sustainable, was important for the protection of a globally important resource and not only for their own survival. International initiatives for stopping deforestation such as TFAP and ITTA, for example, were criticised because they did not consider the role of local populations. The success of the MDB campaign, on the other hand, was helped by their focus on local populations affected by destructive environmental projects.

The development of environmental concerns in the international arena altered the tappers' external context in at least two ways. First, as highlighted in Chapter II, the socio-political context of commoners can enhance their capacity to tackle changes in the circumstances if it provides opportunities for commoners developing alliances with other actors. The NGOs strategy in the context of the MDB campaign provided such opportunity, a matter that is discussed in more detail in Chapter V. Second, the international campaign against deforestation not only temporarily stopped some projects but also contributed to a considerable extent to change the national setting, especially the government's approach towards Amazonia.

4.2 The national political, institutional and legal setting

In 1985, the same year that the World Bank loan was suspended, military rule in Brazil ended, inducing a number of changes in the legal, institutional and political national setting. Before reviewing these changes, however, it is necessary to present a brief overview of the government's initial reaction to international pressure for the conservation of Amazonia, which was up until

1989 highly nationalistic. In a speech during that year, when international concern with deforestation was particularly vociferous, Sarney stated: "Brazil is being threatened over its sovereign right to use its own territory ... With each day there are new forms of intervention containing veiled or explicit threats, designed to force us to take decisions not constructed by us in the defence of our own interests" (Hurrell 1992:405).

The animosity of the Brazilian government against international criticisms regarding its policies for Amazonia was formed by various elements. One is the long-standing fear that Amazonia is never far from attempts at internationalisation. This is partly the result of the National Security Doctrine. The National Security Doctrine put forward by the military, saw Amazonia as a virtually empty region, with enormous wealth and thus vulnerable to foreign occupation. Moreover, as the goal of the military was to transform Brazil into a great power, "all criticism of the government's developmentalist policy necessarily was interpreted as opposition to the regime and was considered a subversive activity that placed national security at risk" (Goldemberg and Durham, 1990:31). The military are still highly suspicious of any international interest in the conservation of Amazonia, which they see as attempts at internationalisation of the region. Although military rule ended in 1985, they still control some of the government agencies responsible for Amazonia, such as the Secretariat for Strategic Affairs (SAE). Fear of international interference in Brazilian affairs was thus also an issue in the early 1990s when Brazil negotiated the G7 proposed Pilot Programme and the extractive reserves project within this programme, as discussed in Section 4.4.

The nationalistic attitude of the Brazilian government was, to a certain extent, characteristic of the concerns of the developing world (Hurrell, 1992): the historical sense of vulnerability of the region in relation to internationalisation by foreigners; the idea that the North wanted to stop the country from becoming an economic power and; the view that industrialised countries were being hypocritical in their defence of the region when they already had destroyed their own forests. Several occurrences also fuelled the idea that there was a threat to the internationalisation of the region. In the 1960s, for instance, the US Hudson Institute's plan to flood large areas of the Amazon region for the creation of lakes. This proposal created considerable commotion in the region and a NGO was formed specifically for the defence of the Amazonia, the National Campaign for the Defence and Development of Amazonia, CNDDA. In the late 1980s, comments made by American senators visiting Amazonia and President Bush telling the Japanese to stop the financing of BR-364 for environmental reasons, also contributed to the perception that there was a risk of internationalisation of the region. The most referenced comment by a foreign authority on this subject, was the speech given by the late French President, François Mitterrand, at the

ozone conference in The Hague: he said that an international organisation for dealing with global environmental issues should be created, and that sovereignty should be limited if necessary for the benefit of humankind (Goldemberg and Durham, 1990; Kolk, 1996). The French President's comment at The Hague, although not explicitly referring to Brazilian Amazonia, fitted with the argument that 'humankind' has rights over tropical forests and each state should agree to "surrender a part of its sovereignty for the common good of all humanity" (Hooker, 1994:834).

In the international arena, the problem of tropical deforestation regularly involves the issue of global human rights to the forest versus national governments' sovereignty rights over their natural resources (Humphreys, 1996; Thomas, 1992). On the one hand, some scholars argue that due to the importance of tropical forests for humankind (see Chapter III), national states should relinquish part of their sovereignty rights (Hooker, 1994; Weiss, 1989; Kuehls, 1996; Mishe, 1992); on the other hand scholars argue that the emphasis on the "people's common interests" steers attention away from "differentiated social groups and nations having different interests in causing and alleviating environmental problems" (Taylor and Buttel, 1992:406)[6]. The case of the MDB campaign seems to support Taylor's and Buttel's argument, since local populations and NGOs, although sharing a common interest in forest conservation, had different concerns. Whereas the former campaigned for forest conservation in order to maintain their source of livelihood, environmental NGOs' interest in forest conservation came after their own livelihoods were fully assured. Because of the differences between the two groups, their interest in the conservation of resources may not always coincide. For example, international NGOs' support for specific environmental issues may shift in focus given a change in the global 'distribution' of problems, and this in turn may have implications for local populations, e.g. commoners, relying on external help.

Most of the Brazilian policy-makers interviewed for this research[7] had encountered the thesis that Amazonia belongs to humankind at one moment or another. However, they considered that this debate was marginal to the political context. "It arises among environmentalist movements with mystic or religious connotations. It seems to be completely absurd, although the philosophical observations ... they have no political understanding of the world. What predominates, are the relationships among social groups and the political relations among countries[8]"(G11). Interviewees also pointed to the fact that nationalistic groups within the country had

6 For an interesting examination of this issue from a moral perspective see McCleary, 1991.
7 To ensure confidentiality, interviewees are referred to in the text by a letter and a number, for example, G2. In most cases it is also indicated whether the interviewee is a governmental official or works in the non-governmental sector or in academia. The policy-makers interviewed are listed in Appendix 2.
8 G11: "... parte de movimentos ambientalistas com conotações místicas e religiosas. Me parece um absurdo dos maiores embora as observações filosoficas ... não têm nenhuma visão política do mundo. O que predomina são as relações entre grupos sociais e relações políticas entre países"

opportunistically used this argument. "I think [the argument that internationalisation is a potential threat] has been used over the years for opportunism, the military used it when it was in their own interest. [The threat of internationalisation] is used to justify other actions... On the other hand it is not possible to deny that other governments have an interest [in Amazonia]; for example, the US have maps of all the region, the best data on the region is in the US rather than [in Brazil][9]"(G7).

Although there was a general suspicion in Brazil that there was something behind the environmental concerns of the international community, some sectors of society, especially among NGOs, saw the international interest as something positive[10]. For instance, a member of a Brazilian NGO (G11) said that the "international pressure on the Brazilian government [had been] very positive [because] it [had] helped the government to construct a new paradigm; under normal circumstances [the government] would have taken several decades to address certain issues[11]". This was not an isolated opinion among NGOs and academics. One of the latter (G17) compared the international pressure on deforestation to the case of South Africa: "the international interest in the region was very positive ... here we also protested against apartheid although we were not South-Africans[12]".

During the 1980s national NGOs often co-operated with international NGOs. During the MDB campaign, for example, Brazilian NGOs often provided the necessary information for international NGOs to pressure their governments; on the other hand, NGOs from industrialised countries co-financed local projects. The social problems created by the development policies of the previous decades had fuelled the creation of numerous NGOs and grassroots organisations in Amazonia (as well as in the rest of Brazil) (Schmink and Wood, 1992; Porro, 1995). These organisations had developed out of the need to support local groups, such as the tappers, through technical, financial and educational assistance. Many of these organisations came out of the Catholic Church, such as the Pastoral Land Commission (*Comissão Pastoral da Terra*) which regularly reports on violence in rural areas, which in the large majority of cases is related to disputes over landed property rights. Some organisations also had a clear political agenda, such as the Rural Unions. Apart from support organisations, also many grassroots movements formed

9 "Acho que tem sido utilizado [internationaliation] ao longo dos anos como argumento de uma maneira muito oportunista, quando interessava aos militares eles usavam o argumento. Isso é usado oportunisticamente para justificar uma serie de acções. ... por outro lado a gente não pode negar que realmente existe interesse de governos, por exemplo dos EUA, os EUA têm a Amazônia toda mapeada, os melhores dados sobre a Amazônia se encontram nos EUA e não aqui".

10 For more detailed analyses on the issue of internationalisation see Miyamoto (1989), Kolk (1996), de Assis Costa (1990) and Goldemberg and Durham (1990).

11 G11: "a pressão estrangeira sobre of governo brasileiro foi muito positiva, ajudou muito o governo a construir um novo paradigma, avançar em questões que ele normalmente levaria algumas décadas".

12 G17: "... interesse internacional na região muito positivo... nós aqui também protestávamos contra o aphartheid e não eramos sul-africanos".

in the region, the most well-known being the Survivors of the TransAmazonica, the Collectors of Babaçu and the Rubber Tappers' Council.

With the political opening in 1985, these movements and organisations could more freely voice their demands in the national political sphere. In the same year the military rule ended, landless peasants, for example, organised a demonstration to demand land reform and, in May 1985, President Sarney presented at the Congress of Rural Workers the new proposal for land reform. Civil groups also lobbied on the issue of the new constitution, established in 1988. The new constitution included a whole chapter and a number of sections on the environment, several of which would be used later to substantiate the rubber tappers' proposals for extractive reserves. According to the 1988 Constitution, the Government has the duty to protect the flora and fauna of the country, to secure a good environment for its citizens, and to define areas to be preserved. Environmental impact assessments are made compulsory, the Amazon forest is declared national patrimony, and a number of specific measures to deal with environmental damage form an integral part of the Constitution (Arnt, 1992; Peixoto, 1996). The constitutional text has been considered extremely detailed concerning environmental matters and one interviewee (G12) commented that if all the law were put into practice the environmental problems of Amazonia would be solved.

With the political opening therefore, both the political and the legal national settings were altered providing a different range of options for the tappers' struggle against the cattle ranchers. In addition, the government attitude towards the region underwent considerable change, in spite of the remaining presence of nationalistic speeches. It can be argued that the late 1980s saw a gradual process of shifting the national attitude in relation to the international interest in Amazonia from one of direct antagonism, represented by President Sarney, to one of co-operation, embodied by President Fernando Collor, whose mandate began in 1990. Nevertheless, new environmental policies had already begun during Sarney's presidency, and it was during his period in office that extractive reserves were introduced in the legislation as one of the tools of environmental policy[13].

In 1988, President Sarney set up IBAMA (Brazilian Institute for the Environment) responsible for formulating, co-ordinating, executing and enforcing the national policy for the environment. IBAMA is charged, for example, with verifying that illegal clearings and fires do not take place. This environmental agency, however, does not always have the necessary capacity to enforce environmental legislation. For example, after numerous threats, IBAMA officials in southern

13 For a review of the evolution of Brazil's environmental policy before the 1980s see Hall (1997b: 53-55).

Pará and Acre, had to request the protection of the federal police (Schmink and Wood, 1992). Upon the creation of extractive reserves in 1990, IBAMA was also given the responsibility of administering these institutions in co-operation with the reserves' inhabitants. In 1988, the President also established the National Environmental Fund (FNMA) with participation of Brazilian NGOs (Kolk, 1996:109) and on the following year he set up the programme 'Our Nature'. This programme, officially named 'Programme for the Defence the Ecosystem Complex of Legal Amazonia', was a response to the international pressure on Brazil on account of deforestation in Amazonia. According to Barbosa (1993) 'Our Nature' was a nationalistic effort to redefine the nature to be preserved as belonging to Brazilians and not to foreigners. Nevertheless, it was also a first attempt at designing a national environmental policy, in this sense a major step forward (Hall, 1997b).

Fernando Collor began his mandate with a number of environmental measures - considered by some to be more of a facade for international public opinion rather than a real interest in the matter. In a pre-election visit to Europe, Collor had noticed that important economic issues of foreign policy were conditioned by the international criticism of the Brazilian policy for the region (Hurrell, 1992). When he began his mandate he thus "turned Brazil's tropical forests into a political and economic tool to regain foreign capital. To protect Amazonia, the developed countries would have to share the costs of preservation" (Barbosa, 1993:125).

The first environmental initiative of President Collor was to create the Secretariat for the Environment directly connected to the President (SEMAM). SEMAM took the decision-making role of IBAMA, and the latter was transformed in the executive agency of the secretariat. To direct the secretariat Collor appointed an internationally renowned environmentalist, Jose Lutzenberger, who had given evidence at the US senate in the context of the MDB campaign. One of the first tasks that Lutzenberger undertook when nominated was to examine the proposals by international organisations to reduce the external debt with investments in the environmental area. (Peixoto, 1996). Later, SEMAM was to lead the negotiations on the Pilot Programme, and was the agency responsible for advancing the Extractive Reserve sub-project in the years before the Earth Summit. Collor also set up Operation Amazonia, aimed at stopping fires in Amazonia. Operation Amazonia included doing an inventory of the wood and metallurgy industries in the region, as well as of the agricultural and mineral projects done with government incentives. Fiscal incentives for new cattle ranching projects were stopped and the government established environmental agencies at the state level (Peixoto, 1996). In 1990, the President approved the National Programme for the Environment (PNMA) the objective of which was to strengthen IBAMA and the state environmental agencies (Kolk, 1996).

The changes reviewed above were largely influenced by international pressure on the country (Barbosa; 1993; Arnt, 1992; Peixoto, 1996). According to Hurrell, for instance, all other factors promoting change in Brazilian Amazonian policies "have been over-shadowed by the role of external pressure and by consequent changes in Brazil's calculations of the international costs and benefits of continuing with its previous Amazonian policies" (Hurrell, 1992:417). The costs that the campaign against deforestation was having in Brazil were not limited to the hindering of specific projects as seen in Section 4.1: the whole of Brazilian foreign policy was affected by the international campaign. According to the Ambassador Bernardo Pericas' closing statement at the seminar 'Amazonia: Facts, Problems and Solutions' in August 1989 at the University of São Paulo, the environmental issue was one of the main diplomatic problems of the country (Peixoto, 1996). As Collor observed in his pre-electoral visits, economic issues such as debt were being linked to the issue of Amazonian deforestation (Hurrell, 1992). The economic position of Brazil in the international arena - with a large foreign debt - and the fact that the country was having an internal economic crisis thus contributed to make Brazil vulnerable to international pressure (Kolk, 1996; Arnt, 1992).

International pressure on Brazil was also, in the opinion of several interviewees, one of the crucial factors that triggered a change in the government policies towards Amazonia. A government official who had previously worked for NGOs (G6) stated, for example, that:

> "The state is now more responsible in relation to Amazonia and I think that what contributed to that was external pressure, no doubt about that. There is no doubt that Amazonia is today ... the trump of the country in the international arena, a trump for the country's discourse. You can systematically see Brazilian presidents dealing with the environmental issues, when visiting abroad, etc., and they discuss Amazonia. Amazonia cannot be used with impunity because it is a political trump. It has value in international negotiations. In addition, there is now more technical knowledge about Amazonia"[14].

14 G6: "O poder público é muito mais responsável. E acho que até contribuiu para essa responsiblidade a pressão estrangeira, não tem dúvida. Assim como não tem dúvida como a Amazônia hoje em dia, ..., é o triunfo do país nos forums internacionais, é um triunfo inclusive para o discurso do país. Você vê sistematicamente presidentes brasileiros tratar da questão ambiental, quando fazem visitas, etc e tratam da Amazônia. Ela não pode ser usada impunemente porque ela é um triunfo político. Valor de negociação internacional . Além do mais você hoje tem também um pouco mais de conhecimento técnico sobre a Amazônia".

The global importance of Brazilian Amazonia thus contributed to change the 'external context' in several ways: first, as we saw in the previous section, by expanding the context from the national to the international sphere; second, by providing direct support in the form of alliances between international actors and local populations; third, by contributing to change the national setting. The new legal, institutional and political setting of Brazil described in this section, also provided, as will be demonstrated in Chapters IV and V, a new range of opportunities for the tappers' struggle against the cattle ranchers.

4.3 The Earth Summit

The growing interest in environmental matters observed during the 1980s reached a peak in June 1992, at the United Nations Conference on Environment and Development (UNCED) or the Earth Summit, in Rio de Janeiro. According to most analysts, the results of this conference, in terms of documents agreed upon, were not spectacular (Grubb et al, 1993; Johnson, 1993; Kolk, 1996). Nevertheless, the Earth Summit had an unparalleled role in temporarily bringing environmental issues, especially those of global importance such as deforestation, to the forefront of international political affairs. In the context of the present thesis, the importance of this conference may be pinned down to two issues. First, the anticipation of the conference induced Brazil and other countries to take a number of environmental measures, some of which brought direct benefits to the rubber tappers. Second, forest conservation and international co-operation on the matter was perhaps one of the most controversial issues at the Earth Summit, although it was generally agreed that the conservation of forests depended on local populations' sustainable use of their forested areas. Agreement on this particular issue can be considered as a positive development for commoners using forests, since it enhances their possibilities of obtaining external support should the need arise. The fact that support for local communities can to a certain extent circumvent disagreement on whether national governments or the 'international community' should have most rights over tropical forests may have contributed to the general agreement on the issue of local communities.

Offering to host UNCED had been one of the environmental initiatives of President Sarney. Hosting this conference would show an interest in the conservation of the global environment, which could help to reduce the international pressure on the country's destruction of its forests. In addition, it would increase the bargaining power of Brazil and improve the perception of rich countries concerning environmental problems in the developing world (Peixoto, 1996). Other countries also offered to host the conference, but in the end the Earth Summit took place in Rio, during the mandate of Fernando Collor. During the run up to UNCED, Collor established 10

environmental units, including five extractive reserves, and signed a programme of co-operation with the G7 countries to promote sustainable development in Amazonia, the Pilot Programme for the Protection of Brazilian Rainforests (Peixoto, 1996). This programme includes among other sub-projects one specifically aimed at supporting extractive reserves, and it was in the run up to the conference that the procedures for the implementation of his sup-project were most advanced (for more details see Section 4.4 and Chapter VI).

Amazonia was not a specific topic of discussion at the conference, a fact that, according to one interviewee, was probably due to the more co-operative attitude of the Brazilian government. "At the Earth Summit I didn't feel any pressure in relation to Amazonia; international NGOs would have been prepared to put pressure on Brazil, but that didn't happen because during the process the Brazilian government took a very reasonable position, so the lobby focused on the attitude of the US instead[15]"(G10). The position of the Brazilian government during the preparatory process to the Summit, and during the conference itself, was based on two points. The first was the acknowledgement that global environmental problems are important and that they must be dealt with mainly by the international community. This represented a more co-operative attitude than the one of the military and President Sarney in previous years, when environmental concerns with deforestation were mainly seen as disguised attempts at the internationalisation of the region. The second point, was that there is differentiated responsibility for the cause and correspondent solution to environmental problems, and so rich countries must bear a higher cost (Viola, 1993).

In relation to forests, Brazil's representatives rejected proposals for a global convention - as did all developing countries in general – and stressed the need for funds and technology to preserve its rainforests. In the Preparatory Committee meetings for the Conference (prepcoms) a number of North-based organisations had proposed a global convention on forests[16]. However, the South strongly opposed this proposal which they saw as interference with their sovereignty. The Brazilian Minister of the Environment stated that "Brazil saw no reason to sign such a convention unless the question of greenhouse gases was resolved. Moreover, unilateral measures to restrict forest exploitation, which would adversely affect the Brazilian economy, could not be accepted" (Kolk, 1996:156). Before the Conference took place the suggestion for a global convention was dropped but the contention between the North and the South regarding forests continued.

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15 G10: "Na Eco 92 não senti nenhuma pressão em relação a Amazônia, a energia das ONGs internacionais estaria preparada para pressionar o Brazil, mas isso no aconteceu porque durante o processo a posição do governo brazileiro era muito razoavel, então o lobby ficou muito mais encima da atitude americana".

16 There were nine proposals for a global forest instrument, either a protocol or a convention: from the IPCC; the independent review of the TFAP; the WRI; the European Council; the G7 declaration in Houston - the same one that proposed the PPB; the European Council; the scientific and technical plenary of the Second World Climate Conference as well as the NGOs present at the conference; and the IUCN, International Union for the Conservation of Nature and Natural Resources (Humphreys, 1996).

The North, in general, viewed tropical forests as the common concern of humankind and considered that the international community should have a say in the management of tropical forests. In this context, the North saw a convention on forests as a form of co-operation among various interested states, whereas for the South such a convention was seen as an attempt to exert supranational control (Kolk, 1996). The South linked the issue of forest conservation to the inequality existing between the two groups. Developing countries pointed to the historical responsibility of the industrial world in greenhouse emissions and how this was partly accountable for their level of development. They stressed their own need for development and the need for financial transfers from the richer countries if they had interest in the conservation of their forests. The Southern states also mentioned the fact that industrialised countries were still responsible for most greenhouse emissions, and they accused the North of putting more emphasis on tropical forests conservation rather than on the reduction of their own emissions of greenhouse gases. Furthermore, the South considered that the issue of tropical deforestation was related to the present structure of the economic system, the issue of debt and the role of these factors in promoting deforestation. Although the proposal for a convention on tropical forests had been dropped, the issue of sovereignty was nevertheless particularly strong, since the South would not agree "to be told what to do with their forests even if they were offered compensation by the North" (Sullivan, 1993:161). The South also disagreed with the proposal of the North for an agreement on tropical forests only and argued for the inclusion of all forests in the agreement.

In the end, participants at the Earth Summit signed the Authoritative Statement on Forest Principles, which is a non-binding document and includes all forests and not only tropical ones. The Statement, according to most analysts, represents the lowest common denominator between the objectives of the North and the demands of the South (Grubb et al, 1993; Johnson, 1993; Humphreys, 1996). For example, while the North did not obtain its desired global convention, the South did not obtain the financial commitments from the industrialised countries it had demanded. The global value of the forest is noted in the final document but not with the same strength that was originally intended by the proponents of a global convention. On the other hand, although the linkage between deforestation and the global economic system is mentioned, there is no acknowledgement in the document of developed countries' responsibility. The text recognises the need for international co-operation; however, there are no specific prescriptions for future collaboration on forest issues (Humphreys, 1996; Sullivan, 1993; Kolk, 1996; Johnston, 1993).

The Statement on Forest Principles represents the state of global consensus in relation to forests that existed at the time and although the document is non-binding, it can be used as a yardstick to

judge governments' policies towards forests. Concerning local populations or direct users of the forest, the Document states in the Preamble that forests are valuable for local populations. Later, there are references to the need to integrate local communities in the "development, implementation and planning of national forest policies" (Section 2d). Support for local communities should come from both national governments and the international community: "The problems that hinder efforts to attain the conservation and sustainable use of forest resources and that stem from the lack of alternative options available to local communities, in particular the urban poor and poor rural populations who are economically and socially dependent on forests and forests resources, should be addressed by Governments and the international community" (Section 9b). However, the role of the international community can be assumed to be subordinated to the states' "sovereign and inalienable right to utilise, manage and develop their forests in accordance with their development needs and level of socio-economic development..." previously stated in Section 2a, and, with different phrasings, in various other parts of the document (Johnson, 1993).

The Statement also acknowledges the importance of land tenure systems in both, the conservation of forests and the well being of local users. "Appropriate conditions should be promoted for these groups to enable them to have an economic stake in forest use, perform economic activities, and achieve and maintain cultural identity and social organisations, as well as adequate levels of livelihood and well-being, through, *inter alia*, those land tenure arrangements which serve as incentives for the sustainable management of forests" (Section 5a). Hence, the Forest Principles not only acknowledges the existence of difference property rights systems, but also indicates that there is general agreement between North and South on the need to support such systems if they contribute to the sustainable use of resources. These facts suggest that first, common property, which, as we saw in Chapter II, has often been associated with resource depletion, is now accepted as one of the many property rights systems that can promote the conservation of forests. Second, they suggest that both the North and the South agree that external agencies should not interfere with local users' organisational arrangements. The Forest Principles can thus be considered to be facilitative to co-owners of natural resources because it is a legal item which recognises the potential of their property rights institutions to ensure resource conservation.

Apart from the Forest Principles, there are also references to forests in Chapter 11 ('Combating Deforestation') of Agenda 21, another document agreed on in Rio whose aim is to set out a international programme of action for achieving sustainable development in the 21st Century (Johnson, 1993). The document lists four objectives and specifies the basis of action, objectives, activities and means of implementation relevant to each of them. Land tenure is mentioned as one

of the basis for actions in relation to Objective B, "Enhancing the protection, sustainable management and conservation of all forests, and the greening of degraded areas, through forest rehabilitation afforestation, reforestation and other rehabilitative means". In this item, it is stated that action for conserving and sustaining forest resources "should include the consideration of land use and tenure patterns and local needs ..." but there are no further references to the relationship of land tenure to sustainable forest use[17].

In spite of the poor results of the Earth Summit, especially in relation to forests, the Conference was a landmark in the process of international co-operation on environmental matters and triggered a number of environmental initiatives. However, once the conference was over, the environmental drive of the previous years slowed down. This was partly due to a certain fatigue among participants because resulting from the high expectations and the minimal results (Kolk, 1996). Among Brazilian interviewees, there was also a widespread feeling that once the conference was over interest in the environment from governments and general public alike had come to a near-standstill, as observed in Box 4.1 below.

Box 4.1 After the Earth Summit

G11(NGO): "there was a change in the negative sense. [Before the Earth Summit] there were high expectations, which ranged from [expecting the development of] local governments to more pragmatic expectation such as 'now we will have financial resources'. [There was a] considerable break up of expectations, things started to move very slowly"[18].

G12(NGO): "the period before the Earth Summit forced a discourse on conservation and biodiversity, especially in Amazonia, because it is such a big genetic reserve. ... Amazonia was an international concern until 1992, and then it fell into vacuum..."[19].

G26 (state government): "the issue of the environment lost priority after the Earth Summit. Even Amazonia, that was the hot topic in the late 1980s, lost priority after the Earth Summit"[20].

17 Apart the Statement on Forests and Agenda 21, three other documents were signed at Rio: the Rio Declaration on Environment and Development, a set of 27 principles that should govern the environment and development of the world and that reflects the "current consensus on values and priorities" in the two matters (Porras, 1993:21); the United Nations Framework Convention on Climate Change; and the Convention on Biological Diversity. The conservation of forests plays a role in all three documents, however, as the references to forests in these agreements were harmonised with the specific documents on forests, they are not be reviewed in this thesis.

18 G11: [Houve alguma mudança radical depois da Eco 92?] "Radical não. Houve mudança no sentido até um pouco pejorativo. Grandes expectativas, expectativas que variavam do governo local até expectativas mais pragmáticas do tipo agora vamos ter recursos. Quebra de expectativa muito grande, as coisas passaram a fluir num ritmo mais lento. Acomodação generalizada tanto dos movimentos ambientalistas, que perderam um pouco da sua bandeira já que a bandeira lhes foi substraída pelos próprios governos como dos governos nacionais, porque se sentiam como se... a nada, tinham cumprido o seu papel".

19 G12: "... o período que antecedeu à Rio 92 forçou um discurso de conservação de biodiversidade, e principalmente Amazônia por ser o enorme banco genético que é ... Nos anos que antecederam à Rio 92 muito papo de conservação de biodiversidade. Alem da retórica do governo, de embaixadores e tal, a legislação acompanhou, ... [Amazônia] uma preocupação internacional que prevaleceu até 1992, depois caiu no vacuo".

20 G26: "todo o tema do ambiente perdeu espaço depois da Eco92. A própria Amazônia que foi o grande tema no fim dos anos 80 perdeu espaço depois da Eco92".

Some events in Brazil also contributed to the loss of political leverage of Amazonia and environmental issues. Shortly after the Earth Summit, Brazil went through a political crisis that culminated in the impeachment of President Fernando Collor in September 1992. The recession the country went through during that period also contributed to diminish the newly developed concern with Amazonia (and to decrease deforestation in the region as well). At the international level the issue of Amazonian deforestation lost some of its salience given the prevalence of other issues such as the collapse of the Eastern/Socialist bloc. Nevertheless, according to some Brazilian observers, the Earth Summit represented a turning point concerning the attitude of the international community in relation to Amazonia: from the Summit onwards the region began to be seen more in the content of the concept of sustainable development than as a conservation shrine. "There was a radical change of international attitude after the Earth Summit, before there was the idea of Amazonia as a shrine, a world reserve, ... after the Earth Summit, ... association with sustainable development and change of attitude ...[21]"(G20).

This change of attitude concerning Amazonia is of particular importance for local populations who depend on forest resources. To a certain extent, the support that rubber tappers have been allocated in the context of the Pilot Programme is an indication that local populations depending on local resources are now perceived as requiring support, rather than as responsible for the destruction of the forest. Whilst this change of attitude was caused by factors largely beyond the control of local populations (although influenced by local struggles for sustainable management of natural resources), they influence what is politically, socially and institutionally feasible for local users of the forest.

4.4 The G7 - Pilot Programme to Conserve the Brazilian Rainforests

The G7 – Pilot Programme to Conserve the Brazilian Rainforests (PP-G7) was one of the most important initiatives which resulted from the developments in the national and international arenas reviewed in the previous pages. Moreover, it represents a change from the initially widespread idea that Brazil had an obligation to protect its forests, to the view which emerged in the late 1980s "that Brazil should probably be given funds on favourable conditions if the industrial countries attached so much importance to the conservation of Brazilian rainforests" (Kolk, 1996:146). Within this context, at the Summit of the G-7 countries in Houston in 1990, Germany suggested setting up a pilot programme to help Brazil conserve its rainforests (Hagemann, 1994; Kolk, 1996).

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21 G20: "Houve uma mudança na atitude internacional depois da Rio 92, antes havia muito a ideia da Amazônia como santuario, reserva mundial, o que é uma coisa que não pode ser sequer cogitada por nós. Depois da Eco92, com a associação de... desenvolvimento sustentavel"

The Brazilian government accepted the offer and set up, in October 1990, an inter-ministerial commission to draw up a proposal. There was however divergence within the government regarding the Pilot Programme. On one hand, a group led by the Secretariat for the Environment (SEMAM) supported the programme; on the other, the Foreign Ministry, Itamaraty, had reservation in relation to the project. Itamaraty feared that the programme could involve international interference in areas of national interest, such as occupation of forest land and road construction (Hagemann, 1994). Itamaraty and its allies in the government proposed that Brazil should compile a proposal made of projects already budgeted. SEMAM, on the contrary, argued that the government should present a proposal made of new projects and that the programme should favour groups in the Amazon that had never benefited before from development plans. This was, for instance, the case of the rubber tappers and other local populations such as the river dwellers (*ribeirinhos*); all of who had been ignored in the previous government policies for the country. In SEMAM's opinion, society could play an active role in the implementation of the programme: "Local communities were to be enabled to carry out their own projects, demonstrating to society the feasibility of sustainable development and encouraging a change of attitude towards deforestation" (Hagemann, 1994:71). Within this framework, support for extractive reserves was an element considered important by the Secretariat for the Environment.

Several factors helped to balance the dispute towards the acceptance of the Programme and to favour SEMAM's proposals (Hagemann, 1994; Kolk, 1996; Fatheuer, 1994). One was the anticipation of the Earth Summit. Co-operating with the industrialised countries in an initiative aimed at protecting the forest would give a positive image of the country, one of Collor's aims. Furthermore, the idea that the environmental cause would yield substantial international funds was already part of the new government's strategy, and the Pilot Programme seemed to exemplify such a situation. Given the political context of the early 1990s, the Environment Secretariat's views on the programme were favoured over those of Itmaraty and thus support for the rubber tappers, an issue that had also considerable support from the donors, was already part of the first version of the PP-G7.

The PP-G7 counted, almost from the beginning, on the participation of NGOs. The Brazilian government invited Brazilian NGOs to participate in the design of the Programme only in February 1991; however, since the G7 Summit in 1989, international NGOs, in particular Friends of the Earth (FoE), had been lobbying the participants in the summit. On the Brazilian side, Instituto de Estudos Amazônicos e Ambientais (IEA), one of the main rubber tappers' supporting NGOs, was in close contact with FoE and was familiarised with the Programme from an early stage (Hagemann, 1994).

Among Brazilian NGOs there were two positions in relation to the Pilot Programme. One group, namely the Brazilian Forum of NGOs strongly opposed the Programme on the grounds that there had not been sufficient public participation in its design. Forum (formed by over 700 member groups) made two criticisms of the PP-G7. First, the rationale and content of the approach had not been developed by Brazilian society but rather by the international community. Second, the programme took an ecological perspective of the Amazon region, instead of considering the social diversity of Amazonia. The other group of NGOs, although having reservations in relation to the programme similar to those voiced by Forum, decided to work together with the governmental parties in the reformulation and implementation of the PP-G7. In July 1991, this second group of NGOs (more than 200) constituted the Grupo de Trabalho Amazônico (GTA) to represent the non-governmental sector at the PP-G7 negotiations (Fatheuer, 1994; Hagemann, 1994).

In December 1991, after much drafting and re-drafting of the Programme, all participants agreed on a proposal. The objective of the programme was stated as being: "to maximise the environment benefits of Brazil's rainforest consistent with Brazil's development goals, through the implementation of a sustainable development approach that will contribute to a continuing reduction in the rate of deforestation" (WB/CEC/GoB, 1991:I). The specific objectives of the programme are: "i) to demonstrate the feasibility of harmonising economic and environmental objectives in tropical rainforests; ii) help preserve the huge genetic resources of the rainforest; iii) reduce the Amazon's contribution to global carbon emissions; and iv) provide another example of co-operation between developed and developing countries on global environmental issues" (WB/CEC, 1991:3)

The Pilot Programme's objective is thus embedded in the new concept of 'sustainable development', in the sense that it aims at conserving the environment through development, and at developing without destroying the natural resource base. However, the central purpose of the programme is the conservation of the global environment rather than development per se; the latter receives support only insofar as it contributes to the conservation of natural resources valuable for humankind. The objectives of the PP-G7 are to be achieved through four sub-programmes. Three are 'structural projects' aimed at improving environmental institutions at the national and regional level, and one is formed by 'demonstration projects' that should be proposed and implemented by both citizen's groups and governmental agencies (FoE/CTA, 1994).

Table 4.3 PP-G7 sub-programmes

Natural Resources Policy	Conservation and Natural Resources Management Units	Natural Resource Management	Demonstration Projects
Economic-ecological zoning	Parks and reserves	Recovery of degraded areas	Type A demonstration projects
Environmental monitoring and surveillance	National forests	Science and technology	
Environmental control and inspection	Extractive reserves	Centres of excellence	
Institutional strengthening of state environmental agencies	Indigenous reserves	Directed research	
Environmental education			

Source: FoE/CTA, 1994

Brazil's initial proposal involved financing of US $1.6 billion. The donors had not given explicit indications of how much funding would be available for the Pilot Programme but, according to Hagemann (1994), there were some indications as to how much Brazil could expect. For example, programmes with similar features but with regional or more specific objectives, e.g. National Programme for the Environment, PNMA or PMACI (the programme for mitigating the negative effects of the POLONOROESTE), had budgets of one or two hundred million US dollars; it could thus be anticipated that a programme for the whole of Amazonia and the Atlantic Rainforest financed by the G7 could expect a budget in the order of a billion dollars (Hagemann, 1994:92).

However, the agreement in 1991 was that the donors would provide external assistance of approximately US$ 250 million for the 3 year initial phase (Hagemann, 1994:118). Projects under preparation that were fully consistent with the PP-G7 could also be included, and so approximately only half of the funds consisted of new donations (Hagemann, 1994:116). Funding would take the form of grants, technical co-operation and highly concessional loans. In December 1991, the Rain Forest Trust Fund was set up - a core fund for multilateral contributions administered by the World Bank. In December, the multilateral contributions amounted to US$ 37.5 million, and when the Trust was established in March 1992, it had approximately US$60 million. According to Hagemann (1994:117) "Most commitments were relatively small, with minimal or no contributions to the multilateral fund and a larger share to already planned projects

and new bilateral funds. A significant portion of the latter funds was already earmarked for prepared or appraised projects".

Several factors have been put forward to explain the limited financial commitment of the donors when compared with initial expectations. First, several countries, especially Germany, Canada and the UK, stated that funds could only be allocated on a bilateral basis. Second, there were political differences among the several parties involved. Some countries fully supported the programme (Germany, Italy, Canada and the UK) whereas others had certain reservations (Japan and the US) and considered that the project lacked maturity (Hagemann, 1994:105-106). In addition, in 1991, the environmental issue was losing some of its momentum in face of the difficult situation in the Soviet Union and Eastern Europe, which required additional funds (Kolk, 1996).

Although by the end of 1991, the programme had been approved, only in 1994-1995 did it start to be implemented. As noted previously, this was partly due to the fact that interest in Amazonia decreased after the end of the Earth Summit (Hagemann, 1994). In this context, the interest of the G7 in the programme, according to some interviewees, declined as well. "In 1991, the G7 announced the great pilot programme in Houston, suggesting funds of the order of more than one billion dollars. Today [1995] the available funds are 50 million US dollars" (G11, ngo[22]). In Brazil there were also changes that contributed to the slow down of the Programme. In the months after the Earth Summit, President Collor had to resign and a new Secretary of State for the Environment was appointed. The new Secretary, Perri, a former diplomat, considered that the PP-G7 focused too much on Indians and Extractivists (such as the rubber tappers) and announced that neither of these two issues would be priorities for the new government (Hagemann, 1994:132).

There has been considerable debate on the Pilot Programme. First, concerning the overall approach of the programme, a seminar of NGOs (including both members of Forum and of GTA) that took place in 1992, re-stated the criticism made by Forum, that the PP-G7 sees Amazonia as nothing but forest and ignores the social complexity of the region (FASE/IBASE, 1993; Fatheuer, 1994). The PP-G7 supports for example the traditional populations of the region, such as Indians and rubber tappers, but it ignores the urban population (which represents over 50% of the inhabitants of the region), as well as migrants and colonists who arrived in the last 30 years. In

22 G11: "Em 1991 sinaliza o grande Programa Piloto na reunião de Houston e sinaliza quantias da ordem de um bilhão de dolares, hoje vai em 50 millhões disponíves. Os resultados são cada ano menores"

spite of this criticism, participants at the seminar as well as FoE[23] have often stressed that the Programme's support for traditional populations indicates that this is a different (and better) model of development than the one followed in the 1980s. Whereas in the 1970s and 1980s, the development model for Amazonia was based on mega-projects and opening of highways, this one focuses on forms of production that are more adequate to the ecological characteristics of the forest and that benefit a sector of the Amazonian population that undoubtedly needs support. "Outstanding differences between this document and the earlier 1988 Nossa Natureza (Our Nature) include acknowledgement of the adverse environmental, economic and social consequences of the traditional model of development and colonisation of the Amazon" (FoE, 1991:6).

Hall (1997a) also considers that the programme's support for Amazonia's traditional inhabitants, which were ignored in previous development programmes for the region, is one of the positive aspects of the PP-G7. "Its importance lies in the fact that the PP-G7 has been able to support a number of pre-existing institutions and initiatives" including, apart from extractive reserves and demarcation of indigenous lands, research institutions in Amazonia and state environmental monitoring as well as "encourage innovative action on a number of other fronts" (Hall, 1997a: 66). New initiatives promoted by the programme are, for example, aquatic resource's management, sustainable forestry initiatives in the private sector, rainforest conservation corridors, community-level projects and environmental education.

A second issue raised by critics of the PP-G7 is that this programme does not address the underlying causes of deforestation in the region. At the above mentioned seminar, for example, participants pointed out that the programme ignores the relationship between deforestation and the international economic system. This criticism has also been voiced by FoE, in its publication 'Mind the Gap', referring to the gap between the Programme's projects and the root causes of deforestation (FoE, 1991; FoE/CTA, 1994). The PP-G7 support for sustainable activities in the forest is undermined by the lack of articulation with other national policies for the region that indirectly can lead to more deforestation. One example of this situation concerns the government's insufficient support for natural rubber production, which according to the National Council of Rubber Tappers and FoE makes sustainable use of the forests by the rubber tappers difficult in the short to medium term. Thus on the one hand the PP-G7 supports the extractive reserves and on the other hand the government, through its rubber policy, undermines the success of this initiative (this issue will be seen in more detail in the next chapter).

23 FoE presents regular evaluations of the Programme in the series "Mind the Gap".

In the context of 'articulation of the programme with other policies for the region' mention is made of the role of land tenure situation in the Amazon in contributing to deforestation (FoE, 1991). According to Hall, the programme "may lead to the creation of 'islands of conservation' [but] the major stimuli to deforestation will not be tackled; namely, land concentration and social pressures in other areas of Brazil which encourage migration... The question of landlessness and of the urgent need for implementation of the largely ineffective 1985 land reform programme (Hall, 1990) is also ignored by the Pilot Programme" (Hall, 1993: 9).

The articulation of the programme with other economic policies for the region has been a recurrent criticism over the years but, on the other hand, the programme has had, according to Hall (1997a), a role in influencing other policies for the region: "the Pilot Programme has undoubtedly played a role in supporting the wider reformulation of environment policy for Amazonia so that it more effectively addresses the diverse needs of its population, an influence which is reflected in recent official policy documents" (Hall, 1997a:66). As will be shown in the next section, official policy documents for the region are indeed now different and the critics of the Pilot Programme also consider that the PP-G7 has promoted debate on the region (Fatheuer, 1994).

The fourth set of issues that have been discussed in relation to the programme concern practical issues that have affected the implementation of the programme. For example, because each project composing the overall programme is negotiated separately, and often in the context of bilateral aid mechanisms, those issues which are more attractive to the public in the industrialised countries may receive most of the funding (Batmanian, 1994). On the side of Brazil, the bureaucracy of the government has contributed to slow down the project implementation (Fatheuer, 1994), a criticism that has also been voiced in relation to the specific case of the extractive reserves, as will be seen in the next chapter. The participation of NGOs, although generally agreed to be one of the important positive aspects of the Pilot Programme, has also been limited by their insufficient technical capacity – an issue that the PP-G7 has not addressed (Fatheuer, 1994; FoE/GTA, 1994). Finally, a regular criticism has been the limited budget set aside for the PP-G7 (Fatheuer, 1994; Kolk; 1996; Hagemann, 1994).

Examining the debate on the PP-G7, it can be said that an overall assessment of the programme will be positive or negative depending on whether one says that the glass is half full or half empty. The Pilot Programme represents indeed a new approach for the region, and although it is not likely to stop deforestation in the region, it certainly does promote the sustainable use of the forest and gives support to the local users of the forest, such as the tappers. As one of the

objectives of this thesis is to examine the relationship between extractive reserves and factors derived from the 'external context', in Chapter VI the PP-G7 sub-project on extractive reserves will be described in more detail. After examining the property rights systems of the Extractive Reserve Chico Mendes in Chapter VII, the Programme will again be discussed in the final Chapter of the thesis.

4.5 Conclusion

As outlined in Chapter II, developments in the external context can trigger changes in the commoners' circumstances, changes to which the resource co-owners have to adapt to prevent the depletion of the CPR. The external setting in which resource users are embedded, such as the socio-political and economic context, the legal setting and the role of the state in relation to common property regimes and related issues, can be more or less facilitative in relation to common property regimes. This and the previous chapter have presented an overview of the tappers' external context from the 19th century to the early 1990s, focusing on the period between the 1970s, reviewed in Chapter III, and the 1980s, reviewed in this chapter. The next three chapters will examine the process of development and characteristics of extractive reserves but before doing so it may be useful to summarise the developments in the external context that have been reviewed.

In the 19th century the Amazon economy revolved around the extraction of rubber. From the end of the rubber boom in the 1920s until the 1960s, the region was virtually isolated from the rest of the country, land in Amazonia was not integrated in national markets and the state was, in Ostrom's (1990) terms, 'indifferent' in relation to common property regimes. The legal setting did not provide any recognition of common property rights. In the late 1960s a drastic change in the government policies for the region began. Highways were opened across the Amazon, migration to the region was encouraged and the state catalysed investment in ranching, mining and large-scale agriculture. These policies naturally attracted vast numbers of people to Amazonia. The rise in the demand for land, which was now part of the national land markets, combined with insecure property rights and the promotion of unsustainable activities, gave rise to a major conflict over rights and to high levels of deforestation. During the 1960s, 70s and early 1980s, the main actor in Amazonia was the national government, which "saw the region almost exclusively as an infinite resource pool which could be tapped at little or no social or environmental cost to serve a range of economic, strategic and political interests" (Hall, 1997b: 61).

Whereas in the 1970s, the role of international actors in relation to Amazonia was virtually limited to support for the Brazilian government policies for the region, in the 1980s international actors begin to be concerned with the ecological importance of Amazonia. International actors, NGOs in particular, begin to take an active role in promoting a different set of policies for Amazonia, and in this context they seek alliances with local populations. There is a change in the general international socio-political context. Environmental issues acquire prominence outside restricted circles of scientists and environmentalists, the global ecological importance of Amazonia becomes common knowledge and the 'forest people' become associated with the sustainable use of forests resources. These issues are discussed not only in the media but also at the intergovernmental level. The issue of deforestation in Amazonia, for example, is brought up in meetings between Collor and foreign heads of state, American senators travel to Amazonia and President Mitterrand outlines his view on the measures that may be necessary to implement to secure the conservation of globally important resources.

These changes in the socio-political context are translated into the international legal setting. At the Earth Summit, apart from the conventions on biodiversity and global climate change (where forests have a role) there is also a particular document on forests. The Forests Principles and Agenda 21, highlight the value of forests for populations who depend on them for their survival, their need for support from both national and international bodies, and the importance of their land tenure arrangements in the sustainable use of forests. By the end of the decade, there are indications that there is also a change (albeit not radical) in economic terms, as far as the Amazon is concerned. Loans for projects in the region must pay some consideration to the environmental impacts they had and industrialised countries begin to consider that they should supply financial resources to help in the conservation of the region. In this context, arises the proposal for the PP-G7, which provides specific support for local populations because they can contribute to the conservation of a globally important resource, the Amazon rainforest.

Several changes also occurred in the national socio-political context. With the end of the military government, local groups can more freely voice their demands, there is more participation in political decisions and environmental issues acquire a higher political profile. These changes are also reflected in the new 1988 Constitution, where environmental issues are given more priority than before. The government develops a new approach towards the environment and Amazonia. A number of new institutions are created with the specific aim of dealing with environmental issues and with the Amazon in particular, such as IBAMA, SEMAM, Operation Amazonia and Our Nature. The changes in the government approach to Amazonia are also related to economic issues. For example, the fact that some of the projects in Amazonia where partially financed by

the MDBs, that are mainly funded by the US, which made it possible for environmental organisations in that country to press for changes in the Brazilian government approach to Amazonia. The economic context was also relevant in the sense that it was an important factor which enhanced the capacity of international actors to influence the Brazilian government policies for the Amazon, was that Brazil needed international loans and to discuss debt issues with foreign governments.

Within the overall trend of the decade of more interest with the conservation of the Amazon rainforest, there are also developments that provoked fluctuations in the political profile of local populations in the region. For example, the anticipation of the Earth Summit served as a catalyst for environmental initiatives, both by the Brazilian government and by industrialised countries' governments. With the end of the Summit, the interest in environmental issues and by extensions in support for the tappers diminishes. The change of government with the impeachment of Collor shifts the balance of power between different government agencies and this in turn changes the interest of the government in supporting rubber tappers. The recession that Brazil was going through shortly after the Earth Summit, was also a factor arising from the economic setting which influenced the priority given by the government to support for environmental projects.

The theory on common property regimes suggests that the external context of the rubber tappers evolved from a virtually 'indifferent' setting to a hostile context and, by the early 1990s, there were indications that their external setting was becoming facilitative. The subsequent three chapters explore how these changes in the external context interacted with internal factors (e.g. tappers' regimes) and influenced the development of extractive reserves, their current legal setting and the use of resources in the Chico Mendes Reserve.

Chapter V

The Rubber Tappers and the Development of Extractive Reserves

Introduction

As outlined earlier, the objective of this thesis is to examine the development of extractive reserves and the characteristics of one such institution taking into consideration internal factors and factors arising from the external context, which was reviewed in the previous two chapters. This and the subsequent two chapters undertake the task of examining the reserves and in doing so represent the original contribution of the thesis. Although there is substantial literature on extractive reserves, this thesis is the first attempt at an in-depth examination of these institutions using the theory on common property regimes as an analytical framework. The research conducted contributes also to the literature on common property because it provides a detailed examination of how one of these institutions was affected by the interaction of internal and external factors, an issue that has not been sufficiently addressed in previous studies. The aim of the present chapter is thus to examine the development of extractive reserves, i.e. the process that led to the establishment of the reserves in 1990. The next two chapters focus on the current characteristics of one extractive reserve.

The theoretical framework outlined in Chapter II suggests that a CPR can be jointly and sustainably used if the resource is not scarce – in which case an open access system will not threaten the conservation of the CPR – or if the co-users develop a robust common property regime. For resource users to develop a regime they must first perceive the need for it and the CPR must have the potential to be managed in a common property regime. If resource users are highly dependent on the CPR for their survival, form a small and homogenous group, have a sound knowledge of the CPR and the state leaves them sufficient autonomy to manage their resources, the potential for a regime to develop is higher than if these conditions are not met. The external context can also influence the development of these regimes by triggering changes in the circumstances and influencing the capacity of resource users to deal with such changes. Attention should thus be paid to the presence of external facilitative actors, government policies and, in more general terms, to the socio-political, institutional and legal setting in which the resource and resource users are embedded. Taking these factors as a starting point of analysis, the following pages identify the determining internal and external factors in the process of development of extractive reserves, analyse the interaction of the tappers with developments in the external context and examine how this process shaped the characteristics of the tappers' institutions.

The chapter is structured in four sections. The first examines the joint use of the forests by the tappers and the factors that led to the development of their common property regime. The second analyses the impact that changes in circumstances, largely provoked by the government policies reviewed in Chapter III, had on the rubber tappers and how they reacted to these changes. The third section examines the National Meeting of Rubber Tappers in 1985. This meeting was a milestone in the process of development of extractive reserves and it provides a clear illustration of the different ways in which the external context can be important in the development of a common property regime. The fourth section reviews the rubber tappers' struggle from 1985 until the establishment of extractive reserves in the Brazilian legislation in 1990, a period during which the influence of the international context was particularly important. The bulk of the analysis presented in this chapter is based on bibliographic material; this has been in some instances supplemented by information gathered through the interviews with forest dwellers and key informants[1].

5.1 Historical background

Private rubber estates

In reviewing the historical background of the rubber tappers, this section highlights several factors that created the conditions for the development of their common property regime. The rubber tapper population was mainly formed at the end of the 19th century, during the rubber boom, when workers from all over Brazil, especially the Northeast, migrated to Amazonia to work in the collection of wild rubber (*Hevea Brasiliensis*). The discovery of vulcanisation - a process that makes rubber's elastic properties permanent - and the growth of industrialisation had made world demand for rubber increase. Amazonia had the virtual monopoly supply of rubber and the socio-economic structure of the region became centred on the rubber trade. Given the shortage of labour in Amazonia, rubber traders promoted the migration of people from other regions to work as tappers on the *seringais* or rubber estates (Chaves, 1990).

Rubber estates may be defined as common pool resources. They are large areas of tropical forest – between 130 and 700 sq. km – with a high concentration of rubber trees (Weinstein, 1983), which can be jointly used by several individuals, as long as the activities practiced do not require the removal of the forest cover, as is the case with rubber tapping. Resource users must not exceed the maximum sustainable yield of the trees, which in the case of rubber trees will dry them

[1] See Methodology section in Introduction of the Thesis.

up and thus they need a 'rest' period. The rubber tappers' work has not changed since the time of the rubber boom: the tapper walks along the rubber trails (*estradas de seringa*) making cuts in the trees; he[2] then puts a small pot underneath the cuts and later collects the latex accumulated. Each tapper has a rubber stand (*colocação*), which is the basic unit of production of rubber tapping and is formed by an average of two or three rubber trails some of them lying fallow; the allotment designated for agriculture; areas for fishing, hunting and gathering; the tapper's house and the site for the processing of rubber. The rubber tappers' holdings are on average 5.5 sq. km (Allegretti, 1989) and their shape is determined by the rubber trails. The trails of one *colocação* are generally intertwined with the trails of other rubber stands, thus the latter are better defined according to the trails, rather than to the land area they occupy. Because of the ecological interdependency of the forest (see Chapter III), the intertwining of the rubber trails and the distribution of water and other resources on the estate, the resource is not easily divisible and thus individual exclusion is difficult.

During the rubber boom, the rubber estates were privately owned by the rubber barons (*seringalistas*). Large *seringalistas* tended to delegate the management of the estate on a patron (*patrão*) and spent most of their time Manaus, but other barons lived most of the year on their estates, where they had a house, a warehouse and other dependencies. *Seringalistas* and patrons controlled the tappers' individual use of the resource through a debt-peonage system known as *aviamento*. Under *aviamento* there were no monetary transactions: the rubber tapper had credit to buy food and industrialised goods from the owner of the rubber estate, on security of the rubber extracted at the end of the harvest. The tapper could sell the rubber only to the patron who paid much less than the market price, and often discounted rent for the use of the land. Rubber tappers were generally indebted to the patrons and they could be arrested if they left the estate without paying off their debts. When the price of rubber was high, tappers were not allowed to practice any other activity for subsistence, and they were compelled to buy all agricultural goods from the patron. The *aviamento* system was also supported by threats of violence, besides personal ties between the patron and the tappers, e.g. the former was often the godfather of the rubber tappers' children (Hecht and Cockburn, 1989; de Paula, 1991; Allegretti, 1989). The patron provided the necessary common services, such as clearing of forest paths, and in case of illness it was the patron or his wife that the tappers would resort to.

According to de Almeida and Menezes (1994) the patrons were not interested in the management of the forest resources, although there were certain regulations concerning the use of rubber trees

[2] Although some women also tap rubber, this activity is primarily performed by the male members of the household. See Campbell (1997) for an account of women's role on the rubber estates.

– as several tappers interviewed confirmed. These rules involved for example, stipulations concerning the amount of rubber that could be taken and the fallow period for the rubber trees, and they were enforced by the patrons' employees. However, when the price of rubber was high, patrons sometimes encouraged the tappers to extract latex above the maximum sustainable yield, which resulted in the drying up of the rubber trees. The criticisms made to private property in Chapter II could thus be observed in the context of the rubber estates. If the price of rubber was high, the most efficient solution for a *seringalista* was sometimes to deplete his estate because the costs of overusing the rubber trees were lower than the benefits of selling large quantities of latex at a very good price. Hence, the reason why forests were conserved during the rubber boom was not the fact that the rubber estates were privately owned and thus the barons carried most of the benefits and costs of overusing the CPR. The main explanatory factors for the conservation of Amazon forests during this period were, first, that the most profitable economic activity, rubber collection, did not require the removal of the forest cover. Second, given the abundance of available land, when the price of rubber was high a rubber baron could choose between encouraging tappers to extract too much latex from the trees on his estate or attract workers to tap rubber in areas outside his estate and which were not owned by other *seringalistas*[3].

From large private estates to common property regimes

The development of common property arrangements on the rubber estates was a gradual process that resulted from alterations in the local context of the tappers, which was in turn the outcome of changes taking place in other regions of the world. Although these changes had an impact on Amazonia as a whole, and by extension affected all rubber estates in the region, common property arrangements did not develop everywhere. In more remote areas, *aviamento* still exists (Schwartzman, 1990; Allegretti, 1989), and whereas in the western past of the state of Acre, rubber estates were privately owned until the mid-1980s (Feitosa, 1995) in the east part of Acre informal common property arrangements had already been established by the 1960s-70s. The remainder of this section focuses on the combination of factors that led to the development of common property arrangements in the east of Acre, in particular in the Acre River Valley where the Extractive Reserve Chico Mendes was later established.

The process that led to the development of common property arrangements on the rubber estates began with the end of the rubber boom in the 1920s, when rubber plantations were developed in Southeast Asia, ending the Amazon region's virtual monopoly. Rubber plantations - more profitable than collection of wild rubber - were tried in Amazonia but with no success. A plant

[3] In some cases, the lands occupied by the seringalistas and tappers belonged to Indian tribes.

fungus, *Microcyclus ulei*, attacks rubber trees in their natural habitat. Wild rubber trees are scattered among other trees in the forest, therefore the pest cannot destroy a whole Hevea population as it can do on a plantation where the trees are side by side (Dean, 1987; Hecht and Cockburn, 1989)[4]. The rubber trade regained some importance during World War II. The Asian supplies of rubber had been blocked by the Japanese and the US made an agreement with the Brazilian government, 'The Washington Treaty', to reactivate rubber production in Amazonia. As part of this treaty, workers from other regions of the country were once again encouraged to go to the Amazon forests to work now for the war effort as 'rubber soldiers' (*soldados da borracha*). With the end of the war, however, the Amazonian rubber trade plunged again.

One of the impacts that the rubber commerce crises had on the tappers was that it increased their autonomy. The collapse of the Amazonian rubber trade led many rubber barons to abandon their estates or to relax the strong labour control of aviamento that had existed during the rubber boom (de Paula, 1991; Weinstein, 1983; Duarte, 1986). Many tappers also deserted the areas, but those who remained in the forest could now develop their own property rights arrangements because they either had been left to their own devices or had more autonomy from the patrons. The patrons were having difficulties with the provision of goods, so they allowed and encouraged rubber tappers to practice other activities for subsistence. In addition, the tappers could no longer rely exclusively on the marketing of rubber for meeting their needs, and subsistence agriculture as well as collection of forest fruits was a way to supplement their income. The diversification of activities also contributed to increase the tappers' autonomy, because it helped them to break their dependency on the patrons' provision of goods and now they were responsible for the overall management of the stands, and not just for extracting a certain amount of rubber. As patrons had less power over them, the rubber tappers started commercialising with middlemen, which further diminished the *aviamento* ties. "Those changes in the social relation of power in the rubber estates, in the period 1920 to 1940... had a considerable historical significance for the rubber tappers, ... diminishing their dependence on rubber, and increasing social ties among themselves, as well as establishing personal and commercial bonds with other social agents such as the itinerant traders"[5] (de Paula, 1991:32).

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[4] The issue of developing plantations in Amazonia has been researched by Dean (1987), as well as by other scholars such as Weinstein (1983). Although the main reason for the lack of plantations in the Amazon is the plant disease, other social and economic factors also played a role, e.g. the investment necessary for establishing plantations was large and it would thus take a considerably longer time to bring profit from a plantation than through collection of wild rubber (Weinstein, 1983:32).

[5] "Essas modificações nas relações sociais de dominação no interior dos seringais, no periodo de 1920 a 1940, ... tiveram um grande significado histórico para os seringueiros, constituindo-se em um dos pilares para conquistas produtivas reduzindo com isso sua dependência em relação à borracha, como também o estreitamento de laços de sociabilidade entre si e o estabelecimento de vínculos pessoais e comerciais com outros agentes sociais ..." (de Paula, 1991:32)

During World War II, the *aviamento* system returned, but "in spite of all the rigidity of the system of domination of the rubber estates, it was not the same domination as at the time of the rubber boom"[6] (de Paula, 1991:40). Labour relations between patrons and rubber tappers were now officially regulated by a standard contract (*contrato padrão*) established through the Rubber Credit Bank, an institution created by the government for, as the name indicates, providing credit for rubber extraction. Under this contract the rubber tapper was an *arrendatário*, he rented land from the patrons, and had the right to sell 60% of his collected *hevea* at a price equivalent to the price of rubber in Belém and Manaus. Additionally, the tappers had under the standard contract the right to one hectare of land for agriculture, and were allowed to fish and hunt for commercial purposes (de Paula 1991; Hecht and Cockburn, 1989). It cannot be stated with certainty to what extent the new labour relations actually followed the contracts. There is a shortage of documentation regarding the life of rubber tappers during this period but, nevertheless, some scholars (de Paula, 1991) have presented evidence of a number of conflicts between tappers and patrons that indicates that when the contract rules were not followed, tappers reacted against the patrons. Although this can be considered as a further indication that the tappers were now considerably more autonomous than at the time of the rubber boom, there is no evidence suggesting that their conflicts against the patrons were part of a collective action initiative.

With the end of World War II, as more *seringalistas* and tappers abandoned the rubber estates, *aviamento* ties got even looser. Rubber tappers could no longer be imprisoned because of debts and, in the 1950s the introduction of radio on the rubber estates broke, or at least diminished, the traditional isolation of the tappers. Through the radio, the tappers could be informed of the rubber prices outside the estate, and so patrons and traders could not mislead them as easily as before (de Paula, 1991). Most conflicts between rubber tappers and *seringalistas* during this period were because of the price of rubber (Allegretti, 1979), and there are records of rubber tappers having positive financial balance with the patrons, thus being in credit rather than indebted to the patrons at the end of the harvest. These changes in the rubber estate context led to the development in the 1960s-70s of the 'autonomous rubber tapper'. 'Autonomous rubber tapper' is the term used to define the extractivist who does not depend on the patron and who is free to sell his product to other social agents, as well as to practice complementary activities such as collection of Brazil nuts (*Bertholletia excelsa*) and subsistence agriculture (Allegretti, 1989).

[6] "Entretanto apesar de todo esse aparato e da permanencia da rigidez do sistema de dominação nos seringais, não se conseguiu reeditar nesse período o mesmo sistema de dominação da época do primeiro ciclo da borracha. ... Quanto às relações de dominação nos seringais, os dados recolhidos nos sugerem que, apesar da emergencia de conflitos localizados, as formas concensuais de dominação teriam-se ampliado a partir dos anos 40" (de Paula, 1991:40).

By the 1960s-1970, especially in the Acre River Valley, there were large numbers of autonomous rubber tappers who used the forest resources in the context of common property regimes. Their CPRs were either rubber estates or parts of large estates, which they jointly used under little or no control from a central agency. They used the resource according to a set of individual and common rights; the extraction of rubber was conducted on their own 'private' rubber stands while rivers and forest paths were used by all. Tappers respected the previously established rules concerning the use of rubber trees and did not interfere with each other's rubber trails, thus respecting the internal boundary rules of the estate. Common areas were used in a system that is better defined as 'restricted access' rather than common property, as only owners could use these areas, but there were no regulations to harmonise the owners' use of the common areas.

Overall, two internal factors appear critical in the development of common property regimes on the rubber estates: the CPR character of the rubber estates, which rendered the division of the forest in private plots difficult, and the existence of a plant fungus, which was the main reason why rubber plantations in the region were not successful. If rubber plantations had been developed the barons would not have abandoned the estates and left the tappers to their own devices. External factors also played a role, mainly because the economic activity of the tappers has always been related to external markets. Although the tappers lived in considerable isolation they were not self-sufficient communities with no links with the external world. The rubber trade crises, which originated in the external context (the international market for rubber), were crucial to the rubber tappers because through a chain of events they increased their autonomy to manage the forest resources. World War II, on the other hand, by renewing the interest of the barons in the rubber trade temporarily hindered the tappers' autonomy to manage their resources. However, the government policies at the time, by establishing that tappers were no longer debt-slaves of the barons but rented their stands from them, appear to have secured a certain level of autonomy to the tappers. At least, more autonomy than they had during the *aviamento* system. Finally, increased access to information, mainly because of the introduction of the radio, but also because tappers now socialised more among them and with other social agents were also important factors in the tappers' transition from debt-slaves to commoners.

The tappers' common property regime in the 1970s, however, did not meet many of the features of a robust regime. For example, as several interviewees commented, they did not have monitoring devices to secure compliance with the rules, and their common rights to the abandoned rubber estates were not legally recognised. Some extractivists, in particular Chico Mendes, the rubber tappers' leader who later became known on the world stage, were trying to organise their fellow tappers to set up co-operatives and break their dependency on the middlemen as well as to

establish schools on the rubber estates (Mendes, 1989; de Paula, 1991). However, there are no records of attempts to regulate the use of the CPR and no interviewee mentioned the existence of any such initiative. Neither are there indications that the tappers felt the need to regulate their own use of the forest. This can be explained by the fact that at the time the CPR was not scarce and thus there was no competition over resources which would require strict regulation regarding the use of the common pool.

5.2 Threat to the boundaries of the CPR

From the late 1960s to the late 1980s, a number of factors would create the motives and conditions for the tappers' weak common property regime to develop into a stronger one. The main factor that triggered the change in the tappers' institutions was the threat to the boundaries of their CPRs, which was triggered by developments in the national sphere, namely the government policies for Amazonia which were described in Chapter III. In relation to the tappers' common property regimes, the state at the time could be considered 'indifferent', in the sense that it did not attempt to take over the tappers' CPRs. However, by actively supporting other interests in the area and not providing legal back up for the tappers' rights, the state had a distinctly negative impact on the tappers' regimes and lives.

In the late 1960s, in the context of the government policies for 'developing' the Amazon region, a highway was opened linking the capital of Acre, Rio Branco, to Assis Brazil - the BR 317 highway (see Map 6.1, page 169). Access to the rubber estates along this track was considerably facilitated and this, initially, further contributed to increase the autonomy of tappers in the area. They had now easier access to markets and thus their dependency on middlemen was somewhat reduced. However, the increased autonomy of the tappers was soon overridden by other less positive developments. Before the road was opened, there were not specific mechanisms to secure that only the appointed users could access the rubber estate since the tappers had no indication that this should be necessary - hardly any outsiders ventured in the area. Although the boundaries of the estates were clear, they were not protected. Easier access to the rubber estates through the new road, and the new government policies, which encouraged rearing of cattle in Amazonia, changed this situation. The opening up of the BR 317 brought to the Acre River Valley investors from the south, especially cattle ranchers. Many rubber estates, especially the ones nearer to the new highway, were thus bought for ranching and speculative purposes.

The tappers living on these estates, like most peasants in Amazonia, were *posseiros*, untitled occupiers of their plots. Whilst they had usufruct rights to their lands, the rubber estates[7] were formally public lands *(terras devolutas)* or were owned by the former rubber barons. The rights of the latter were not clear. As we saw in Chapter III, the barons often did not have legal titles to their estates and when they did, the limits were not clearly defined in terms of sq. km or hectares, which was the measure used to define landed property in the newly developed land market. Given the imprecise definition of property rights, land owners often claimed to own areas of forest that were larger than their rubber estates, a strategy known as the 'enlargement of lands' (Basilio, 1992)[8]. In the specific case of Acre, the situation regarding land ownership was further complicated because land titles had been granted by four different entities: the government of Bolivia, at the time that Acre belonged to Bolivia[9]; the independent State of Acre; the state of Amazonas, before Acre was made a federal state; and finally INCRA, the federal land agency. Sometimes, land titles to the same area of forest had been granted by each of these four entities and therefore land titles in Acre amounted to more land than the area of the state (Basilio, 1992; ELI, 1994; Schmink, n.d.).

The rubber barons at the time were selling their estates cheaply because many of them had gone bankrupt. In addition to the already diminished world-wide demand for Amazonian rubber, government help to the rubber sector was drawing to an end. In 1966, the Rubber Credit Bank had collapsed and, in 1967, the state monopoly of rubber terminated. Apart from the federal incentives for buying land in the region, the state government of Acre also engaged in a massive campaign to attract southern investors (de Paula, 1991; Duarte, 1986). According to the Environmental Law Institute (1994:7), between 1970 and 1975 nearly 80% of the land of the state of Acre was sold to new private owners. By 1982, more than 100% of the state had been sold, with some municipalities (*municípios*) boasting that 160% or more of their land area had been claimed (Hecht and Cockburn, 1989)[10].

Some of the land sold were rubber estates abandoned by their owners during previous rubber crises, and inhabited by autonomous tappers (ELI, 1994). The new formal owners of the estates

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[7] In the strict sense, these areas were former rubber estates. However, in this thesis the term is used to refer to a geographical unit independently of its ownership situation since the term rubber estate or *seringal* is still the denomination the tappers give to their areas.

[8] "... o esticamento das terras, ou seja, a ocupação irregular de grandes extensões de terra a partir da area original do seringal adquirido" (Basilio, 1992:27).

[9] The state of Acre belonged first to Bolivia. Later, Bolivia signed a contract with the Bolivian Syndicate – consortium with its headquarters in New York constituted by English and American capital – by which it rented Acre to the Syndicate. In 1902, Plácido de Castro promulgated the Independent State of Acre and finally, in 1903, Acre was annexed to Brazil.

[10] The valorisation of land in Acre from 1970 up to 1977 was of approximately 2000% (Duarte, 1986:102).

did not want extractivists[11] living in their newly acquired lands. The tappers' presence interfered with pasture creation. One of the defining features of CPRs is that they can be used in common; however, this depends on the type of use of the resource. Whilst the rubber estates can be jointly used for extractivism, joint use is no longer possible for rubber tapping and rearing of cattle: whereas the former requires the standing forest, the first requirement for practising the latter is the removal of the forest. There were cases when the ranchers allowed extractivists to stay in some areas of their ranches (*fazendas*); there was still sufficient abundance of land for ranchers and extractivists not to interfere with each other. However, as mentioned in Chapter III, the presence of extractivists interfered with the market value of land. Land with *posseiros* was known to carry problems with it: either the new owner had to pay compensation for usufruct rights or expel the occupiers. The general policy of the new owners was thus to expel rubber tappers from their lands.

Initially, rubber tappers did not resist eviction from their CPRs through institutionalised co-operation or 'collective action'. Many tappers abandoned the rubber estates to the new owners, and those who resisted eviction from their individual rubber stand did it in isolation and not as part of a group. For instance, when the employees of the new landowner arrived in a *colocação* telling the tappers to leave, they would refuse to do so. When rubber tappers did not leave peacefully the new owners used various devices to convince them: they obstructed roads and forest paths, destroyed cultivation fields, and expelled the families with the help of gunmen (*pistoleiros*) (Duarte, 1986). The expulsion of rubber tappers was, following the general pattern in the region, extremely violent (Hecht and Cockburn, 1989; Schwartzman, 1992). Many rubber tappers left for rubber estates in Bolivia, or migrated to nearby cities. The capital of the state of Acre, Rio Branco, doubled in size between 1970 and 1980. But the cities did not have the necessary infrastructure to cope with such an increase in population. Furthermore, rubber tappers did not have the skills to find work outside the forest and so a number of them went back to the rubber estates, establishing themselves in areas that had not yet been occupied by the ranchers (Hecht and Cockburn, 1989; Duarte, 1986; ELI, 1994).

Several factors can explain the lack of collective action in the first instance of the cattle ranchers' invasion of the rubber estates. As mentioned earlier, the rubber tappers' common property regime was rather weak. It had not been designed with the specific purpose of protecting their common resources from their own overuse nor from outsiders. Although tappers used the estate in common, they lived in relative isolation from each other (in average, there is one hour walk

[11] The term 'Extractivist' refers to those people whose activity is extractivism, collection of non-timber forest products. In this thesis, the term is used as a substitute for 'rubber tapper' that is in fact one category of extractivists only.

between rubber stands) and saw themselves as owners of their stands rather than of a common resource. There were no mechanisms specifically designed to protect the estate from the entrance of outsiders. Moreover, as the tappers had never owned their stands (they had either worked as employees for the patrons or had rented their stands during World War II), they were not always aware of their usufruct rights as *posseiros*. Although they were highly dependent on the resource and were rather homogenous, without information about their rights, little contact among the different members of the group and having to face agents who were considerably more powerful than them, the tappers' capacity to protect their resources was initially rather low.

5.3 The development of collective action

Several factors enabled the rubber tappers to engage in a collective movement to secure their permanence in their own stands and later to obtain the legalisation of their common rights to the forests. Two factors in particular appear as crucial: increased access to information and direct help from external agents. The tappers who had lived in the cities, when back on the rubber estates, were now more conscious of their lack of livelihood alternatives outside the rubber estates and this in turn reinforced the rubber tappers' awareness of how dependent they were on the forest resources for survival. Direct help from external agents also played a crucial role in facilitating information and in encouraging the tappers to organise themselves and develop forms of collective action to manage their common resources, improve their marketing of rubber and later resist eviction from their lands. Three groups of external actors can be identified: members of the Catholic Church, the Unions and independent policy-makers.

In the early 1970s, under the 'liberation theology'[12], priests and nuns from various orders organised literacy courses on the rubber estates and set up grassroots communities promoting religious teaching and social action (Mendes, 1989). These communities, as will be seen in Chapter VII, formed the basis for community development on the rubber estates. Most leaders of the rubber tappers' movement were formed in these Christian base assemblies, where they learned reading and writing as well as the rudiments of community organisation. The Church also denounced the violence that the ranchers were using against the rubber tappers, and informed the latter of their legal rights regarding their *colocações* (de Paula, 1991; Duarte, 1986). Knowing that they had legal rights to their stands bolstered the tappers' resistance. Whilst information on their legal rights did not help concerning forceful eviction by gunmen, it made it more difficult for the ranchers to lure the tappers into leaving their stands by telling them that they had no right to

[12] A dissident strand within the Catholic Church that supports economic and political change in developing countries.

be there because they did not own the land. In the same way that the introduction of the radio to the estates some years before had helped to alter the tappers' options concerning the patrons, information on their legal rights contributed to change their approach to the cattle ranchers.

In the second half of the 1970s, CONTAG, National Confederation of Agricultural Workers[13] established rural workers' unions in Acre. The first union was established in Brasileia (see Map 6.2, page 169) in 1975 and two years later Chico Mendes helped to set up another one in Xapuri. The unions provided the organisational know-how for the rubber tappers, especially for those like Chico Mendes who, already before the arrival of the cattle ranchers, were trying to get the tappers together to improve their social conditions (Mendes, 1989). The most important initiative in this field was Projeto Seringueiro (the Rubber Tapper Project), which began in 1980. The purpose of this project was to encourage tappers to set up co-operatives and its cardinal component was a literacy programme designed by CEDI, Ecumenical and Documentation Information Centre based on the teachings of Paulo Freire about empowerment through education[14]. Apart from the Church and the Xapuri Union, the project counted with substantial co-operation from individual policy-makers, in particular anthropologist Mary Allegretti, who was later to set up a NGO, Instituto de Estudos Amazônicos (IEA), aimed at supporting the tappers (see later sections and Chapter VI).

Apart from articulating literacy programs and encouraging the organisation of co-operatives, the establishment of unions was essential in leading the tappers' resistance against land eviction, including the staging of the *empates* or stand-offs (Mendes, 1989). "From that moment onwards, the union movement became the main expression of the rubber tappers' resistance" (de Paula, 1991:83)[15]. On the one hand the rural workers' unions provided the organisational structure behind the rubber tappers' movement against land eviction; on the other hand, the land issue was the motor behind the development of the rural workers' unions in Acre, whose members at the time were mostly rubber tappers. The unions can thus be only partially considered as external agents.

The staging of *empates* was one of the main strategies of the rubber tappers' resistance against eviction and the first instance of institutionalised co-operation or 'collective action' on the rubber estates. *Empates* are peaceful stand-offs of rubber tappers against the clearing of the forest.

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[13] Confederação Nacional dos Trabalhadores da Agricultura

[14] This project also counted on modest funding from international organisations such as OXFAM and Christian Aid and subsequently from the federal government through the National Foundation of the Ministry of Culture (Mendes, 1989).

[15] "A partir desse momento, a resistência dos seringueiros passará a ter como principal expressão as suas ações no movimento sindical." (de Paula, 1991:83).

Rubber tappers, sometimes with their wives and children, go to an area of the forest that is about to be cleared and confront the workers, not letting them cut down the trees. The *empate* is generally organised by members of the union, who when informed that a clearing is going to take place, and after having collected more details about the problem, convene a meeting with the tappers. Afterwards, union members and/or leaders of the rubber tappers' communities, go from hut to hut telling the families about the day and place of the *empate.* During the stand-off, that in some cases lasted up to 3 days, and involved 60 or more rubber tappers and their families, the leaders tried to reach an agreement with the person in charge of the clearing. If no agreement is reached, the lawyers of the union take the case to court.

The stand-offs are a good indication that tappers when confronted with a common problem co-operate. Free-riding in relation to stand-offs would mean not facing the risks involved in participating in an *empate* (participants in stand-off were sometimes taken to the police station and beaten up) but benefiting from the expulsion of the ranchers from the area. The high participation recorded and the effectiveness of these initiatives indicate that free-riding was not a considerable problem, otherwise participation would have been much lower. The organisation of *empates* was carried out by the union, which, although mainly formed by rubber tappers, were partly an external organisation, in the sense that they were not established by the tappers but by CONTAG with the support of the rubber tappers. To a certain extent, the unions' political background may have been responsible for proposing collective resistance, however this type of action fitted with the isolated resistance the tappers were already carrying out before the establishment of rural unions in Acre. Furthermore, CONTAG unions were initially conservative, welfare-distribution agencies which the tappers transformed into more radical organisations actively engaged in the fight for landed property rights (Hall, 1997b). The staging of *empates* thus represented an instance in which external actors provided support for the tappers and at the same time the tappers adapted this external support to their own needs.

Thanks to the *empates* and to the role of the unions' lawyers, rubber tappers began obtaining compensation for having to leave their stands. Compensation was for the improvements made to the land (*benfeitorias*), such as the house, the animals, and the vegetable plot. Initially, the tappers were receiving monetary compensation, but this soon proved to be not a good solution because there was not much they could do with the indemnity, apart from moving to a city, where, as shown above, they could not find work. Rubber tappers then started being compensated in plots of land, similar to those small farmers had - thus not delineated according to the rubber trails as the *colocações* were, and considerably smaller than the latter. After some time, many tappers sold their plots and moved away.

The little success of the agricultural plots was partly due to the fact that they did not have the necessary conditions for production - e.g. technical assistance, credit and transportation of goods - nor for commercialisation of the goods, namely the existence of roads for taking out the production, warehouses and minimum prices. An additional and important reason for the inadequacy of the INCRA settlements, however, was that they were based on the division of the area in private plots. Private property – often put forward as a solution for the management of CPRs - was in this case not adequate because of the indivisibility conditions of the CPR if used for extraction of forest products. The utilisation of the former rubber estates, as we saw earlier, was based on a combination of individual and common rights. Whilst the institutional boundaries between the two were clear to the tappers, in terms of space there was considerable overlapping between the two. For example, rubber trails of one stand crossed those of neighbouring stands, rivers that could be used by all cut across private stands. In the agricultural settlements this intertwining was not present and as the plots granted to the tappers were smaller than their former rubber stands, vital resources were sometimes left out, e.g. the water stream was the private property of the neighbour. Private property also presented problems because the tappers found adaptation to this new form of social organisation difficult. The cultural knowledge needed in the agricultural settlements was very different from what they had learned from living in the forest, from a work and social perspective (de Paula, 1991)[16].

The inadequacy of INCRA settlements contributed to the extractivists' realisation of the features of their property rights institution. Autonomous tappers used the forest resources individually: each tapper worked for his own rubber stand and there was no management of the CPR by the group of inhabitants. The rubber stands were to a considerable extent private property, in the sense that the family living in the stand carried most of the costs and benefits of using the stand. If the stand was cleared it could not be sold for tapping rubber and apart from tappers there were at the time no other potential buyers. Also, if too much rubber was taken from the trees, the stand would stop being productive and moving to a new area involved having to clear a new set of rubber trails. The problems involved in the agricultural settlements clearly showed that although the tappers worked individually, their use of the forest involved more than elements of private property. Given the indivisibility of the forest, the rubber tappers do not have rights to independent plots, they use in fact a common area and within this area each family has rights to their rubber trails. Forest paths and fruit trees, many of which are in what is the area formed by

[16] "Em primeiro lugar, ao sair dos seringais, esses trabalhadores, além de serem expropriados no plano material, objectivo - a perda das suas colocações - sofrem também uma expropriação subjectiva, que é a do seu saber, pois tudo o que haviam aprendido, através de experiências próprias ou herdadas de seus antepassados, para sobreviverem na floresta - tanto no dominio do trabalho até as relações sociais, culturais, etc, pouco ou quase nada lhes servia para enfrentar os desafios de uma forma de reprodução social tão diferente" (de Paula, 1991:129).

the various rubber trails of a stand, are also used by all. That is, each tapper (or each family) has individual rights to their rubber trails and plot for agriculture, but not for all the area of the stand. (When using the term 'rubber stand', the thesis refers to the rights of the tappers to their trails, agricultural plots and other 'private' resources).

The realisation that even with financial compensation they could not make a living in the forest, also helped the tappers to define the features of their institutions. In particular, it made clearer that the right to use the forest (usufruct rights) were more important than commercialising the stands. To what extent these factors were apparent to the tappers' leaders only or to all tappers is, however, not clear. According to Rueda (1995), in 1987 when extractive reserves were first implemented in the legislation, some tappers actually wanted to have individual land plots, influenced perhaps by the government's policy of encouraging private settlements in Amazonia. The observations in the Chico Mendes Reserve, however, indicate that the majority of the tappers do not consider the right to sell land as necessary, a matter that will be further examined in Chapter VII.

To summarise, the development of collective action was influenced by several factors, mainly the government policies for the region, such as opening of roads and incentives for investment in non-sustainable activities. However, it should be noted that the opening of a road did only represent a threat to the boundaries of the CPR. In the case of the tappers, by diminishing their isolation the opening of the road was initially a positive factor. Whereas many commoners are autonomous because they live in isolation, the isolation of the tappers was a hindering factor to their autonomy, because it made them more vulnerable to other agents, such as middlemen. The main impact of the road, however, was the arrival of external actors trying to occupy their lands. In this respect the case of the tapper is similar to that of many other commoners whose resources had been destroyed not as a result of a 'tragedy of the commons' but because of insecure rights to their lands. The legal setting also played a role. First, the existence of usufruct rights in the legislation provided the tappers with a legal means to secure their stands. On the other hand, the lack of well defined property rights and the fact that usufruct rights did not receive consistent support from the state (and police) was one of the reasons that led to the conflict over land and the destruction of at least part of the rubber estates. The help tappers receive from external actors and organisations was also crucial for their struggle for secure property rights. These actors, however, do not appear to have attempted to take control over the resources. They provided support against the ranchers, facilitated access to information and provided organisation training. Finally, as highlighted by Ostrom (1990) a very significant factor influencing the development of a more robust common property regime was knowledge of other alternatives (private plots and

monetary compensation), which helped the tappers to define how they would like to solve their problems.

5.4 The wider political setting

In 1985, the rural workers' unions from Xapuri decided to organise a national meeting of rubber tappers in Brasilia. In reviewing the reasons that led the unions to organise this event and the results of the meeting, this section attempts to show how the capacity of commoners to articulate their needs in the wider socio-political setting can be a determinant factor in the conservation of jointly used resources. The case of the tappers provides a good example of how commoners are not only affected by isolated external events, such as outsiders occupying the CPR or external agents providing help to the resource users. Commoners are also affected by wider trends in society and need to devise their strategies within developments in the external context which are not always directly related with issues of common property in the strict sense (e.g. recognition of common property regimes by the legal system). In order to do this, they need representation in the political arena as much as they need management systems for their resources.

Several factors triggered the organisation of the 1985 Meeting. First, the rural unions' realisation that collective action at the local level, namely the staging of *empates*, was not sufficient for solving the tappers' landed property rights situation. Independent of the characteristics of the tappers as a group and of the features of the resource, and in addition to the direct help from external agents, the establishment of a robust institution also required state support to secure the resource boundaries and facilitate the tappers' use of the CPR. Although the stand-offs were achieving some objectives, namely avoiding the expulsion of the tappers from their rubber stands, they were not providing a long standing solution (de Paula, 1991). The stand-offs could not continue indefinitely because they posed an enormous strain on the unions' financial resources and on the tappers themselves. In the summer of 1985, two major stand-offs had been organised, lasting approximately 2 weeks. During this time the union had had to support the participants, e.g. provision of meals for the tappers involved in the stand-offs. For the tappers, participating in *empates* meant losing workdays during the period of rubber collection, which later resulted in additional difficulties for paying their debts with the middlemen. Rubber tappers' leaders were also concerned that with the frequency of stand-offs, these would loose their impact and a national meeting of tappers from all over the region could increase the lobbying capacities of the movement (de Paula, 1991).

Second, the tappers were concerned that they did not have a well-defined proposal to meet their needs. According to Chico Mendes, a "moment arrived when we began to get worried, because

we had got a fight on our hands, the struggle to resist deforestation, but at the same time we didn't really have an alternative project of our own to put forward for the development of the forest. We didn't have strong enough arguments to justify why we wanted to defend the forest" (Mendes, 1989: 37). Through the unions and national organisations such as CONTAG, CUT and the Workers Party (PT) the tappers had found a channel for their resistance, but not a forum for addressing their specific demands which were different from those of other rural workers (de Paula, 1991). A national meeting of rubber tappers could provide an arena for discussing their specific problems and devising potential solutions for them.

The national socio-political setting in 1985 provided the third motive for organising the National Meeting because tappers could now voice their demands more freely than in the past and because there were several indications that the tapper population was 'ignored' in the wider political setting. With the end of military rule in 1985, as we saw in the previous chapter, several civil movements were organising to voice their demands but the rubber tappers' concerns did not fit into any of them. For example, in May the 4th National Congress of Rural Workers had taken place but although several rubber tappers attended this meeting, their specific demands had not been fully addressed in the final resolutions of the meeting. Also at this meeting, President Sarney had presented the National Plan for Land Reform, an issue which at the time was quite central in the political agenda of the country; the tappers' landed property right requirements, however, were not mentioned. Likewise, in the draft of the new state policies for Amazonia, put forward by the government in 1985, no reference was made to the rubber tapper population (de Paula, 1991; Revkin, 1990).

At the time, the existence of the rubber tappers was hardly known outside some restricted circles of Acrean intellectuals and activists. Rubber tappers thus arranged that their national meeting should take place in Brasilia. "Why Brasilia? Because it was the decision making centre of the country. Also, because for most of the authorities the Amazon region was just one big empty jungle. We wanted to show them that the Amazon was in fact inhabited – there were people living and working in the forest" (Mendes, 1989: 38). On the one hand, the tappers' initiative to organise a national meeting originated (in part) from the new possibilities offered by the altered national setting. In other words, the changes that had occurred in their external context made it possible for them to seek support at a national level, outside the local sphere where their struggle had so far developed. On the other hand, the objective of the meeting was to influence the external context in relation to them, to induce the government to recognise their existence.

Between 11th and 17th October 1985, the National Meeting of Rubber Tappers took place in Brasilia with the participation of 130 rubber tappers from several Amazonian states. Tappers had direct help from external agents to organise the meeting. They obtained the support of various organisations, such as CONTAG, the national association of unions, and the rural workers' unions of Xapuri, Brasileia and Assis Brasil. Through their contacts in the capital, namely anthropologist Mary Allegretti, the rubber tappers' Meeting also had the support of governmental agencies, such as the Pro-Memória Foundation, a branch of the Ministry of Culture, and of the University of Brasilia, that provided the place for the meeting. Funding also came from international NGOs working with developing countries and that had already provided support for the *Projeto Seringueiro*, in particular OXFAM. As one of the main objectives of the Meeting was to influence the state, state officials were invited and thus the Rubber Tappers' Meeting was attended by governors of Amazonian states, senators, deputies and government officials from the Ministries of Industry and Commerce, Education, Health, Agriculture, Agrarian Reform and Culture (Mendes, 1989). In addition, there were several observers from abroad, especially members of international environmental NGOs.

The National Meeting of Rubber Tappers was successful in at least four ways. First, it served to define a solution to the tappers' problems, the creation of 'extractive reserves'. Second, it was at this meeting that a national organisation for representing the tappers interests in the wider political setting was created, the National Council of Rubber Tappers (*Conselho Nacional de Seringueiros*, CNS). Third, the Meeting provided an opportunity for the tappers to articulate their specific demands within the national political context and to make alliances with other actors, namely Indian groups and international environmental organisations. Fourth, the National Meeting contributed to make the tappers' struggle more widely known in the national and, especially, in the international arena.

The central features of the proposal for extractive reserve were similar to the characteristics of the common property regime the tappers had before the arrival of the cattle ranchers. However, whereas that regime had not been designed by the tappers with the specific aim of securing the conservation of their forests, the explicit aim of the extractive reserves was to secure the conservation of the tappers' forests through an institutional arrangement devised by the tappers themselves. As mentioned earlier, tappers defined the features of their arrangement by comparing the different solutions that outsiders had proposed. Through this comparison they identified the features of their common property regime and the reasons why this regime was for them the best solution. The formulation of the extractive reserve proposal was a gradual process: the central features of the proposal were outlined in a number of meetings before and during the National

Meeting. At the National Congress of Rural Workers in May 1985, one of the propositions of the Acrean representative, a rubber tapper, was that the small plots allocated by INCRA did not work for the tappers; a special module of 3 to 5 sq. km should be considered for the extractivists (Allegretti, 1989). In the preparatory meetings for the National Meeting that took place in Rondônia, Acre and Amazonas there are also references to the basic characteristics of what would be later called extractive reserves. A rubber tapper from the union of Rondônia stated at the preparatory meeting that "it is not a matter of owning the land, but of having the forest where the rubber estates and the rubber stands are, that the forest be demarcated as a forest reserve, so that the tappers can continue their extractivist activities". A similar comment was recorded by Allegretti at the Xapuri preparatory meeting: "[it is necessary] to stop the clearing of the rubber estates. To expropriate taking into consideration the rubber stands".

The extractive reserve proposal was a demand for legal recognition and state support of a common property regime. The core features of the proposal are, first, that extractivists' rights to the lands they have traditionally inhabited should thus be recognised. That is, rather than allocating them land elsewhere, or providing financial compensation for the improvements they have made to the land, tappers should be allowed to remain in the areas where they have been living for generations. Second, their land tenure system should not be disrupted. That is, the state should recognise their common rights to the CPRs rather than grant private property rights to each rubber tapper family.

The landed property rights issue, however, was not the only topic addressed at the Meeting. Participants demanded a rubber pricing policy, which should include support for the production and commercialisation of wild rubber. They also highlighted the need for social improvements for the tapper population in the form of schools and health posts; and discussed the debt-slavery situation of tappers outside Acre as well as the situation of the former rubber soldiers who were not receiving their retirement pension. The model of development for Amazonia that had been followed during the last two decades was likewise discussed, in particular the fact that this model had ignored the existence of tappers and other populations in the region. What had started as a local movement for securing individual rights to rubber stands, had thus developed first into a struggle for recognition of what was a common property regime, and now into a set of demands which amounted to a requirement for sustainable development.

Sustainable development, as commented in Chapter IV, is a rather complex concept, which involves considerably more than the conservation of the natural resource or landed property rights issues. However, in the case of commoners, sustainable development requires the sustainable use

of the CPR. This in turn requires the development of robust institutions that provide the necessary mechanisms for preventing the depletion of the resource system, which is the only component of sustainable development this thesis examines. The tappers participating at the Meeting were fully aware that legal recognition of their landed property rights was essential for their livelihood, and that other development initiatives could only be carried out effectively once this issue had been dealt with. However, there were no references to any of the other requirements of a robust institution, for example, demands for provision of conflict resolution arenas or support for internal monitoring. To a certain extent the absence of this type of requirement may be attributed to the fact that they rather needed a different type of external support, e.g. in terms of development. Nevertheless, the absence of any references to these issues, as well as the tappers' history up to the Meeting, also suggests that the potential destruction of the resource by the tappers themselves (the 'tragedy of the commons' scenario) had so far not been an issue on the rubber estates.

The National Council of Rubber Tappers was created to defend the specific interests of the rubber tappers as a separate category from other rural workers. The entities that had until then voiced the tappers' demands were the rural workers' union but whilst in Acre their members were mainly rubber tappers this was not the case in other Amazonian states where most members were agricultural workers. The latter, as we saw earlier, did not always take into consideration the tappers' different needs. Moreover, the unions were not the most appropriate organisations for forging alliances with potential supporters within civil society, such as environmentalists groups (de Paula, 1991). At the national level, the tappers' specific requirements lacked political leverage because they represented a minority. Although there was a national organisation addressing the issue of rubber, the National Council of Rubber, this organisation catered only for the interests of the rubber estates' owners (*seringalistas*) and industrialists; a fact confirmed by the Council's refusal to receive a commission of rubber tappers to discuss their demands (Mendes, 1989; de Paula, 1991; Revkin, 1990).

The role of CNS was thus to represent the rubber tappers at the national level and as a specific category of workers. Its mandate included the promotion of health, education and co-operatives for the tappers; it also aimed at dealing with the different demands that each group of tappers had. For instance, whereas for tappers in Acre the main problem was the occupation of their lands by the cattle ranchers, the tappers of Rondônia were mainly concerned with the fact that the former rubber soldiers were not receiving their retirement pensions; in other areas, the crucial problem was that there were tappers working in debt-slavery (Revkin, 1990; de Paula, 1991). In

all situations, however, the need for the establishment of extractive reserves was felt and CNS became the main articulator of the proposal for the creation of such reserves.

The tappers' demands for extractive reserves were articulated in relation to three political issues that had high political leverage in the mid-1980s: land reform, Indian tribes' rights to their lands and environmental concerns. The rubber tappers' demands included issues of land reform, such as posseiros' rights to secure landed property rights. As their demands were different from those of other *posseiros*, since they requested recognition of common property rights, the extractive reserve proposal was presented as the 'land reform of the rubber tappers' (*a reforma agrária dos seringueiros*). However, the articulation of the extractive reserve proposal within the context of land reform presented an important shortcoming, namely that Brazilian legislation in the context of land reform did not include recognition for common property rights[17]. The closest concept to the rubber tappers demand was that of 'Indigenous Reserves', were the land is legally granted to the resident population in function of their historical use of it. This was the only case of granting common rights rather than allocation of private property plots (Allegretti, 1989; Revkin, 1990; Mendes, 1989). According to de Paula (1991:210) "the appearance of the extractive reserve proposal should be understood not only in the context of the tappers struggle but also because of the political importance that the fight of Indian tribes for their lands had acquired in the national context[18]" – which in turn was related to the international interest on Indian tribes, which was closely linked to the concern with the conservation of the Amazon rainforest.

Rubber tappers and indigenous tribes had traditionally been enemies. When in the late 19th century the future rubber tappers arrived in the Amazon forests, they often invaded Indian lands, and bloody encounters between the newly arrived tappers and the various Indian tribes were frequent. However, in the 1980s, both groups faced the same threats – clearing of their forests and expulsion from their lands – and shared the same view concerning landed property rights; rather than being colonists they wanted to hold the land in common (Mendes, 1992). In 1987 extractivists and Indians formed The Forest Peoples' Alliance. The demand for extractive reserves and indigenous reserves became part of the same struggle for a system of development of Amazonia that would include the traditional inhabitants of the region.

As the extractive reserve concept also included demands for the conservation of the forest, it was possible for the tappers to articulate their proposal with the environmental concerns that were

[17] For more details on the legal aspects of this issue, see section ,1 in Chapter V.
[18] "... o surgimento da proposta de criação de RE deve ser entendido não só no contexto da luta dos seringueiros mas também pela importância política que a luta dos índios pela demarcação das reservas indígenas havia assumido na conjuntura nacional" (de Paula, 1991:210).

gaining popularity in the national arena and, in particular, with the international campaign for the conservation of Amazonia. As we saw in the previous chapter, by 1985 the international campaign against deforestation in Amazonia was already under way: some months before the Tappers' Meeting took place, the environmental NGOs had succeeded in temporarily stopping World Bank funding for the Polonororeste. As the NGOs' strategy involved finding partners in the countries where the MDB funded projects were located, the tappers' Meeting signified an opportunity for them to find potential allies for their campaign. According to Revkin (1990), international environmentalists came to know of the rubber tappers through Allegretti and Gross. The latter were looking for potential donors for the Rubber Tappers' Meeting and for this they sought the help of their contacts among the US environmental NGOs. The rubber tappers' struggle and their demand for the conservation of their forests fitted with the NGOs' concerns with deforestation in Amazonia.

The alliance that was formed between the rubber tappers and the environmentalist movement was based on the similarity of some of their interests and the political strategies of both groups. On the side of the environmental movement, the tappers provided first a proof that the development policies for Amazonia they were attacking did not only cause environmental destruction – and issue often presented as a concern of the North – but they had also serious social repercussions for the local population. Second, the tappers' demands for the standing forest clearly indicated that the conservation of Amazonia was not merely a concern of foreigners, but that local populations also had environmental concerns. And thirdly, the concept of extractive reserves could be seen as an alternative model of development of the region, in the sense that it provided for the economic development of the tappers while at the same time being based on the conservation of the natural resource base. In other words, the extractive reserve proposal seemed to epitomise the concept of sustainable development that was to gain so much leverage with the publication of the Brundtland report two years later (see Chapter IV).

For the rubber tappers, the environmental NGOs represented powerful allies in their struggle for recognition and establishment of extractive reserves. One of the main demands of the tappers was the conservation of the forest, a concern which was shared by environmental organisations, albeit with different motives. Whereas for many environmental organisations the conservation of the forest was considered important because of the global ecological importance of Amazonia, the tappers were mainly preoccupied with the conservation of the forest because they did not have alternative sources of livelihoods. Thus for the rubber tappers, forest conservation was not a goal in itself; the conservation of the forest was necessary for them to practice their traditional economic activity, collection of rubber, and secure landed property rights was equally necessary.

The tappers' struggle had at least as many elements of land reform as of environmental concerns and, in fact, from the interviews with some members of the union, the issue of reserves appeared to be mainly one of land reform. A CNS publication on extractive reserves (CNS, n.d.) also referred to them as part of land reform. However, by highlighting their contribution to an issue that was important for society at large and with which public opinion (especially in the industrialised countries) appeared to be so concerned about, tappers could obtain more political leverage for their demands. Hence, the tappers' political strategy gradually came to focus on the importance of extractive reserves for the conservation of the Amazon rainforest.

The tappers' awareness that they needed to present their demands as important not just for them but also for society as a whole could also be observed in their initial attempt at basing their political strategy on the supposed importance of rubber for the economy. Many tappers at the Meeting descended from those who had travelled to Amazonia to be 'soldiers of rubber' and they still believed that their collection of rubber was of crucial importance for the country. Although the economic value of natural rubber had diminished considerably since the end of the war, they were strongly convinced that the importance of rubber for the national economy was their most important bargain point to obtain support from national entities. According to Allegretti (1989:21), "when several speakers [at the meeting] presented evidence of the economic decline of natural rubber many rubber tappers, who had left the rubber estates for the first time in their lives did not accept this[19]". The same attitude on the part of the rubber tappers is described by Revkin (1990), who states that tappers were urged by their advisors to switch their strategy away from rubber and towards their role as defenders of the environment.

Although the tappers' adapted their political strategy to the wider context and at the advice of external actors, this change of strategy did not involve substantial alterations on the rubber tappers' demands. The formal declaration of the National Meeting ends stating that "we rubber tappers demand to be recognised as producers of rubber and as the true defenders of the forest" (Platform of the CNS, 1985 in appendix E of Hecht and Cockburn, 1989). However, the manifesto also clearly states all their original proposals. Under the item 'Amazon reform' they list the following: "natural rubber stands should be expropriated; rubber stands occupied by rubber tappers should be demarcated by them conforming to their traditional rubber trails; land should not be divided in colonist lots; areas occupied by tappers should be placed in extractive reserves,

[19] "quando ... a falência do seringal nativo foi apresentado por diferentes expositores, muitos participantes, que pela primeira vez na vida haviam saido da mata recusaram-se a aceitar" (Allegretti, 1989:21).

secured for their use by tappers; the decisions of the 4th National Congress of Rural Workers should be respected which argues for a specific model of agrarian reform for Amazonia that guarantees a minimum of 300 ha and a maximum of 500 ha per rubber stand obeying the reality of extractivism in the region". In other words, the tappers positioned themselves as defenders of the forest but maintained their original demands regarding landed property rights.

The National Meeting represents a turning point in the tappers' struggle for recognition of their landed property rights. At the end of the meeting the tappers have defined a solution to their problems and have begun their campaign for the establishment of extractive reserves. Rubber tappers have also established alliances with other actors, in particular international environmental NGOs, whose help would prove crucial in triggering the establishment of extractive reserves. Moreover, from 1985 onwards, the tappers also have a representative organisation in the wider political setting, CNS, whose function is to articulate the tappers' demands within the government policies, the legal system and the external context in general. Finally, the tappers' event in Brasilia helped to make the tappers' struggle more widely known at the national and, especially, at the international level. According to Chico Mendes it was from the 1985 National Meeting onwards that "the rubber tappers' struggle began to get known all over the world" (Mendes, 1989:36). Several developments in the international arena enhanced the capacity of commoners to address the problems created by a change in their circumstances. By 1985, the most significant ones were the interest of international environmental NGOs in deforestation and their strategy of making alliances with people directly affected by the negative impacts of the MDBs projects.

The analysis of the National Meeting provides several indications of the importance of the national socio-political context for the tappers. First, political opening of the country provided the opportunity to organise a national meeting. Rubber tappers would have been unable to organise a national meeting to voice their demands had the political situation in the country not changed. Second, the creation of CNS suggests that the tappers considered the political context as crucial, since they needed a representative organisation not to manage their resources but to represent them in relation to other agents. Third, the different levels of political leverage of the various issues being discussed at the time made the tappers articulate their demands with one or another issue, the environmental issue being in the end the most powerful one. In examining the 1985 Meeting, some interesting observations also arise regarding the role of the state in relation to commoners. The fact that one of the objectives of the meeting was to obtain state support suggests that co-owners of natural resources may request more than autonomy from the state. Without state support, the tappers considered that they could not secure their livelihoods, even if they could obtain legal back-up for their rights. On the other hand, they were definite that they did

not want the state to interfere with their property rights institutions. This seems to confirm the argument presented in Chapter II that common property regimes may need state support to secure the sustainable use of their resources, but that such support should not be state control of the resource.

To conclude this section, it should be noted that although the external context and external actors were important factors in the Meeting (as well as before and after it), the tappers were not passive agents in relation to these external factors. On the contrary, the tappers' organisations made use of the external developments that were taking place at the time. The best example of this attitude was their decision to emphasise the ecological component of their proposal while at the same time maintaining their property rights demands.

5.5 The creation of extractive reserves

In 1987, INCRA answered the tappers' demands for extractive reserves by issuing an internal decree creating Extractivist Settlement Projects (*Projetos de Assentamento Extrativista*, PAEs) and, three years later, President Sarney enacted a presidential decree creating Extractive Reserves, which, as the next chapter will show, represented an important improvement in relation to the INCRA settlements. This section reviews the factors that influenced the creation of extractive reserves during the period between 1985 and 1990, when the first Reserves were established. Four interrelated external factors appear to have been determinant: the interest of the international community in the Amazon rainforest, the role of the media in publicising the tappers' plight, the MDB campaign and the evolution of the relationship between the Brazilian government and the international community (see Chapter IV).

Soon after the National Meeting and, partly as a perverse result of President Sarney's proposals for land reform, violence in Amazonia increased. The ranchers were concerned that they could be more easily expropriated if their lands were occupied by extractivists and redoubled their efforts to expel the tappers from the forest. Hence, in 1986, the rubber tappers organised several stand-offs in which women and children also participated. Apart from confronting the ranchers' employees, however, the tappers' organisations also undertook several initiatives to publicise these confrontations and obtain media coverage of their efforts to protect the forest. "At the same time as 100 or 200 colleagues are involved in the *empate,* standing in the way of the chainsaws and scythes, we aim to have a team whose job is to get information about what is happening back to Xapuri where another group will make sure it travels all over Brazil and the rest of the world. This is something we have only recently started to organise" (Mendes, 1989:70).

According to Chico Mendes, the international environmental lobby and the foreign press were major assets for the tappers' fight, which received more support from abroad than from national entities (Mendes, 1989). The international media began making references to the rubber tappers and the extractive reserve proposals in 1986 (Allegretti, 1989). The National Meeting had made the tappers known outside Acre and several individuals took an interest in the tappers' plight. For example, filmmaker Adrian Cowell, who had been filming deforestation in Amazonia for several years, began in 1985 to film the tappers' struggle, focusing on the role of Chico Mendes (Revkin, 1990; Shoumatoff, 1991; Melone, 1993). According to Revkin (1990), Cowell also encouraged officials from United Nations Environmental Programme (UNEP) to visit Xapuri, which further increased international publicity of the tappers' struggle. The National Meeting was also, as we saw in the previous section, the origin of the tappers' alliances with the international NGOs leading the MDB campaign and especially with the Environmental Defence Fund and his director Steven Schwartzman. In connection with this organisation, Chico Mends made two trips to the US in 1987, which further highlighted the plight of the tappers' in the international arena. On his first visit in March, Mendes went to Miami, to the annual meeting of the Inter-American Development Bank, who had decided to finance the highway BR-364 (see previous chapter). Later in the year, he presented to the American Senate evidence of the negative impacts that the road would have on the rubber tapper population and asked for support for the establishment of extractive reserves. In July, Chico Mendes received two international awards, the Global 500 Award, given annually by UNEP to leaders in conservation and environmental action around the world, and the Better World Society Protection of the Environment medal, creation of US media tycoon Ted Turner. Mendes' visits to the US received considerable coverage from the national and especially from the international media, both in the US and Europe and the "rubber tappers' movement [was] now seen as a crucial defender of the environment in Amazonia" (Hall, 1997b: 99).

It is a moot point whether INCRAs' enactment of the Extractivist Settlement Projects in the same year that Mendes travelled to the US and received two international awards were related or coincidental events. On the one hand, the discussions between INCRA officials and the rubber tappers had already begun in 1985, before the tappers became internationally known. On the other hand, the international attention the rubber tappers received in 1987 may have sped up the process of creation of the PAEs. The interviews with the policy makers, however, suggest that one of the factors that made it possible to establish the PAEs was the higher political leverage that environmental issues were acquiring in the national political context. The PAEs were the first items of land reform that took into consideration environmental issues and some years before the

environmental component of the tappers' demands would not have had the political leverage they had in the second half of the 1980s.

In 1987, INCRA established two Extractivist Settlement Projects, São Luis do Remanso and Santa Quitéria. However, these PAEs, were established in areas of little conflict (Hecht and Cockburn, 1989) and violence in Acre continued, culminating in the murder of Chico Mendes in 1988. The conflicts that took place on rubber estate Cachoeira exemplify the problems faced by the tappers at the time. The inhabitants of rubber estate Cachoeira had agreed not to sell their rubber stands to outsiders, but one of the group defected and sold his plot to a rancher, Darli Alves da Silva, who began clearing the forest (Mendes, 1989). There is no evidence that the tappers from Cachoeira had robust mechanisms to prevent defection, e.g. penalties for those who did not follow the rules established. However, it is unlikely that, had they had such mechanisms, they could have prevented Darli's occupation of the rubber estate. The violence used by the ranchers to expel the tappers indicates that even if none of the estate inhabitants had defected the tappers could not have protected *Seringal* Cachoeira without the support of the state. The tappers organised a stand-off in Cachoeira and the violence reached such high levels that INCRA expropriated the land, compensated Darci and set up Cachoeira as a PAE. In the following months, however, the national ranchers lobby (UDR), opened an office in Xapuri and hired gunmen to intimidate the rubber tappers (Hall, 1997b).

Two factors were decisive for the creation of Extractive Reserves in 1990: the Brazilian government change of attitude towards the interest of the international community in the conservation of the rainforest and, the high profile the tappers had in the international arena. Although by no means the first rural worker to be murdered in land conflicts in Brazil, Chico Mendes' death in December 1988 created an international uproar and in the months that followed many journalists, environmentalists and some senators from the American Congress visited Xapuri, the city were Mendes had been assassinated. The attention that the murder of Chico Mendes received was due to the fact that by the end of the decade the rubber tappers' movement, and Chico Mendes in particular, were well-known in the international arena. This in turn was related to the interest of the international community in the conservation of the Amazon rainforest. The different factors that triggered this interest, reviewed in the previous chapter, thus enhanced the tappers' capacity to protect their CPR because they made it possible for them to obtain international political leverage. Hence, the publication of INPE's report, the droughts that occurred that year in the US and the special place of Amazonia in the mind of outsiders are external factors that influenced the development of extractive reserves. Users of a CPR which is not part of a globally important resources, even if in a situation similar to the one of the tappers

(i.e. all internal factors the same), would not have received the same level of international coverage and thus national political leverage.

By the end of the decade, the Brazilian government was gradually changing from a nationalistic attitude towards a more 'political' approach in which environmental concerns were no longer totally dismissed as disguised attempts at the internationalisation of Amazonia. In this context, President Sarney took several initiatives to address environmental issues and one of those was to transfer the tappers' demands to the environmental policy of the country, legislating on extractive reserves. For the government, the creation of extractive reserves was an environmental measure with considerable international leverage, given the high profile rubber tappers had acquired in the international arena. One of the factors that contributed to the change of attitude of the Brazilian government was international pressure and the international economic context, which made the country more vulnerable to the international campaign against deforestation. The international developments reviewed in Chapter IV thus influenced the tappers directly, by making it possible for them to establish alliances with more powerful agents, and indirectly, by contributing to change the overall attitude of the Brazilian government towards the Amazon region.

Upon the decree creating extractive reserves, President Sarney established four such reserves, and in the months before the Earth Summit, the new President Fernando Collor established another five extractive reserves. In the year of the Earth Summit, Collor also set up a state agency responsible for the administration of these environmental units, the National Centre for the Sustainable Development of Traditional Populations (CNPT). The publicity the tappers received also helped them to get support from several international NGOs as well as Brazilian organisations[20]. In the early 1990s, co-operation between the Brazilian government and the industrialised countries was also beginning to develop, especially in the context of the Pilot Programme. Given the high international profile of the tappers and the political leverage that SEMAM had during the government of Fernando Collor, a specific sub-project for supporting extractive reserves in the context of the Pilot Programme was drafted. This sub-project, which will be discussed in some detail in the next chapter, was most advanced in anticipation of the Earth Summit.

To summarise, developments in the international context influenced the tappers' capacity to tackle their problems in the following ways. First, the strategy of international NGOs in the MDB

[20] International organisations: Ford Foundation, MacArthur Foundation; Canadian International Development Agency, Environmental Defence Fund, Cultural Survival, Health Unlimited, WWF, UNEP, Survival International, Sierra Club; national organisations: Campinas University; National Bank of Economic and Social Development, state planning secretariats.

campaign enhanced the capacity of the rubber tappers to make alliances with more powerful actors. Had the NGOs taken a more conservationist approach instead of advocating sustainable development it would have been more difficult for the tappers to establish alliances with environmental groups. Second, the MDB campaign and the interest in forest conservation of public opinion in the industrialised countries contributed to change the national setting. Third, the development of a project, specifically aimed at supporting rubber tappers in extractive reserves and funded by the G7 countries, would have not occurred had Brazil and the international community not changed their approaches towards each other. That is, rubber tappers could expect external support from the G7 because the Brazilian government took a more co-operative approach towards international actors' concern with deforestation in Brazilian Amazonia and because the international community changed its expectations regarding the obligations of Brazil concerning the rainforest.

5.6 Analysis and conclusion

As outlined earlier, the research presented in this thesis aims to explore two distinct but related issues. The first one concerns the development of a common property regime. This chapter has partly achieved this objective through the examination of the process that led to the establishment of extractive reserves in light of the theoretical framework on common property.

Many of the factors discussed in Chapter II as conducive to the development of common property regimes could be observed in this process. First, rubber tappers only engaged in collective action once the need to do so was perceived. Until the arrival of the cattle ranchers, there are no indications that they took any initiative to secure the boundaries of the CPR or the harmonisation of their own use of the forests. The resource only became scarce when the ranchers attempted to use the forests and tappers realised the pressing need to have stronger mechanisms to secure their resources against outsiders. Second, the jointness and exclusion conditions of the rubber estates made common property the best solution for the rubber tappers. Given the indivisibility of the forest, especially if used for rubber tapping and given the cultural background of the rubber tappers, private property plots were not adequate. Exclusion of outsiders from the entire area was feasible and not very costly. For example, if the resource had been mobile or too large, exclusion of outsiders would have created considerable difficulties. The fact that the entire area was inhabited facilitated exclusion because tappers could easily monitor entrance of outsiders. Enforcement of boundary rules was also relatively easy if the tappers' had their rights protected by the state because ranchers had little interest in occupying land which they could not sell or have secure access to. Once the state stopped granting private property titles for the area, the

incentive of land speculators to occupy rubber estates disappeared and thus pressure on the CPR boundaries considerably diminished.

Third, the tappers were highly dependent on the resource. They had little alternative economic possibilities outside the rubber estates and thus securing their resource was vital for their survival. Fourth, whenever tappers had more access to information their capacity to act was enhanced. This was first observed in the 1950s, with the introduction of the radio to the rubber estates, which encouraged the tappers to demand a better price for their rubber. Access to information about their economic alternatives in the cities also encouraged the tappers to engage in collective action because their dependency on the CPR became more apparent. Information about the rights of *posseiros* to their plots enhanced the tappers' capacity to resist eviction because after knowing their legal rights ranchers could not convince them to leave their lands by threatening with the law. Fifth, a factor that appears to have helped the tappers do devise a solution for their problems was increased access to arenas for discussion, mainly in the context of the National Meeting in 1985, but also through meetings organised by the Rural Workers' Unions.

Scholars on common property regimes tend to disagree on two issues. One is the influence that the size and homogeneity of the group of resource users have on the development of a regime. Singleton and Taylor (1992), for example, suggest that this is a crucial requirement for the development of common property regimes. Ostrom (1992), on the other hand, considers that the size and level of homogeneity of the group of resource users are not determining factors, although other factors being equal, small and relatively homogenous groups are more likely to develop such a regime than large and/or heterogeneous groups. The review of the process of development of extractive reserves appears to suggest that these two factors were not determining factors in the process of establishment of the reserve. However, as will be discussed in Chapter VII they can play a crucial role in the development of arrangements to harmonise the use of the CPR by the co-owners themselves. The rubber tapper population of the Acre River Valley was relatively homogenous, in the sense that all tappers in the Valley had a similar historical background and practiced the same economic activity. Also, all those who participated in the struggle faced the same problem and were equally dependent on the forest. The groups of tappers participating in the *empates* were rather small, involving between 60 and 300 rubber tappers. However, the participants in the *empates* were not the members of one particular group with a stable set of members. Tappers from many estates participated in each stand-off although this confrontation was to protect one particular estate only. According to the interviewees, participation on the empates was not limited to a small set of tappers, but to all those tappers in the area that the

members of the unions, tappers themselves, could visit and inform. Many tappers interviewed commented they had met extractivists from distant areas during the stand-offs. Information, persuasion and awareness of the danger seemed to play a stronger role in the collective action process than the size of the group or whether the members of the group expected to continue interacting over time.

A second controversial issue discussed in Chapter II concerns the role of the state. The literature tends to focus on commoners' need for autonomy from the state and on how regimes are disrupted when the state takes over the management of the CPR. This matter will be further explored in later chapters, but some observations can already be made at this stage. First, in the 1970s, the tappers had plenty of autonomy from the state, which was hardly aware of their existence. However, the state contributed to the depletion of their resource by not securing their rights, by encouraging migration to the rubber estates and by supporting the cattle ranchers. As Richards (1997) commented, state policies can trigger the depletion of commonly owned CPRs in various ways and not only by taking control over the CPR. Second, the tappers' struggle was not merely for state recognition of their rights. As could be observed in the 1985 National Meeting, one of the main demands of the tappers was for state support in terms of health, education and aid for their production. As Yadav et al (1998) argued, the conservation of natural resources cannot be the sole responsibility of the communities and the case of the tappers shows that these communities consider in some cases state support as a pressing need.

One of the postulates of this thesis is that the external context can play an important role in the sustainable use of CPRs and in particular in the case of the rubber tappers because their forests are part of a resource which is globally important, the Amazon rainforest. This chapter has shown that the development of extractive reserves could not have been explained without considering developments that took place in the external context. As outlined in Chapter II, external factors can provoke a change in the circumstances of commoners and can hinder or facilitate the capacity of resource users to deal with a change in circumstances (induced by internal or external factors).

Several of the external factors mentioned in the theoretical framework could be discerned in the development of extractive reserves. It was an external factor – the arrival of cattle ranchers – that provoked a change in circumstances which in turn triggered collective action among the rubber tappers. The help that the rubber tappers received from external actors, namely the church, the unions and independent policy makers such as Mary Allegretti, was crucial in enhancing their capacity to deal with the radical change in their circumstances that occurred in the late 1970s.

External actors provided the tappers with increased access to information and training in community organisation and encouraged them to organise the *empates*. The rural workers' unions provided them with an organisational structure. Independent policy-makers helped the tappers to make contacts with other actors in Brazilia - who were useful for the organisation of the National Meeting - and in the international arena, namely environmental NGOs. The legal setting also influenced the tappers' options. On the one hand, the fact that under Brazilian law *posseiros* have usufruct rights to the lands where they work, provided them with a means to resist eviction or obtain compensation from being expelled. On the other hand, the absence of any legal item that recognised common property rendered the task of obtaining recognition difficult, as will be seen in more detail in the next chapter.

The influence of the wider socio-political setting in the development of the extractive reserves could be observed in several instances. In fact, the developments in the national and international context reviewed in Chapters II and III were reflected in the process that led to the establishment of the reserves. The approach of the Brazilian government to the Amazon region in the 1970s resulted in the need to strengthen boundary rules. The political opening of Brazil in 1985 and the mounting international pressure on the country to stop deforestation made it possible for the tappers to discuss their problems in a wider forum, to gain more attention at the national level and to obtain support from international actors as a way of putting pressure on their own government. When by the end of the decade international pressure reached a peak and a more co-operative attitude between Brazil and the international community began to develop, this was also reflected in the establishment of the extractive reserves. The process of development of the extractive reserves was thus influenced by the wider political developments at all stages.

The influence of the external context on the development of extractive reserves was not limited to specific events in the external context, such as arrival of outsiders and help from external agents. Overall trends in society and the view of the state regarding the use of natural resources also influenced the tappers' use of their resources. For example, the role of the state in relation to the tappers cannot be reduced to their support for the cattle ranchers. The negative impact the state had on the rubber estates, arose from an approach to the development of Amazonia which ignored the fragility of the region and the importance of securing the sustainable use of forests. The decision to establish extractive reserves was also not an isolated act in response to a specific struggle. It was part of the government's new strategy regarding the environment and the country's relationship with the international community. The establishment of extractive reserves was partly due to the fact that support for the rubber tappers fitted in with the wider objectives of the government, such as improving its relationship with other countries with which it had

economic relations. The help of priests and nuns and of the Rural Workers' Unions was also related to wider trends, such as the development of the liberation theology within the Catholic Church and the approach of CONTAG regarding the establishment of unions in places where there were disputes of workers. Finally, and most importantly the overall trends in society taking place in the international arena during the second half of the 1980s provoked a radical change in the options available to the tappers. The Brundtland Report, and in particular the political leverage it gave to the concept of sustainable development, can exemplify this effect, as one of the reasons why extractive reserves received international support was because they were considered as the epitome of sustainable development.

It is beyond the scope of this work to fully examine the influence that the Earth Summit had on the development of the extractive reserves; however, three comments can be made. First, the anticipation of the conference induced Brazil to set up extractive reserves and the G7 to provide support for the reserves in the form of the PP-G7. Second, given the impact of wider trends on the rubber tappers discussed in the previous paragraph, it can be postulated that the debate on forests during the Earth Summit had some influence in the development of extractive reserves. The extractive reserve proposal fitted in with the arguments of both Brazil and the international community, which may have been a factor facilitating the establishment of reserves. On the one hand, the creation of reserves ensures the ownership of the forest for the nationals of the country and the Brazilian State; on the other hand, it does not conflict with the argument that forests should be conserved for the benefit of humankind. However, the rubber tappers were accused of taking side with international actors trying to take over the Amazon, which was the argument used by some national actors to oppose the tappers' demands. The dispute between the South and the North in relation to forests was also the main impediment for a binding agreement on forests, which could have provided more advantages to the tappers. For example, a binding agreement including international funding for forests could have increased the availability of funds for supporting co-owners of forest resources. The Forest Principles Agreement was also a facilitative factor for the tappers because it provided them with a legal argument for justifying their property rights.

The second objective of this thesis is to explore the characteristics of the Extractive Reserve Chico Mendes and assess the capacity of this institution to secure the conservation of the forests. From what could be observed in the present chapter, the tappers did not develop robust mechanisms for harmonising their use of the forest before the arrival of the cattle ranchers and there were no indications that they attempted to develop such mechanisms while their struggle for secure property rights lasted. As mentioned before, this can be explained by the fact that the

process which led to the establishment of the reserves in the Brazilian legislation, was triggered by a threat to the CPR boundaries rather than by any problem regarding the use of the CPR by the tappers themselves. Before the arrival of the ranchers, there had been no problems of scarcity, so it can be assumed that the need to develop robust mechanisms for preventing a potential 'tragedy of the commons' had not arisen. During the struggle for the establishment of extractive reserves, the priority of the tappers had naturally been to prevent themselves from being expelled from their land. With the establishment of the reserves, the boundaries of the CPR are legally protected but this, as argued in Chapter II, is not a sufficient condition to secure the conservation of a jointly used CPR. The next two chapters thus turn to examine the characteristics of extractive reserves focusing on how the interaction of external and internal factors influences the tappers' capacity to secure the conservation of their forests, now that their rights are legally protected.

Chapter VI
Characteristics of Extractive Reserves: Legislative and Formal Aspects

Introduction

Chapter V reviewed the development of extractive reserves, that is, the process that resulted in the formation of a common property regime and its recognition by the state. We turn now to examine the characteristics of extractive reserves. In doing so, attention will be focused on the capacity of these institutions to ensure the conservation of the CPR, taking into consideration internal factors and the external context.

In general lines, previous studies on the capacity of extractive reserves to secure the sustainable use of natural resources can be divided in two groups. One considers that extractive reserves cannot secure the conservation of forests in the long term because rubber tapping, and extractivism in general, is not economically sustainable (Homma, 1989; Torres and Martine, 1991; Browder, 1992). Extractivism is considered to be economically unsustainable because extractive products have a fixed supply and if the commercialisation of the product is successful the demand is likely to exceed the supply[1]. When this happens, either artificial substitutes for the product are found, or the products starts being produced in plantations. As the price of the substitute product tends to be lower than that of the 'wild' one, the demand for the latter diminishes (Homma, 1989). Wild rubber, according to some scholars, has been economically viable until now because of government subsidies. The price of natural rubber produced in the Southeast is approximately three times lower than the price of Amazon rubber (Fearnside, 1989a). Critics of extractive reserves also argue that the environmental sustainability of extractivism is debatable. Extractive activities, although they do not require the removal of the forest cover (the main reason why they have been considered environmentally sustainable), can destroy the trees if too much of the product is extracted (Homma and Anderson, n. d.; Browder, 1992).

However, like most activities involving joint use of CPRs, extractivism can be ecologically sustainable if resource users develop robust common property regimes that secure that individuals do not extract too much rubber from the trees. In economic terms, extractivism presents some shortcomings, as CNS itself admits (FoE/GTA, 1994). However, as mentioned earlier, extractivism is not the only activity that can be practiced in extractive reserves (Allegretti, 1994). There are other activities that are also sustainable if practiced in the context

[1] Homma refers to the supply of extractivist products from the natural forests; as the natural forest cannot 'increase', the supply of extractivist products presents little elasticity to changes in demand.

of common property regimes but that are more profitable than rubber tapping, as will be seen in Section 6.3. As long as large-scale deforestation is not required, the existence of robust common property regimes is thus important for ensuring the sustainable use of resources in extractive reserves.

The second group of studies has examined extractive reserves in relation to its socio-political aspects (Allegretti, 1989; 1994; Schwartzman, 1990; 1992; 1994). This line of analysis holds that by recognising the rights of the extractivist populations, disputes over landed property rights and insecurity over land tenure, two important causes of deforestation, have stopped. In addition, because reserves are based on the proposals of grassroots organisations following their traditional land tenure systems, they form the basis for promoting sustainable development in the areas where they have been established. The sustainable use of jointly used resources, however, does not depend only on the existence of secure property rights. As Hall (1997b) has pointed out, the capacity of extractive reserves to secure the conservation of the forests in the area is also related to resource users overcoming the free-rider problem. According to this scholar, the large size of reserves, the heterogeneity of the population and their lack of frequent contact may render this task difficult; on the other hand, a history of collective action may facilitate the development of mechanisms to prevent free-riding. Hall (1997b) also observes that the overall success of extractive reserves, in economic, social and environmental terms, depends on government support, a view which is shared by CNS (FoE/GTA, 1994).

As argued in Chapter II, commoners overcoming the free-rider problem is indeed fundamental for securing the sustainable use of jointly used resources. However, whether this occurs, depends not only on the size and homogeneity of the group of resource users and their experience in fighting outsiders. Regarding state support, the literature on common property tends to highlight that it should not interfere with the co-owners' autonomy to manage their resources. Whether the reserve inhabitants have sufficient autonomy to manage their resources, however, is an issue that previous studies have not addressed. In examining the capacity of extractive reserves to secure the conservation of the forest, this thesis discusses these and other related issues using the framework on common property outlined in Chapter II and focusing on one specific reserve, the Extractive Reserve Chico Mendes.

The theoretical framework used in the present thesis suggests that the capacity of a common property regime to ensure the conservation of a CPR depends on whether the regime is robust or has the potential to become robust. A robust regime is one that has the necessary mechanisms to prevent overuse of the resource by outsiders and co-owners and that can deal with a certain level of change in the circumstances. Both the robustness of a regime and the capacity of co-owners to develop a robust regime are influenced by the existence of a facilitative legislative framework

and the assistance that users of a CPR may receive from external agents, be that the state or other organisations. This chapter thus reviews the legislative framework of extractive reserves and the formal support they receive and the next chapter examines the actual characteristics of the Chico Mendes Reserve.

The present chapter now turns to examine the Extractivist Settlement Projects (PAEs), the first legislative attempt to support the tappers' property rights, the legislation on extractive reserves (ERs) and the Pilot Programme sub-project RESEX, since this is the main source of aid of the Chico Mendes Reserve. In exploring the PAEs, ERs and RESEX, the chapter provides a preliminary assessment of whether the external context of the reserves is facilitative. Particular attention is given to the level of support for the tappers' exclusive rights and for the encouragement they receive to harmonise their use of the forests, and to the level of autonomy tappers have from the state and in relation to the PP-G7.

6.1 Extractivist settlement projects

A facilitative legal setting can be defined as one which includes recognition of the common property rights of well-defined group of co-owners to use CPR, whose boundaries should also be clearly defined. Recognition of common rights means that joint users of a CPR have the right to take decisions concerning the use of their resource and that the state does not have the right to interfere with the co-owners' management of the resource unless the latter interfere with the wider legal setting. For example, if there is a law protecting a particular type of tree, co-owners of a forest harbouring this type of tree are free to manage the forest as they wish, as long as they do not cut down the tree in question. The state can support the resource users but the latter are, in the final instance, responsible for the CPR.

With the enactment of the Extractivist Settlement Projects, the legal setting of the rubber tappers and of Brazilian commoners in general becomes significantly more facilitative than before. The extractivist settlement projects (PAEs – *Projetos de Assentamento Extrativista*) represent in Brazil the first legal item that recognises common property rights in relation to natural resources (Gomes and Filippe, 1994). In 1985, as mentioned in the previous chapter, the concept of common property rights to land only existed in relation to Indian reserves and in the context of land reform there were only settlement projects based on private property. As a result of the tappers' campaign for recognition of their rights, in March 1987, a working group formed by CNS, IEA and technical staff from INCRA was set up to examine the problem and incorporate the tappers' proposal to the National Plan for Agrarian Reform. In July of the same year, INCRA issued an internal decree (portaria n. 627 39th July 1987) constituting Extractivist Settlement Projects.

The internal decree on PAEs is constituted by four items. Item 1 states that the owner of the land is the federal government, through INCRA, and that the extractive community has usufruct rights. The reasons for choosing state ownership are related to the characteristics of the resource users (internal factors) and to the external context in which the tappers are embedded. As we saw in the previous chapter, the rubber tappers' demands were not limited to recognition of their landed property rights; they also wanted to have more external support in terms of health, education and production. One motive for choosing state ownership was thus that the rubber tappers' representatives and their advisers believed that this would allow for more logistical support from the Brazilian State as well as from environmental organisations (Allegretti, 1994).

Preference for state ownership was also motivated by this modality providing more land security than private ownership of the rubber stands. Granting private property rights to the rubber stands would not have carried with it the limitations that were involved in the traditional INCRA's settlement projects, i.e. the distribution of natural resources in the area could have been respected and the plots would have been large enough. However, as private ownership includes the right to sell the land, there was the risk that the tappers could be pressured into selling their stands and endangering the survival of their fellow tappers. As we saw in Chapter III, peasants in agricultural settlements in Brazil have often been persuaded or forced into selling their plots to large landowners. Granting of private rights to the stands would also have been difficult because of the rubber estates are not easily divisible, and whereas it is possible to exclude outsiders from the CPR individual exclusion is difficult.

A further reason for state ownership and only usufruct rights for the community was that the rubber tappers were not yet ready for communal ownership. Although tappers had been able to conduct collective action in staging stand-offs, tappers' leaders feared that once the threat of land expulsion was over, the sense of community that had developed among the extractivists would vanish. As several key informants commented[2], even in Acre, where tappers had most experience of group action, they were not prepared for communal ownership. Tappers had a 'weak' common property regime, which, for example, did not include monitoring mechanisms and penalties for defectors. In the 1970s, given the abundance of resource and the isolation of the rubber estates, these mechanisms were not necessary for ensuring the sustainable use of the forests. The situation in the 1990s was, however, different. Outsiders, e.g. loggers, were now interested in the tappers' CPRs and there were doubts that rubber tappers would be able expediently to develop a robust regime that could deal with new potential threats to their resource.

[2] Key informants were, as mentioned in the Introduction of the Thesis, Section 3.2, interviewees who did not live in the forest, but that because of their work in the reserve had a thorough understanding of the issues involved in the setting up and problems of the ERCM.

The PAE decree also includes definition of the boundaries of the group of co-owners. The second item of the PAE decree establishes that the use of the area is transferred to the community by a contract between INCRA and the entity representing this community. Item 3 specifies that participation in the community is limited to the traditional inhabitants of the area practising sustainable extractivism, and who the members of the community are must be established in the contract. The definition of the members of the community in the contract with INCRA was a way of protecting the traditional inhabitants from outsiders attempting to obtain rights to the common resource (ELI, 1994). The fourth and last item clearly acknowledges the existence of common property rights: the community can use the total area and natural resources in it in a common property system, *condominio*. The internal features of the common property regime of the PAEs, however, are not specified in the literature; there are no references, for example, to rules to harmonise the use of the CPR by the co-owners themselves. As the tappers' regimes did not have mechanisms for harmonising their use of the CPR before the establishment of the PAEs, it can be inferred that the inhabitants of the PAEs did not have them either.

Although the PAEs decree represents an improvement in the legal setting of the rubber tappers, the Extractivist Settlement Projects were not very successful. Between 1987 and 1989, as can be observed in Table 6.1, ten extractivist settlement projects were established in the Amazon region. Landed property rights disputes and instances of resource depletion, however, often continued in the areas where the PAEs had been established.

Table 6.1 Extractivist Settlement Projects (PAEs)

Extractivist Settlement Project	State	Decree and date	Area (ha)	Population No. of families
São Luis Remanso*	Acre	472/87	39 572	130
Cachoeira	Acre	158/89	24 973	80
Santa Quiteria	Acre	886/87	44 000	150
Porto Dias	Acre		22 145	83
Riozinho	Acre		35 896	120
Maracá I**	Amapá	1 440/88	75 000	214
Maracá II**	Amapá	1 441/88	22 500	94
Maracá III**	Amapá	1 442/88	226 000	760
Antimary	Amazonas	1 055/88	260 277	867
Terruã	Amazonas	1/89	139 235	426
Total			**889 598**	

Sources: Rueda, 1995; Allegretti, 1989

* São Luis do Remanso was later incorporated in the Extractive Reserve Chico Mendes

** The three Maracá PAEs later became the Extractive Reserve Rio Cajarí

The problems of the PAEs resulted mainly from the fact that although legally the tappers' rights were protected, the state did not actively support their rights and the tappers did not have robust regimes. According to several sources, the state agency INCRA did not follow the principles of the PAE decree (ELI, 1994; FoE/GTA, 1994; Rueda, 1995). In some instances, INCRA conceded rights of use to individuals rather than community organisations. In the extractivist settlement projects in Amapá, INCRA allowed the inclusion of migrants who had neither experience in the extractivism of renewable resources nor any relationship with the existing community – thus disrupting the principle that only the established group of users should have rights of access to the resource. The result is that the inhabitants of the PAEs in Amapá, are still embroiled in land disputes with large unauthorised ranching operations, illegal loggers and heart palm gatherers, although the land had been allocated to them by the Federal State (FoE/GTA, 1994; Westermann, 1997). To what extent the existing users had the power to refuse the entry of such migrants is not clear; in the Antimari and Terruã Projects, people in the area did not have any organisation to administer the project and in Amapá only recently communities began forming associations (Westermann, 1997). The fact is thus that either for lack of community organisation or powerlessness in relation to INCRA, the rubber tappers were not able to prevent entry of the newcomers[3]. The relative lack of success of the PAEs can also be attributed to the fact that INCRA continued conceding incentives to clear the forest and develop non-sustainable uses of the land (ELI, 1994; Rueda, 1995; FoE/GTA, 1994). This explanation for the problems of the PAEs seems to confirm that extractivist populations' common property regimes were weak institutions and accordingly they did not have the capacity to deal with new external incentives to deplete the resource. Finally, according to several sources, another factor that contributed to the difficulties the PAEs faced was that INCRA rarely provided support for the establishment of PAEs, with only the settlements in Acre receiving any (ELI, 1994; FoE/GTA, 1994; Rueda, 1995).

The brief review of the PAEs presented in the previous pages thus confirms the argument made in Chapter II that the conservation of jointly used resources depends on internal and external factors. It is a moot point whether the tappers, had they had robust regimes, would have been able to able to resist pressure from outsiders (supported by the state) and new incentives for deforestation (also resulting from state policies). However, this is a possibility that cannot be ignored. The literature on common property regimes provides many examples of commoners who were able to secure the conservation of their CPRs in spite of new incentives for their own overuse of the resource. Also, the tappers in the PAEs had legal support for their rights which, in theory at least, they could have used to oppose INCRA's granting property rights to individuals outside the community.

[3] Now, however, the Amapá communities are forming an association and they hope to receive compensation to use the land in the name of their associations (Westerman, 1977).

Whilst the literature on common property regimes stresses the need for autonomy, the tappers emphasise the necessity of external support. The main reason for this is that one of the main problems of tappers has always been their lack of access to medical and other social services. However, their interest in state support may also be related to the fact that tappers had never experienced a 'controller' state or a state agency attempting to manage their forests. On the contrary, the rubber tappers had had to deal with an 'indifferent' state that did not protect their rights and left them subject to exploitation by patrons and middlemen. As pointed out in Chapter II, however, a crucial distinction exists between state control of CPR and state support for co-owners of CPRs. The tappers' demands for land ownership rather than communal ownership fitted into this second category since at no point did they request state management of their rubber estates. The PAEs, however, only partially met the tappers' requirements, since apart from land ownership there are no provisions in the decree regarding support for the resource co-owners. The changes that took place in the external context in the late 1980s, however, made it possible for the tappers to obtain more support for their common property regimes but also appeared to have limited their autonomy to manage their resources. This and other issues are discussed in the section below, which reviews the legislation on Extractive Reserves.

6.2 Legislation concerning extractive reserves

In reviewing the legislation on Extractive Reserves (ERs), this section shows first how developments in the legal setting which are not strictly related to recognition of common property can be useful for commoners, and then proceeds to examine whether the legislation on ERs enhances the capacity of tappers to ensure the conservation of their resources.

As we saw in Chapter IV, the socio-political context of Brazil had changed by the end of the 1980s, which resulted also in an alteration of the legal setting of the country, in particular through the drafting of a new constitution. The new legal setting provided an opportunity for strengthening the rubber tappers' common property regimes. The main constitutional basis for the creation of the reserves was Article 225, Paragraph 1, III, which determines that one of the measures the government must take to secure a healthy environment for the population is to define areas that should be especially protected. As a result of this article, environmentally protected areas can only be altered or eliminated if a law stating so is approved by the National Congress; before 1988, conservation areas could be eliminated by decree and thus their existence was less secure (ELI, 1994). By legally giving the extractive reserve concept the status of a conservation unit, the regularisation of the tappers' rights acquired a stronger legal base than the one they had in the context of the PAEs. The legal base of the latter was rather weak: an internal decree of INCRA, which could be revoked at any time by the director of the agency.

The decree creating an extractive reserve on the other hand can only be changed or revoked through a law approved by the National Congress. The decrees constituting each specific reserve cannot be easily altered either. They can only be changed if so stated by the National Congress, and even the Congress cannot alter the primary aim of the reserves which is to protect the sustainable livelihood of the inhabitants of the area (ELI, 1994).

Three other items of the 1988 Constitution have been useful in relation to the extractive reserves. In Article 225, Paragraph 1, VII, it is stated that the Public Power has to protect fauna and flora by making illegal practices that threaten their ecological functions, destroy species or imply cruelty towards animals. This item has been used by those, who, like the rubber tappers, depend on sustainable economic activities and who are in conflict with non-sustainable activities, like cattle ranching (ELI, 1994:28). Also in Article 225, Paragraph 4, has been useful for the rubber tappers. In this paragraph it is stated that the Amazon Rainforest is national patrimony, and requests all citizens to defend the environment of the forest. The interpretation of this article by the Environmental Law Institute is that sustainable extractivism has constitutional protection as long as it conserves the natural resource base. Finally, Paragraph 5 (Article 225) forbids the state to dispose of public land that is environmentally important in a way that would endanger the environment - e.g. by selling the lands to companies that do not exploit the resources sustainably (ELI, 1994).

The enactment of the new constitution made it necessary to introduce some alternations to the Law of the Environmental National Policy (LPNMA – *Lei de Política Nacional do Meio Ambiente*). The first reference to extractive reserves in the federal legislation is found in the alterations made to LPNMA in 1989 (law number 7.804 of July 1989). Article 9 determines that one of the instruments of the National Policy for the Environment is the creation of conservation areas and extractive reserves: "Article 9: the instruments of the National Policy of the Environment are ... VI the creation of territorial spaces specially protected by the federal, state or municipal public power, of relevant ecological interest and extractive reserves" (Gomes and Felippe, 1994:76). However, it was only in September 1989, that a working group formed by state officials from IBAMA and INCRA, CNS representatives and members of Mary Allegretti's NGO, IEA, began preparing the decree that should constitute the new legal item. On 30th January 1990 President Sarney signed the General Decree on Extractive Reserves (Decree n. 98.897/90).

Upon the signing of the general decree on extractive reserves, president Sarney constituted the Extractive Reserve Alto Juruá, in the state of Acre, and in March four more reserves were established, including the Chico Mendes reserve (see Table 6.2). In addition to the federal reserves, the state of Rondônia also approved a law that authorises State Extractivist Settlements

(*Assentamentos Extrativistas Estaduais*) and established five of them (ELI, 1994). In the months before the Earth Summit, as mentioned in Chapter IV, President Collor took a number of environmental initiatives among which was the enactment of decrees constituting four more federal extractive reserves. In addition, President Collor established in the same year an agency with the specific purpose of administering these reserves, CNPT (*Centro Nacional para o Desenvolvimento Sustentado das Populações Tradicionais*). The formal role of CNPT can be described as 'facilitative' and as fully responding to the tappers' demands. The functions of CNPT are not to establish full state control of the extractive reserves but, as specified in the agency internal statutes, to give support to the reserves' inhabitants. This support, also according to the internal statutes of CNPT, is based on the rubber tappers' requirements. For example, to promote the elaboration of projects proposed by the tappers; CNPT officials evaluate the demands of the populations, harmonise them with available state funds, and monitor the use and consequent results of these funds. CNPT also promotes meetings between rubber tappers and relevant specialists in, for instance, agriculture extension, and it organises management courses for the tappers (Rueda, 1995). In 1994, CNPT/IBAMA enacted an internal decree outlining the formal procedures for establishing an extractive reserve (*portaria* do IBAMA n. 51 – 11/5/94).

Table 6.2 Extractive Reserves

Name	Date of Creation	Area (ha)	Population	Activities practiced
Alto Juruá	January 1990	506 186	5 821	rubber tapping
Chico Mendes	March 1990	970 570	12 017	Brazil nuts, copaíba, rubber tapping
Rio Cajarí	March 1990	481 650	3 639	Brazil nuts, copaíba, rubber tapping, açaí
Rio Ouro Preto	March 1990	204 583	775	Brazil nuts, copaíba, rubber tapping
Pirajubae	May 1992	1 444	690	cockle (seafood)
Ciriaco	May 1992	7 050	844	Babassu, subsistence agriculture
Ext. Norte de Tocantins	May 1992	9 280	320	Babassu, subsistence agriculture
Quilombo do Freixal	May 1992	9 542	1 080	Babassu, subsistence agriculture, fishing
Mata Grande	May 1992	10 450	776	Babassu, subsistence agriculture

Sources: IBAMA/CNPT 1994; Rueda 1995.

The legal framework of Extractive Reserves comprises thus two items: the General Decree on

Extractive Reserves, which defines 'extractive reserves' and stipulates the requirements for any decree that enacts the establishment of a particular reserve, and IBAMA's internal decree. These two items, maintain the central feature of the PAEs, however, there are also three important differences between Extractive Reserves (ERs) and PAEs. First, the tappers' rights are more secure than in the PAEs and not only because the decree itself is more difficult to revoke than the PAE decree. Second, in extractive reserves the state provides more support for the resource users than in the PAEs; in fact, the legislation on extractive reserves indicates that the latter should be co-managed between the state and the reserves' inhabitants. Third, this co-management system includes a set of rules and monitoring mechanisms specifically devised for the conservation of the jointly used CPR. Whether these differences between PAEs and ERs represent an improvement of the tappers' external context is discussed below.

The General Decree

One of the reasons why tappers' rights are more secure in extractive reserves is that the explicit aim of the latter is the conservation of natural resources. The General Decree stipulates that Extractive Reserves are areas designated for the sustainable use and conservation of renewable natural resources by extractivist populations (art.1). The government will set up extractive reserves in areas that are considered to be of ecological and social interest (art.2). The latter are those that have natural characteristics that make possible the sustainable use of the natural resources in the area, without negatively affecting the environment. The conservation of tappers' CPRs is thus now not only a matter of concern for the resource co-owners but also for Brazil, and thus the state has a higher incentive to encourage the conservation of resources in reserves. Extractivists can also expect to receive more back-up for their rights because expropriation in the context of the ERs legislation is carried out as a means of environmental protection. The creation of extractive reserves is considered to be in the interest of society on account of the contribution of these institutions to the conservation of the forest, and thus if land expropriation is deemed necessary, its justification is the protection of the environment for society (ELI, 1994). As by the end of the decade environmental protection had higher political leverage than land reform, extractivist populations' requests for recognition of their rights in the context of the extractive reserve decree were likely to be more successful than the same demands in the context of the PAEs. The state agency responsible for processing the expropriations is IBAMA (art. 3) rather than INCRA, a fact which can also be considered to be an advantage, since INCRA had a poor record in relation to both the PAEs and traditional settlement projects (ELI, 1994). IBAMA's function is environmental protection, so it may be also expected that, for example, this agency will not provide incentives for resource depletion like INCRA had done.

The back-up of the state for common property regimes in the context of the Extractive Reserve

legislation is also stronger than in the PAE decree because the extractivists' common rights are given priority over other property rights' claims (art.3). An extractivist settlement project can only be established after the land tenure situation in the area has been regularised. If there are conflicting claims to the land, the state must expropriate the land – a process that can be extremely lengthy – before formalising the extractivists' rights. The working group who drafted the extractive reserve decree decided that the establishment of an extractive reserve should not require previous expropriation of the land because in Amazonia most land titles do not have a legal basis (Allegretti, 1994; Menezes, 1994; see Chapter III). The creation of a reserve thus only needs to specify which are the necessary measures that the state must take to establish a new reserve, measures which may include solving conflicts over land titles in the area.

Finally, the stipulations of article four of the decree constituting extractive reserves also ensure that tappers' rights are secured in the long term and thus tappers do not have the incentive of overusing the resource today in case they lose the rights in the future. The fourth article states that the state is the owner of the reserve and the community or entity representing the community has non-transferable usufruct rights over the area by means of a contract with IBAMA (*Contrato de Concessão Real de Uso*). This contract is based on the legal item 'concession of usufruct rights' (*Concessão de Direito Real de Uso*) which stipulates that the usufruct rights over private or state property are transferred to another entity for exploitation that is in the social interest. In this case the 'social interest' is the conservation of the natural resource. The rights are granted for an indeterminate period of time but no less than 10 or 20 years (Rueda, 1995); in the case of extractive reserve the contract should be established for a period of at least 60 years (Allegretti, 1994; Hall, 1997b). An additional incentive to use the resource sustainably is that the resource users' property rights are conditional to the conservation of the CPR. The fourth article stipulates that the contract includes an 'Utilisation Plan' which should be approved by IBAMA. This contract lists the rules that users should follow to secure the sustainable use of the natural resources base, and if there is damage to the environment the contract can be cancelled. IBAMA is responsible for monitoring compliance with the conditions specified in the contract (art 5).

For common property regimes to be robust, they must be able to prevent overuse of the resource by outsiders and co-owners even in face of changes in the circumstances. The ER general decree largely provides for the first condition. Given the difficulties involved in revoking the general decree and the decrees constituting each specific reserve, a decrease in the political leverage of the tappers or in international concern with environmental issues should not alter legal support for the tappers' boundary rules. Regarding the second condition, preventing overuse of the resource by the tappers themselves, there are more provisions for preventing this problem in the ER decree than in the PAEs. However, the incentives for resource conservation in the legislation

are not sufficient in themselves to secure that tappers use the resource sustainably. As other cases have shown (Chapter II), if the users themselves are not committed to the conservation of the CPR, the state alone is unlikely to have the necessary means to monitor compliance with the Utilisation Plan. A change in the circumstances may thus affect the conservation of the natural resource base by influencing the choices of the co-owners, although not by direct occupation of their resource by outsiders. The decree enacted by IBAMA in 1994, however, includes several items aimed at encouraging the tappers' to develop mechanisms for ensuring their own harmonious use of the forest.

Formal procedures for establishing extractive reserves

IBAMA's internal decree, the Manual for the Creation and Legalisation of Extractive Reserves, outlines the three phases that constitute the establishment of reserves. The decree specifies in which cases the state should formalise a property rights regime through the creation of an ER (legal creation phase), defines the procedures for the implementation of a co-management system between state and resource users (implementation phase), and outlines the support that the state should give to the resource users (consolidation phase).

The procedures for the legal creation of ERs, which consists in the publication of a presidential decree constituting the reserve, indicate that although this legal item is a conservation unit, it is specifically aimed at securing the rights of commoners. The creation of an extractive reserve begins when a group of extractivists requests from IBAMA the regularisation of their lands in the form of an extractive reserve (Rueda, 1995). Hence, the state cannot create a reserve because IBAMA or another state agency considers that a certain area should be protected; the creation of an ER is a response to users of natural resources who require state back-up for their property rights. CNPT is responsible for taking the final decision of creating or not creating an extractive reserve. This decision will depend mainly on the existence of a common property regime in the area and the ecological value of the area. Before establishing an ER, IBAMA thus needs to have indications that there is a common property regime in the area, which indicates that IBAMA's aim is not to take control over the CPR. Extractivists must clearly indicate that they have an association that represents them, that they jointly manage the resource or that they are willing to do so. The fact that the creation of a reserve does not require the existence of a robust regime, but only the willingness to jointly manage the resource, can act as an incentive for joint users of a CPR to develop a resource management regime, in order to secure their rights. IBAMA must confirm and complement the users' statement by visiting the area and gathering information concerning the level of organisation of the community and how the inhabitants use the natural resource base.

Whether commoners whose natural resources are not important for society at large can also benefit from the extractive reserve legislation is not entirely clear. On the one hand, the fact that the ecological value of the area is one of the considerations for the establishment of a reserve, suggests that if the resource is only of value for the direct users, the latter cannot have their rights recognised. On the other hand, the General Decree states that reserves should also be established in areas of 'social interest', which suggests that even if the resource is not nationally important, reserves may be established because support for a particular community is important. For example, if there are no alternative ways of protecting a particular community and the establishment of a reserve would be beneficial for this community, IBAMA may create an ER even if their CPR is not important for society as a whole. Nine of the extractive reserves established so far, however, are in the Amazon region, and the other two are in the Mata Atlântica, which is also considered important for society as a whole.

The stipulations of the implementation phase indicate, once again, strong support for the tappers' common rights. To conclude the contract between state and resource users, IBAMA' decree states that it is necessary first to address the remaining issues involved in the protection of the boundaries of the resource against outsiders. The first step is the regularisation of the landed property rights in the area. For this, IBAMA needs to examine the legal value of any landed title to the area, determine whether or not to expropriate, and pay the necessary compensations to those with legal titles. The state then becomes the owner of the land in the reserve and can grant usufruct rights to the resource users. However, this decree stipulates that if there are conflicting claims to the land and this process may take several years, IBAMA should not delay the conclusion of the contract on this account (IBAMA/CNPT, 1994), indicating that the state gives priority to the informal rights of the commoners. The boundaries of the group of co-owners (the reserve inhabitants) are clearly defined, as the survey of the population living in the area must be updated before proceeding with the contract.

To conclude the contract it is also necessary to address potential problems arising from the joint use of the resource, which is done through the Utilisation Plan that specifies rules and monitoring mechanisms specifically aimed at securing the conservation of the CPR. The rules listed in the Plan are based on the Brazilian environmental legislation, the environmental and socio-economic characteristics of the area (which should be described in the Plan) and on the traditional use of the forest by the rubber tappers. The Plan should include rules for using the resource, for changing the established rules, and for monitoring and enforcing compliance with the rules. The Plan should thus specify the limits and conditions that apply to the extraction of forest products; for example, commercialisation of animals is not allowed, hunting should not be conducted with the help of dogs, fishing techniques must be sustainable, and mineral resources in the area cannot be exploited. The plan should also specify rules in relation to the

individual and common rights of access within the reserve, for example, what are the conditions that apply to the transference of rubber stands and what are the common areas of the reserve. The latter should be used in accordance with community rules, and the opening of new forest paths should be responsibility of the entity representing the reserve. Co-owners can change the rules but the minimum number of inhabitants required to propose a change should also be stated in the Plan (Rueda, 1995).

The rules and monitoring mechanisms of extractive reserves appear to be locale-specific since IBAMA's decree stipulates that the Utilisation Plan of each reserve should outline the specific monitoring mechanisms that apply to that particular reserve. There are however some requirements regarding monitoring and enforcement that apply to all reserves which meet many of the suggestions of the literature on common property. According to the CNPT *portaria*, monitoring compliance with the rules is the responsibility of each inhabitant of the reserve, the entity representing the reserve inhabitants and, at a higher level, IBAMA. If any other local organisation is responsible for sanctioning instances of lack of compliance with the rules, this should be established in the Utilisation Plan. Sanctioning is gradual, thus if an extractivist does not comply with the established regulations he will receive first an admonition, then a fine, thirdly the temporary suspension of his or her rights and finally, his usufruct rights to the reserve may be cancelled. The Utilisation Plan of each reserve should define the specific relationship between infraction and penalty. Regarding conflict resolution mechanisms, the CNPT decree stipulates that the organisation representing the reserve inhabitants should be the entity responsible for mediating in case of conflict and deciding on what to do.

Once the group of co-owners is well defined and the rules that should formally govern the joint use of the resource have been established, the co-management contract between IBAMA/CNPT and the organisation representing the reserve inhabitants can be concluded. Whereas in the General Decree on Extractive Reserves, there is only reference to the recognition of common property rights, in the IBAMA decree the tappers' individual rights to their stands are also formally acknowledged. After the contract between IBAMA and the organisation representing the reserve has been concluded, the latter can grant individual usufruct rights (*Títulos de Autorização de Uso*) to the inhabitants of the reserve. Individual usufruct rights are not transferable between living people (*inter vivos*); that is, tappers cannot sell their rights to the stands to other individuals. In case of death of the holder of the right to the stand, however, this right may be transferred to his or her heirs, which can act as an additional incentive to secure the conservation of the resource. In the absence of heirs willing to work in the forest, the right can be taken by the public power and given to a third party.

Finally, IBAMA's decree includes in the 'consolidation phase' detailed recommendations regarding the support that extractive reserves should receive to improve the social and economic conditions of the reserves' inhabitants. The aim of these recommendations is clearly that the tappers and not the state should manage the reserve; however, some of the recommendations may hinder the tappers' autonomy. IBAMA's decree outlines the activities that the state and the reserve inhabitants should carry out in order to promote sustainable development in the reserves and, suggests drafting a Development Plan for each reserve (Rueda, 1995). Each Development Plan should address six issues, four of which are directly related to the development and implementation of a robust regime. The first item of the Development Plan is 'to enhance the capacity of reserve inhabitants to manage the reserve'. In order to achieve this objective, IBAMA/CNPT suggest to implement training activities for community development and for dealing with other issues suggested by the reserve inhabitants, such as organisation and management of unions and other associations. The second item, 'social and community organisation', sets up a number of requirements for decentralising the social organisation of the reserve in terms of area and in terms of activity, to avoid the concentration of power in only a few. The third item must outline how the reserve will be managed and secure community participation; it should describe the monitoring mechanisms of the reserve and how the reserve inhabitants will evaluate the structure of the reserve and, if necessary, incorporate changes. The last item directly addressing the issue of robustness of institutions is the sixth one, which states that the Development Plan should outline the level of support from the state and other organisations, and that the responsibilities of the different parties involved in the co-management system should be clearly defined. The remaining two items of the Development Plan address the issues of 'production and commercialisation' and 'housing, transport, health and education', which also affect the robustness of the reserve albeit in an indirect way.

Can the legislation on ERs be considered to provide a more facilitative legal setting for tappers and commoners in general than the PAE decree? In many respects, the answer is yes. For example, the fact that the tappers' rights receive stronger protection under the ERs than the PAE is an improvement. There are also additional incentives for tappers conserving their resources, such as the fact that their rights to the CPR depend on its conservation. As the administrator of reserves is an environmental agency, it can also be assumed that IBAMA is less likely than INCRA to provide the reserve inhabitants with incentives to practice non-sustainable activities or encourage the entrance of peasants with no experience in extractivism in the reserves. Both INCRA and IBAMA are subject to the limitations of state agencies reviewed in Chapter II, however, whereas before the establishment of the PAEs INCRA had no experience with projects involving environmental conservation, the central objective of IBAMA has always been to ensure the conservation of natural resources.

The legislation on reserves also attempts to address two issues ignored in the PAEs, namely that the conservation of jointly used CPRs requires the existence of rules and monitoring systems specifically aimed at ensuring sustainable resource use, and that resource users need support to develop robust regimes. These issues are addressed by including the Utilisation Plan in the contract between IBAMA and reserve inhabitants, and by the provisions stipulated in the Development Plan. Whether these two initiatives can facilitate the development of robust regimes or hinder the autonomy of the tappers is, however, a moot point to which we will return after reviewing the specific situation in the Chico Mendes Reserve. The stipulations of the Utilisation plan include many of the recommendations of the theory on common property regimes. For example, according to the review of the IBAMA decree by Rueda (1995), the rules should be proposed by the reserve inhabitants based on their knowledge and experience and approved by IBAMA, indicating that the rules are based on local conditions rather than imposed by the state agency.

However, given that rubber tappers' original institutions did not appear to meet any of these features the question arises as to what extent the rules and monitoring mechanisms are indeed those of the tappers. Similar criticisms can be made of some of the items included in the Development Plan. The organisation of training and other activities promote contact among tappers and therefore enhance their capacity to develop a robust regime. The issue of autonomy is strongly stressed in the first item, and the activities are aimed at encouraging the tappers to manage their own reserve. However, some of the requirements of the Development Plan seem contradictory. For example, while item number 1 clearly indicates that the state is aware of the lack of organisation of the tappers and sets up incentives to improve their management of the reserve, item number 2 proposes a management plan based on the tappers proposals. Although the tappers may have sufficient autonomy to manage their own resources in the future, in the present the management of the reserve can only be nominally done by the tappers themselves. On the other hand, setting up a management plan between state and users may serve to encourage the latter to manage their own CPR in the future.

Regarding support for production and social services, whether the support provided is adequate to the needs of the reserve can not be assessed in the context of this thesis. However, as far as this support affects the robustness of the tappers common property regimes the following observations can be made. First, the conditions that apply to the joint use of a resource depend on the use that is made of a resource. Support for production is thus important in the sense that it will secure that tappers find alternative ways of using the resource which can increase their economic situation and not endanger the CPR. Second, poverty is a strong incentive for resource depletion. Tappers, if faced with lack of access to medical services and poor return on their production, will be inclined to undertake short-term strategies to improve their welfare, even if

they have a robust common property regime. The price of rubber has been decreasing in the last few years, and given the new incentives faced by tappers, the decline of their economic situation may thus encourage them to destroy their resource. On the one hand, the tappers' economic development depends on the land tenure situation, since, for example, without secure rights they cannot invest in the future. On the other hand, however, the resilience of their land system and the conservation of the resources depends on their economic development (Hall, 1997a). Third, education facilitates access to information, which is a factor that enhances the capacity of commoners to develop robust regimes and tackle changes in the circumstances that threaten their CPRs. For these matters, reserve inhabitants are likely to need outside support. In the case of the Extractive Reserve Chico Mendes External, this support comes mainly from the Pilot Programme and its sub-project RESEX, which is examined in the next section.

6.3 The Pilot Programme Sub-Project on Extractive Reserves (RESEX)

In examining the sub-project RESEX, this section focuses on the same issues that were discussed in relation to the legislation on extractive reserves. That is, it addresses the influence of the external context in this project and whether the aid that the RESEX sub-project provides for extractive reserves is likely to facilitate the sustainable use of resources in reserves. As before, particular attention is paid to the issue of autonomy.

The support extractive reserves receive from the Pilot Programme for the Conservation of Brazilian Rainforests (PP-G7) is one of the most important external factors playing a role in the tappers' common property regimes in the 1990s. Moreover, through the PP-G7 the tappers' capacity to secure the conservation of their forests is also affected by developments in the national and international socio-political and economic context. The PP-G7 influences the capacity of tappers in ERs to manage their resources; as the PP-G7 resulted from the developments in the wider context reviewed in Chapter IV, these developments have thus not only influenced the development of reserves but also their capacity to secure the sustainable use of the forest. Reserves are also affected by developments in the wider context through the PP-G7 because such developments influenced the inclusion of reserves in the Programme and the evolution of the RESEX sub-project since first agreed in 1990.

Support for extractive reserves was already mentioned in the first draft of the PP-G7 (WB/CEC, 1991). At that time, November 1991, they were part of a project that included also support for national forests[4] but later, because of differences in the advancement of the two components,

[4] National Forests are conservation units where productive activities are also allowed; the difference between National Forests and Extractive Reserves, however, is that the latter are based on granting rights to the population already living in the area, whereas in National Forests anyone, or any organisation, can undertake the sustainable exploitation of the forest (Allegretti, 1994).

extractive reserves became a separate sub-project, called RESEX (Hagemann, 1994). The inclusion of ERs in the first draft of the Pilot Programme was related to the political leverage that tappers had in the international arena and among some sectors of the Brazilian government. Sub-project RESEX together with the demarcation of indigenous territories and demonstration projects, were priority projects for the Secretariat of the Environment (SEMAM). However, not all sectors of the government supported the new model of development represented by extractive reserves, reflecting the differences mentioned in Chapter IV between SEMAM and Itamaraty. Aware that RESEX was a politically difficult project, SEMAM, together with the donors and the World Bank who also saw extractive reserves as an important component of the PP-G7, tried everything to advance the RESEX sub-project in the run up to the Earth Summit (Kolk, 1996; Hagemann, 1994). The international interest in extractive reserves was also related to the fact that tappers were by now well known to international public opinion, largely due to their alliances with international environmental NGOs.

Apart from these political factors, the core reason for including extractive reserves in the Pilot Programme was that national and especially international actors believed that tappers can contribute to the conservation of a globally important resource, Amazonia, on account of their economic activity and due to their common property regime. The primary goal of the project National Forests and Extractive Reserves was stated in the World Bank progress report of 1991: "to support efforts to make ... [these concepts] into a viable alternative to deforestation within the Amazonian region" (WB/CEC, 1991:32). Extractive reserves, in particular, deserved "priority for two reasons: firstly, the integrated processing of collected products appears to be well adapted to the ecological conditions prevalent in the highly diversified forest of Amazonia; secondly, organised groups of collectors are a viable form of protecting land from destructive use patterns" (WB/CEC 1991:31). The second motive for supporting extractive reserves suggests that there had been change from previous decades when common property tended to be associated with resource depletion. The tappers perhaps would not have received the same level or type of support had common property still be seen as an imminent 'tragedy of the commons'. The environmental dimension of extractivism has been, however, the main factor behind the international support the tappers have received (FoE/GTA, 1994). It should be noted that as regards biodiversity conservation, which is one of the reasons for international interest in the maintenance of the forest, extractive reserves are not necessarily the best solution. Because of the nature of extractivism, ERs will be established in areas of low biodiversity, since from an economic perspective the best areas are those where there is a high concentration of single species (Browder, 1992). On the other hand, however, biodiversity does not require only the conservation of areas which are particularly rich in species, but the conservation of the forest as a whole. In this respect as well as in relation to the role of the forest in the global climate, extractivism can play a significant role (de Almeida, 1994).

The developments in the national and international political context in the early 1990s also influenced the development of the RESEX sub-project, whose implementation only occurred in 1995. Hence, the capacity of tappers to manage their resources was also affected by developments in the external context, since the activities planned for strengthening their regimes were delayed on account of these developments. As seen in Chapter IV, once the Earth Summit was over, interest in environmental issues within Brazil and international concern with Amazonia diminished considerably and, consequently interest in extractive reserves also decreased. The change of government in Brazil (because of President Collor's impeachment) also contributed to reduce interest in the rubber tappers. The new Secretary of the Environment, Ambassador Perri, was not in favour of the Pilot Programme, which he thought put too much emphasis on extractive reserves. According to Hagemann (1994:135) government officials were worried that the RESEX sub-project would lead to the creation of additional reserves. In early November 1992, according to an internal survey of the Ministry of the Environment, there was no progress concerning the Extractive Reserves sub-project (Hagemann, 1994). In October 1993, a new version of the sub-project RESEX was presented to the World Bank. This version incorporated the results of the pre-investment phase as well as the comments made by the World Bank on the previous proposal, and counted with the contribution of CNS (GoB/BIRD/CUE, 1994). In April 1994, the World Bank appraised the latest draft of sub-project RESEX and declared it effective in February 1995; in May of that year the first disbursements towards the US$ 9 million project began.

The overall objective of the sub-project RESEX is "to test in four extractive reserves appropriate models of economic, social and environmental management; to improve methods and techniques used by traditional populations for the use of natural resources in tropical forests, through co-management between Government and society. The project aims at promoting the generation of rent, social equity and the spread of experiences concerning sustainable use of natural resources" (GoB/BIRD/CUE, 1994:12[5]).

As suggested in Chapter II, support for commoners should be aimed at ensuring that outsiders do not have access to the commonly owned CPR and at encouraging the co-owners of the CPR to develop common property regimes. Encouragement can include provision of information, arenas for conflict resolution, supply of small-scale infrastructure, establishing monitoring procedures and mechanisms for communicating the views of users. An important requirement,

[5] O objectivo geral do Subprojecto Reservas Extractivistas é testar, em quatro RESEX, modelos apropriados de gerenciamento econômico, social e ambiental aperfeiçoando os métodos e procedimentos utilizados pelas populações tradicionais, na administração dos recursos naturais renováveis nas florestas tropicais, através da co-gestão entre Governo e sociedade. Pretende-se viabilizar geração de renda, equidade social e difusão de experiências, tendo como base a conservação dos recursos naturais (GoB/BIRD/CUE, 1994:12).

is, however, to leave sufficient autonomy to the commoners, so that they devise the institutional arrangements.

Sub-project RESEX is constituted by five components (see Table 6.3), and the first one, implementation of the reserve, aims at strengthening the reserve mechanisms to prevent overuse of the natural resource base by both outsiders and reserve inhabitants. This is done by supporting the activities involved in the first phase of the establishment of a reserve (as outlined in the IBAMA decree). Regarding regularisation of landed property rights, the project finances, for example, topological studies to demarcate the reserves' boundaries. To strengthen representative organisations of each reserve, RESEX promotes meetings among the inhabitants of the reserve and provides financial support for these meetings, e.g. for stationary, meals and transport of forest dwellers. Regarding monitoring, the sub-project aims at strengthening the institutional capacity of the relevant state organisations, of the extractivist associations and of the forest dwellers' to deal with these matters. Regarding the latter, the Pilot Programme provides training of rubber tappers as environmental monitors (*fiscais colaboradores*) who should be members of the community, preferably one of the leaders.

The support provided by the RESEX sub-project is based on the particular state of affairs of each reserve (GoB/BIRD/CUE, 1994; Irving and Millikan, 1997). Although the four reserves supported by the Pilot Programme were created in 1990, their situation regarding the three phases of their implementation were not similar. For example, in some of them the demarcation of the reserve boundaries and regularisation of landed property rights were not yet complete. In the case of Extractive Reserve Chico Mendes, the demarcation of the limits of the reserve had already been done, but there were still problems regarding the payment of compensations to former landowners. Concerning the entity that should represent the inhabitants of the reserve, this was not defined in all reserves. In the case of the Chico Mendes reserve, for example, given the large size of this reserve (it covers an area of nearly one million hectares) support was provided for the creation of three, instead of one, representative associations.

The second component of the RESEX sub-project, community organisation, is aimed not only at securing the harmonious use of the natural resource base by the reserve inhabitants, but also at enhancing their capacity to manage the reserve in order to increase their economic situation. This component includes activities to strengthen the managerial capacities of the population of the reserves. That is, to improve the management capacities of the entities representing the reserves' inhabitants, and other organisations responsible for the reserves, e.g. IBAMA, CNS, unions, existing co-operatives. This requires investment in physical infrastructure, such as construction or improvement of central offices, facilitating transport and bettering communication services (telephone, fax, radios for the headquarters, warehouses and other

strategic places, office equipment, such as computers, calculators and furniture). To strengthen the managerial capacity of the reserve inhabitants it is also planned to set up training schemes in community organisation, administration, organisation of the production, commercialisation, financial administration and design of projects. Support for education and health are also part of this component which includes literacy courses for adults, building of schools and health posts inside the reserve, training of teachers and health workers, and investment in public health.

Table 6.3 Components and sub-components of Sub-Project RESEX

RESEX sub-project components	**RESEX sub-project sub-components**
Implementation of reserves	• Regularisation of land tenure • Strengthening of entities representing reserve inhabitants • Utilisation plan • Monitoring
Community organisation	• Physical and operational infrastructure of local associations • Training in administration, finance, accountancy and management • Education • Health
Improvement of productive activities	• Diffusion of improved technologies for subsistence and pilot activities • Improvement in processing and commercialisation of traditional • products • Applied research on new potential economic activities • Improvements in storage, transport and communication
Management of natural resources	• Socio-environmental data base for reference for development • plans • Research to support the production initiatives • Socio-environmental monitoring
Management and evaluation of sub-project RESEX	• logistic support for CNPT • training staff working in the project • creation of information system for physical and financial data • hiring of consultants for evaluating the project

Sources: GoB/BIRD/CUE, 1994; Irving and Millikan, 1997

The third component of the sub-project also addresses the issue of economic development and it is aimed at the improvement of productive activities because the collection of rubber alone is not profitable enough for the tappers to survive on. Rubber extraction, however, can be

economically viable if practiced in combination with other activities, such as agriculture, small-scale farming as well as the extraction of different products (Schwartzman, 1994). According to Torres and Martine (1991) an economy based on the extraction of a combination of wild products, poly-extractivism, can also be sustainable. Poly-extractivism involves the extraction of products that have an individual demand that is too small to make the domestication of the product profitable, but where the sum of the collection of all the products is profitable or can at least guarantee a decent income for the collector. Support for productive activities include improving technologies used for subsistence and pilot activities such as cultivation of vegetable plots, agroforestry systems, rearing of small animals, and micro-fish farms. There is also investment for ameliorating rubber and Brazil-nuts processing techniques; for developing more profitable ways of commercialising these products and for the construction of warehouses, improvements in transport as well as in communication systems. In addition, the PP-G7 supports applied research on potential economic activities that could be practiced in the area. All these activities must be based on the sustainable use of the forest.

The fourth component of the sub-project RESEX is environmental management, which includes the development of a referential database (to evaluate the evolution of the project), the implementation of a global system of environmental monitoring in each reserve, and a plan for the sustainable development of the reserve. This plan's objective is to examine what can be accomplished concerning the sustainable utilisation of natural resources in the area; for example, what are the potential impacts of the new production and transport developments in the area, how to minimise these impacts, which activities are most appropriate for the area. The necessary studies for drafting this plan will be carried out by specialists, in co-operation with people living in the reserve and representatives of the reserve inhabitants, under CNPT supervision.

To conclude the inclusion of the RESEX sub-project in the Pilot Programme appears to represent a positive development in the external context of the rubber tappers. This sub-project contributes to enhance the exclusion rights of the tappers to their resources and includes several items aimed at encouraging the development of robust regimes in the reserves. Moreover, much of the aid provided by the tappers relates to problems that the tappers alone do not have the means to tackle. For example, development of alternative economic activities that can increase the return of their produce, provision of detailed information on the environmental possibilities of the area, and supply of infrastructure and financial means to enhance the organisational capacity of the rubber tappers. However, whether the project interferes with the autonomy of the reserve dwellers and whether the support they provide are adequate to the features of each reserve is an issue that cannot be assessed from the review of the documentation. These two questions thus will be only addressed after examining the Chico Mendes Reserve and in relation

to this specific reserve only. The RESEX sub-project's actual impact on the Chico Mendes reserve could not be evaluated during the fieldwork, which was carried out at the same time that the activities of this sub-project were only starting to be implemented. However, after examining the characteristics of this reserve in the next chapter, the Conclusion of the Thesis will discuss the adequacy of the PP-G7 support with regard to the characteristics of this reserve.

6.4 Conclusion

This chapter has attempted to examine the legislative framework of extractive reserves and the support they receive in the context of the Pilot Programme. In performing this task, the chapter has first shown how changes in the wider national legal setting and developments in the national and international socio-political context influence the capacity of extractive reserves to ensure the conservation of the CPR.

Chapter II suggested that developments in the external context can influence the capacity of commoners to tackle problems created by changes in the circumstances. One component of the external context which can affect commoners is the legal setting. In Chapter V, it was shown how the existence of recognition for *posseiros* rights facilitated the struggle of the tappers against the ranchers and how, on the other hand, the absence of any legal item recognising common rights to resources rendered their struggle more difficult. In this chapter, the relationship of the tappers with the wider legal setting was observed at several points. First, the tappers' struggle led to a change in the legislation of the country: the concept of common property to resources was recognised for the first time in the PAEs. The PAEs were specifically designed to answer the demands of the rubber tappers, however, they are legal items to which other commoners can also apply. Second, changes in the Constitution of Brazil provided opportunities for the tappers to improve the legal back-up of their rights. For example, by giving a stronger legal basis to environmental units, making the Amazon rainforest national patrimony and including sustainable use of resources as a means to achieve resource conservation, the new Constitution facilitated the tappers' capacity to obtain the recognition of their rights.

Another component of the external context which has influenced the tappers has been developments in the socio-political context, both in Brazil and abroad. Chapter V largely discussed this influence in relation to the process that led to the recognition of the tappers' rights, i.e. the establishment of reserves. This chapter suggested that the socio-political developments have also affected the capacity of rubber tappers to sustainably use their resources within extractive reserves. The inclusion of extractive reserves in the Pilot Programme and the delays that have occurred in the implementation of the RESEX sub-project, were related to the balance of power between different members of the Brazilian government. The support that tappers receive from the G7 has been related to socio-political developments in the international

arena, which influence the level of interest environmental issues receive in relation to other international problems. As commented in Chapter IV, for example, after the Earth Summit international donors' concerns were more geared towards Eastern Europe rather than environmental issues, a fact that according to some observers influenced the disbursements for the Pilot Programme.

Second, this chapter has provided a preliminary assessment of whether the legal framework and aid that the reserves receive, can be considered to facilitate the conservation of natural resources in extractive reserves. The framework on common property regimes outlined in Chapter II suggested that a facilitative framework should secure the boundaries of the CPR against non-owners, help commoners to harmonise their use of the CPR and leave resource users sufficient autonomy to manage their resources.

The legislative framework on extractive reserves, including both the General Decree and IBAMA's Manual for the Creation and Establishment of Extractive Reserves, and the aid provided by the Pilot Programme largely meets the first requirement. Tappers' rights are given priority over other claimants both upon the creation of the reserve and upon the establishment of the contract between IBAMA and resource users. Property rights are granted for the long term and once they have been granted they cannot be easily removed. The fact that there is an agency specifically aimed at supporting the reserves' inhabitants and which is within an environmental agency, suggests that the state will not, as in the case of the PAEs, grant rights to individuals who are not part of the established community. In addition the PP-G7 provides support for the regularisation of the tappers' rights and the existence of this project also suggests that there is some level of international monitoring regarding the management of extractive reserves by IBAMA. Finally, the tappers now have more access to information than in the past, which would increase their capacity to expel outsiders trying to take over their resources. Finally, outsiders cannot obtain legal rights to the areas within extractive reserves and thus land speculators will be less attracted to occupy the tappers' lands. However, outsiders may also be interested in short-term investment in, for example, logging, for which legal rights are not so necessary. Although the boundaries of the tappers' resources are legally recognised and there are strong indications that the state actively supports these rights, IBAMA does not have the capacity to monitor the entire area. Tappers therefore must also participate in monitoring, and whether they do so in the Chico Mendes Reserves is an issue discussed in the next chapter.

Regarding the harmonious use of the resource by the tappers, the literature suggests that they do not have developed the necessary mechanisms. The legislation on reserves and the Pilot Programme attempt to address this issue in several ways. First, having established state ownership of the land, the legal framework prevents tappers from defecting in terms of selling

their plots to outsiders which was the only defection problem identified at the time. Second, it conditions the tappers' property rights to their sustainable use of the resource base. Third, the regulations regarding the use of the CPR are not totally externally designed, but at least formally they incorporate the resource users knowledge of the resource. Fourth, both IBAMA's internal decree and the RESEX sub-project include a number of items specifically designed to encourage the tappers to develop a robust regime. In spite of the provisions made for the harmonious use of the CPR in the legislation and the support the tappers receive, the sustainable use of the resource depends, however, on whether the tappers have or develop mechanisms for harmonising their use. Like the monitoring of boundaries, this is an issue that can only be assessed by examining the actual situation of an extractive reserve and will thus be assessed in the next chapter.

Finally, this chapter has introduced the issue of autonomy. According to the literature on common property, a robust regime and the development of such a regime depends on the autonomy that external actors leave to the resource users. This chapter has suggested that the aim of both the RESEX sub-project and the legislation on reserves is that tappers should be autonomous and manage their resources without state interference. However, this chapter has also raised some questions regarding the autonomy of the tappers. First, do tappers have autonomy at present or is autonomy only a future aim? If tappers did not have robust mechanisms for harmonising their use of the forest before the establishment of the reserves, to what extent are the rules and monitoring mechanisms of the Utilisation Plans indeed those of the tappers? Second, if the tappers are not autonomous, should they have more autonomy, as the theory on common property regimes would suggest? That is, can they ensure the conservation of the rubber estates if outsiders do not interfere in their supposedly weak common property regimes? Third, are the stipulations of the legislation and RESEX sub-project appropriate to the specific features of each reserve? To what extent, for example, the requirement that users must decentralise is in accordance with the characteristics of their informal institutions?

The next chapter thus turns to examine the actual characteristics of the Extractive Reserve Chico Mendes and in doing so it assesses whether the tappers' external context facilitates the conservation of natural resources in this particular reserve.

Chapter VII
The Extractive Reserve Chico Mendes

Introduction

This chapter examines the characteristics of one particular reserve, the Extractive Reserve Chico Mendes (ERCM). In doing so, the chapter assesses whether this institution can ensure the sustainable use of natural resources in the long term, taking into consideration the external factors reviewed in the previous chapter and internal factors which relate to the reserve inhabitants, their natural resources and their informal institutions.

As outlined in Chapter II (see fig. 2.4, page 60), the sustainable use of a CPR owned in common depends on the jointness and exclusion conditions of the CPR, the characteristics of the group of co-owners, the features of the common property regime and on the external context. The present chapter begins thus by examining the jointness and exclusion conditions of the Chico Mendes Reserve and the characteristics of its population. The second section of the chapter explores the institutional arrangements of the reserve in order to assess whether the regime is robust, i.e. whether it addresses the jointness and exclusion conditions of the CPR and can cope with a certain level of change in the circumstances. In a robust regime the boundaries of the CPR and the co-owners are well defined, there are rules specifically aimed at securing the conservation of the CPR, and monitoring, enforcement and conflict resolution mechanisms. In addition, co-owners should have sufficient autonomy to manage their resources. As these conditions are not fully met in the reserve, this section concludes that the reserve is not a robust regime. The third section thus explores the potential for a robust regime to develop by looking at the factors that according to the theoretical framework are conducive to the development of robust regimes. The fourth and last section of the chapter identifies the factors that have contributed to the development of incipient common property regimes on the rubber estates and argues that the role of external help is crucial for the reserve to become a robust regime, but that autonomy is also essential.

The analysis of the ERCM provides not only an assessment of the capacity of this institution to secure the conservation of the natural resources in the area, but also an insight into the relationships between external and internal factors in the context of common property regimes. In this context, the delicate balance that exists between the commoners' need for autonomy and external help are discussed. The bulk of the analysis exhibited in this chapter is based on

interviews carried out by the author with approximately 100 forest dwellers and 10 key interviewees (see Methodology section in Chapter I and Appendix 1). The interviews took place on five rubber estates listed in Table 7.1.

Table 7.1 Rubber estates visited

Rubber estates	Distance to nearest city - Xapuri	Rubber estates	Distance to nearest city – Assis Brasil
São Pedro	1 day by boat	Guanabara	12 hours walk
Floresta	5 hours walk	Icuriã	5 hours walk
Dois Irmãos	5 hours walk		

Source: author

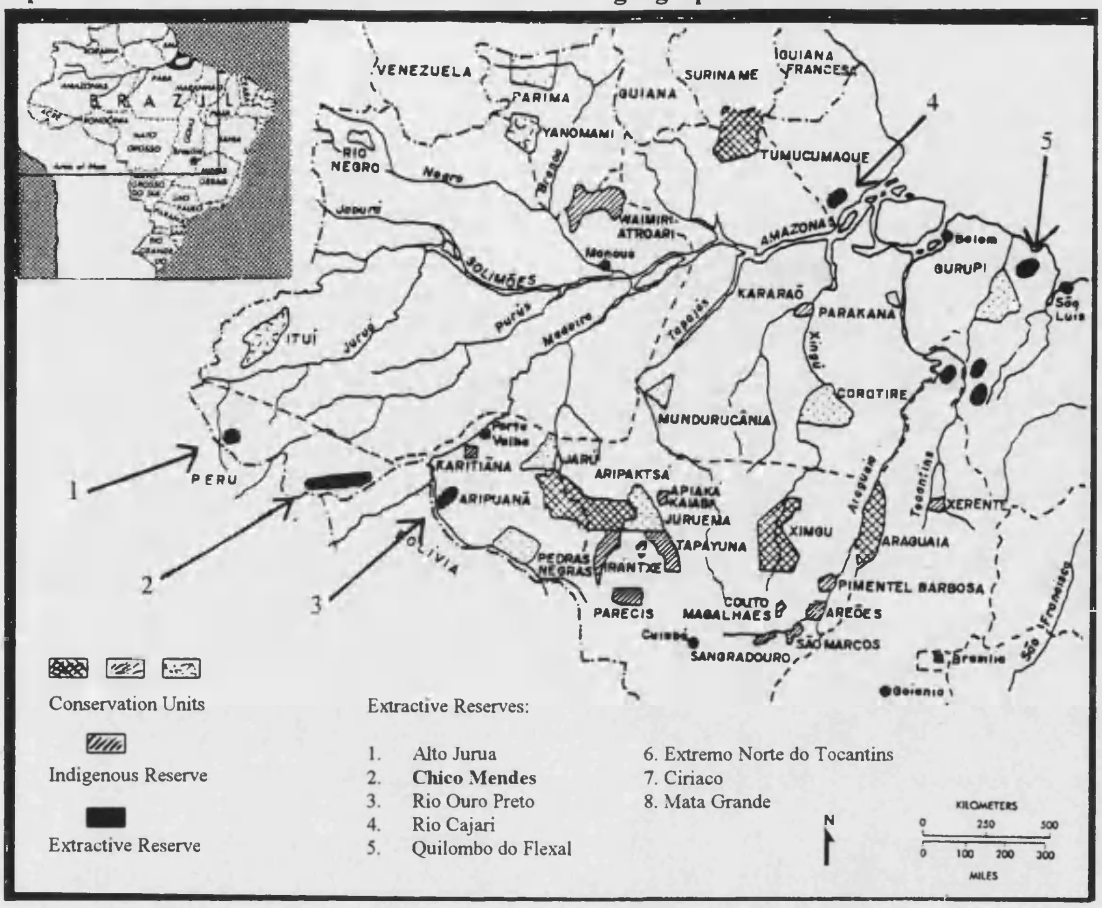
Note: Xapuri is the closest city to Rio Branco, the capital of Acre. Assis Brazil is one day by car from Xapuri during the dry season and largely inaccessible during the rainy season.

7.1. The resource users and the CPR

As it can be observed in Map 7.1, the Extractive Reserve Chico Mendes is located in the state of Acre, in the Southwest of Amazonia. The reserve covers an area of 9,705 sq. km inhabited by 1,838 families. In relation to Amazonia as a whole the size of the reserve is not significant. However, in relation to other CPRs in the literature the ERCM can be considered to belong to the group of large CPRs and thus present the management difficulties associated with large common pools. For example, monitoring mechanisms for large CPRs tend to be more complex than for small CPRs (e.g. village well) that can be more easily monitored in the context of the co-owners daily activities.

The reserve inhabitants are rather isolated, both in terms of their property rights system and of their economic activities, which may become an incentive to change their use of the CPR. From the late 19th century until the early 1960s, the rubber tappers in the area which is now the ERCM were surrounded by areas where the property rights system was similar to theirs and where extraction of rubber was the main activity. Therefore, during that period there were not obvious alternative forms of occupation of the land. In the 1990s, however, the tappers living in the ERCM have a property rights system that is radically different from those of the neighbouring areas and their use of the forest also differs from that of their neighbours. There are no other conservation units or indigenous reserves (where the land is also held in common) close to the ERCM (see Map 7.1). The reserve's isolation makes the development of a robust regime more necessary but also more difficult, as it is unlikely that tappers would continue using the resources in a different way from their neighbours unless there are mechanisms that ensure that they do so.

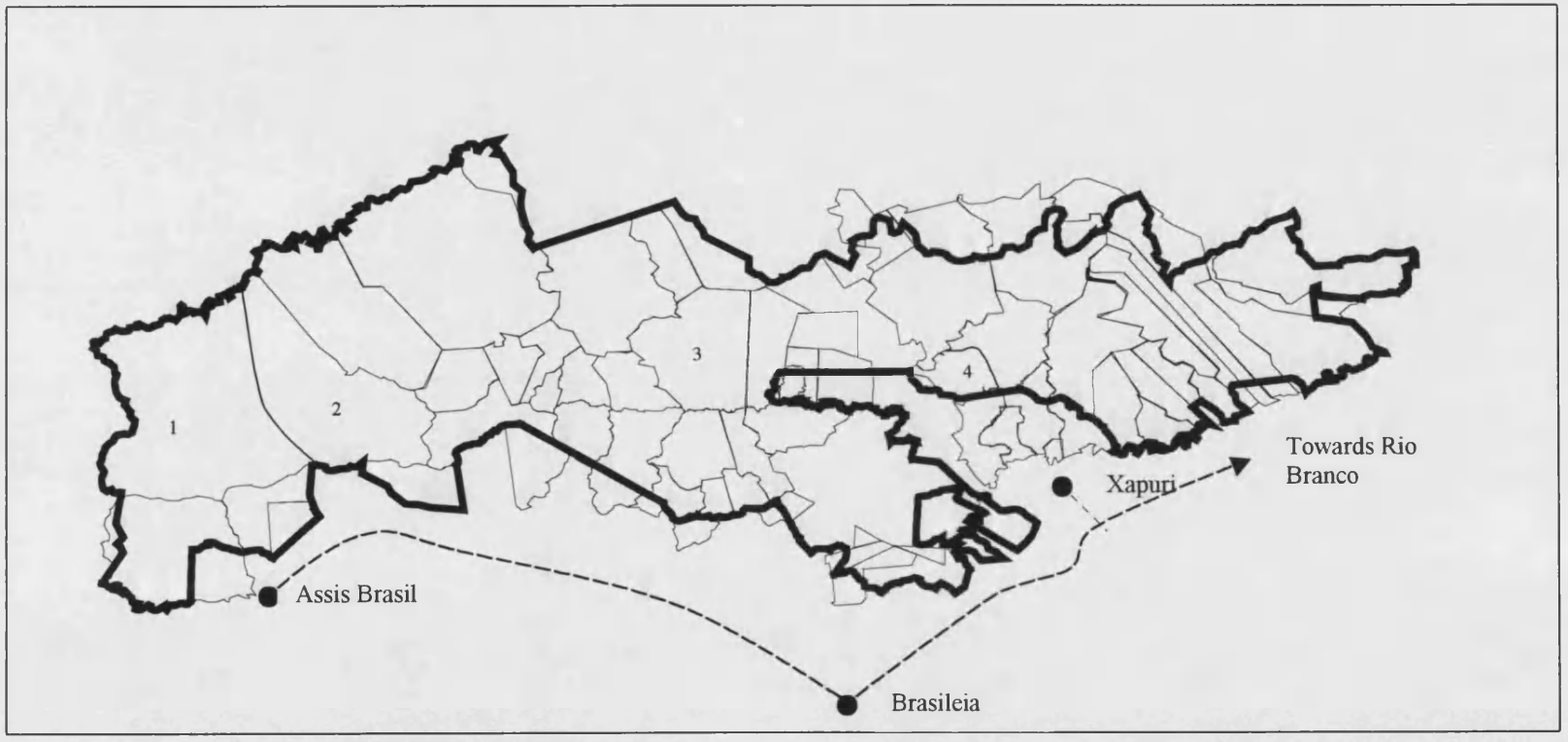
Map 7.1 The Extractive Reserve Chico Mendes: the geographical context of the reserve



Adapted from: Becker and Egler, 1992, page 220; Hall, 1997, page 102 and MMA, 1995

Most of the conflict over landed property rights examined in Chapter V took place between the municipalities of Xapuri and Brasileia (see Map 7.2). The tappers' organisations that developed in this area, however, did not fight only for recognition of their own property rights. Their objective, upon the creation of the reserve was to include as many extractivist areas as possible in what would become an extractive reserve. The rubber tappers' leaders knew that the problem they had faced with the arrival of the cattle ranchers would be repeated in any extractivist areas left outside legal protection. It was clear that if areas bordering their own stands were occupied by ranchers this would put pressure on their own forests. An additional motive for including the largest possible number of extractivists areas in the future reserve was that this was part of the new objective of the tappers' organisations. From 1985 onwards, as we saw in Chapter V, the objective of the tappers' organisations was the improvement of the socio-economic conditions of the extractivist population in general through the establishment of extractive reserves.

Map 7.2. Extractive Reserve Chico Mendes: boundaries of the reserve and of rubber estates and former ranches



1 Rubber estate Icuriã
2 Rubber estate Guanabara
3 Rubber estate São Pedro
4. Rubber estate Floresta
5 Rubber estate Dois Irmãos

Road: BR 317

Boundaries of reserve

Boundaries between Rubber estates

cities

N

Scale: 1/1,000,000

Adapted from:
Mapa Demonstrativo dos imóveis abrangidos pela Reserva Extrativista Chico Mendes, Sena Madureira,Assis Brasil, Brasileia e Rio Branco, Cliente: IBAMA/CNPT
ASSERPLAN – Engenharia e Consultoria, Ltd.m 10/3/92

As a result of this approach, the population of the Chico Mendes Reserve is large and relatively heterogeneous. Whilst some of the reserve inhabitants have a long history of co-operation and collective action, this is not the case for many others. According to a member of one of the rural unions who had accompanied tappers' struggle from the beginning, only around 30% of the inhabitants of the reserve had taken part in the fight for land. Moreover, among those who participated in the struggle, especially by taking part in stand-offs, many did not follow the political and bureaucratic process that culminated in the creation of the reserve. On the other hand, all interviewees shared a 'common memory' of the potential advantages of co-operating and they were aware of their dependency on the natural resource. All rubber tappers interviewed knew of the existence of the stand-offs and how important they had been in securing their rubber stands. Many interviewees had either participated in one or more stand-offs, or knew someone who had. Those who had not participated said that at the time of the confrontations with the cattle ranchers they were children, or that stand-offs had not taken place in their areas. All respondents were fully aware of the reasons that prompted the staging of stand-offs, namely to prevent cattle ranchers from occupying their lands; they were ready to do it again if necessary. The fact that they had now security over their rubber stands was greatly appreciated. Even in those areas where the ranchers had not arrived, the tappers had heard of the brutal expulsions of extractivists, and they knew of tappers who had not been able to make a living in the cities.

Another outcome of the approach taken by the tappers' organisations is that the boundaries of the ERCM do not correspond to any existing natural boundaries or to boundaries that had been previously established by an informal institution. The area inside and around the reserve presents the same ecological features. Prior to the creation of the reserve, there was no informal institution which had jurisdiction over the nearly 10 000 sq. km. In 1990, when the ERCM was created, the area which is now the reserve was a conglomeration of approximately 50 former rubber estates and *fazendas* or former ranches (see Map 6.1) inhabited by autonomous or quasi-autonomous rubber tappers who did not have any organisation that represented them all. Moreover, the area of the reserve does not fully correspond to the extractivist areas. Upon the demarcation of the reserve boundaries, carried out by IBAMA in co-operation with local teams and CNS representatives in 1991, it was found that the limits stated in the constituting degree were incorrect (ELI, 1994). Whilst deforested areas had been included in the reserve, some rubber estates with tappers living on them had been left out. This error resulted from the fact that IBAMA had based the drawing of the reserve boundaries on aerial photographs without *in situ* confirmation.

Exclusion of outsiders is difficult because of the large size of the reserve, the absence of clear natural boundaries and the density of the forest. There are equally dense forests on both sides of the reserve's extensive limits. Hence, to exclude outsiders it is necessary to physically demarcate the boundaries and to monitor them. Given the density of the forest this is likely to be difficult because intruders can enter unnoticed at almost any point along the reserve limits. For an external agency to monitor the boundaries would thus be very costly. For the reserve inhabitants less so because some of them live near the limits of the reserve and thus they would notice outsiders in their daily walks along the rubber paths. However, the population in the reserve is quite dispersed and outsiders can enter through non-inhabited areas. Poverty can increase this problem because it acts as an incentive for tappers abandoning the forests and as more areas are abandoned it becomes more difficult for the remaining tappers to prevent entrance of outsiders.

The joint use of forests in the ERCM is based on the individual use of the rubber stands. That is, joint use of the CPR does not mean that that all co-owners extract units from the same common patch of forest as, for example, in the case of a pasture, where all the herdsmen take their animals to the same place, or a ground water basin, where all users take water from the same basin. The forest is 'divided' in rubber stands and each individual or family has individual rights to the stand; a tapper can only extract rubber from his stand and not from the rest of the forest. However, as mentioned in Chapter III, the forest as an ecological system is not divisible; a rubber stand cannot survive in isolation. Also, as mentioned in Chapter V, the rubber stands do not form clearly delimited wholes; they are intertwined. The 'division' of the reserve in rubber stands is thus better understood as a specific allocation of rights based on the characteristics of the forests and the use the tappers made of it. For example, in the case of a village that jointly uses a ground water basin, co-owners may stipulate that each family has the right to use the well only once a day and take only three buckets of water. In the reserve, co-owners only have the right to use their stands. Nevertheless, they cannot act independently, since if each tapper does not ensure the conservation of his stand this will have implications for the forest and thus for all the tappers' reserve.

The allocation of property rights to resources in the reserves, however, did not result from an explicit agreement by the tappers that rights should be distributed the way they are. The rubber estates have been constituted by individual rubber stands since the time of the rubber barons. The fact that this system of property rights did not wholly[1] result from an explicit decision to conserve a jointly used CPR may explain why the majority of the interviewees tended to see their resources

[1] Although the 'division' of the rubber estates was not the tappers' decision, it was their decision to maintain such an arrangement when in 1985 they devised 'extractive reserves' as the solution for their problems (see Chapter IV). However, as mentioned earlier in this chapter, not all the ERCM inhabitants participated in this decision.

in terms of the rubber stands (individual units) rather than the forest (the common resource). Although the stands are intertwined and tappers use resources from each other's stands, e.g. there are no restrictions regarding the use of fruit trees in the stands, tappers are largely individualistic (Hall, 1997b). There are no communal rights to the stands, even within the same family. For example, if one of the daughters or sons gets married, the new family sometimes stays in the same stand but the young couple builds their own house and does not work in common with the parental family. The stand is divided and some rubber trails are given to the new couple. This could be explained by the fact that rubber tapping is an individual type of work. However, the new family also has its own agricultural plot. The son will help the father in his agricultural plot, and if the father is not too old he will help the son too, but each stand belongs to one family only.

The main 'cash earning' activities of tappers living in the reserve are rubber tapping and collection of Brazil nuts; they also practice subsistence agriculture and hunting mainly for consumption purposes (Feitosa, 1995). These activities allow for the joint use of the CPR as long as the clearings for agriculture are small and the maximum sustainable yields of the rubber trees and the game are respected. Even in the absence of a robust common property regime, tappers cannot exploit the resource to its limit as in the case of the herdsmen described by Hardin (1968) because the utilisation of the rubber stands is limited by the number of family members able to work. Sometimes, stand-owners hire young tappers to work in their rubber trails, however, the availability of employees is limited because given the low capital investment which is necessary to 'own' a rubber stand, the employee will move to his own stand as soon as he gets married. Second, if a tapper exhausts his rubber trees he will have to clear a new set of rubber trails in a different area, which involves a considerable amount of work.

The main threat to the tappers' harmonious use of the forests is that the reserve inhabitants may switch to economic activities with a lower jointness potential, such as small-scale cattle ranching or logging. The inhabitants of the Chico Mendes Reserve are very poor which is an incentive to engage in activities that have a higher return even if only in the short term, as commented in the previous chapter. Their economic problems arise mainly from their dealings with the middlemen, who buy the rubber at low prices and charge inflated prices for commercial goods. Apart from their economic problems in the strict sense, tappers have little access to social services – in 1995 only 43% had access to medical services in the city of Xapuri (ELI, 1994: 55) – and in 1994 93% of the population was illiterate (ELI, 1994:55). If a change in the circumstances provides the reserve inhabitants with the possibility of practising non-sustainable activities, they will be attracted by the prospect of being able to move to a city where they would expect to be able to educate their children and have access to medical services. Several interviewees commented that

if they had the financial means they would try for a better life in the cities. Apart from being a crucial end in itself, addressing the issue of poverty in the reserve is thus also necessary for securing the sustainable use of the CPR.

In Chapter VI we saw that the formal institutional arrangements of extractive reserves involve co-management between the state and the reserve inhabitants. The review of the jointness and exclusion conditions of the Chico Mendes Reserve and the characteristics of its inhabitants suggest that the ERCM meet several of the conditions that, as highlighted in Chapter II, make co-management an appropriate regime for the conservation of a jointly used CPR. First, the CPR is extremely large. The conservation of the rubber stands does not depend only on whether small groups of tappers sustainably use their resources. Given the indivisibility conditions of the forest, the entire area of the reserve (as well as neighbouring areas) must be sustainably used. In other words, small groups of tappers may set up arrangements to secure their own area of the forest, but, unless the remaining inhabitants also conserve the forests, the conservation of their stands is at risk of depletion. It is, however, difficult (but not impossible) for small groups of tappers to establish such mechanisms in the entire reserve, in which case external help may be welcome. Second, the reserve inhabitants as a group present characteristics that render difficult the development of a robust common property regime. The reserve inhabitants tend to focus on the management their own stands rather than the common areas. Also, they form a relatively large and heterogeneous group spread over an extensive area and, given that the means of transport is walking, contact among tappers from different areas is difficult. Even among tappers living near by, contact is difficult, as it does not occur via their work, which is individual, and houses are usually one-hour walk from each other. Third, the conservation of the forests is influenced by factors that do not only depend on the existence of robust resource management regimes, such as access to health and education and variations in the price of rubber. A system of co-management appears thus adequate to the ERCM; whether the specific system in place in the reserve is conducive to the sustainable use of the forests is however a different issue, which the next section examines.

7.2 Co-management in the Chico Mendes Reserve

In reviewing the institutional situation of the ERCM, this section examines the formal institutional arrangements of the reserve in light of the information gathered through the interviews with the reserve inhabitants and suggests that the reserve is not a robust regime. The formal arrangements of extractive reserves, as seen in Chapter VI, include delimitation and protection of boundaries, participation of reserve inhabitants in the co-management system

through their representative organisations and an Utilisation Plan, which specifies the rules, monitoring and conflict-resolution mechanisms of the reserve.

As outlined in Chapter II, well-defined and protected boundaries are important for two interrelated reasons. One is that this condition must be met for co-owners to be able to expel outsiders and thus ensure that the resource is used only by a restricted group of users. The second is that without well-defined boundaries co-owners cannot manage the CPR because they do not know what are they managing and for whom are they managing it.

Table 7.2 Implementation of ERCM - Chronology

DATES	EVENTS
March 1990	Decree establishing the Extractive Reserve Chico Mendes
September 1991	Demarcation of reserve boundaries begins
November 1991	Conclusion of reserve boundaries demarcation
February 1992	Information on land tittles completed[2]
1992	Completion of reserve population studies
End 1992	Expropriation actions of private lands inside the reserve begins
November 1994	Creation of Associations of Inhabitants of the Reserve Utilisation Plan discussed with reserve inhabitants
April 1995	Utilisation Plan approved by IBAMA
April 1995	Implementation of PP-G7 sub-project RESEX begins

Sources: ELI, 1994; Feitosa, 1995; GoB/BIRD/CUE, 1994

By 1995, at the time of the fieldwork, the boundaries of the reserve were formally well defined and regularisation of the tappers' exclusive rights was virtually complete (see Table 7.2). Although the boundaries had been demarcated in 1991, there had been several problems regarding the regularisation of the land tenure situation in the reserve because of the disputes over landed property rights in the area and the existence of land titles granted by different bodies (see Chapter V). In addition, at the time of the creation of the reserve, IBAMA had no experience with expropriation procedures and there was little co-operation with other governmental organisations on the matter, such as INCRA (ELI, 1994; Irving and Millikan, 1997). The delays in the regularisation of the land tenure situation contributed to the continuation of conflicts over access to natural resources between rubber tappers and non-tappers who have land titles to areas in the reserve (Irving and Millikan, 1997). In the second half of 1992, however, IBAMA obtained legal

[2] *Conclusão de levantamentos e pesquisas de titulação.*

rights to take possession of the lands in the reserve and was able to expel former owners[3]. The formal situation of the reserve in 1995 would thus suggest that the reserve meets all requirements regarding boundaries.

However, the interviews with the forest dwellers provided a different view of the situation. The large majority of the interviewees did not know the boundaries of the reserve. This can be partly attributed to the inadequate description of the boundaries in the Utilisation Plan: the limits of the reserve are described in cartographic terms that are difficult for a lay person to understand, let alone a mostly illiterate population. There is not an additional description of the reserve boundaries using the terms of reference familiar to the forest dwellers, e.g. 'the reserve ends in the rubber stand so and so' (the names of the rubber stands do not change with the owner). Some interviewees, who lived near the limits of the ERCM, knew the boundaries near by. All interviewees knew that their stands were inside the reserve, and thus outsiders did not have the right to take them over. On rubber estate Guanabara, however, interviewees only knew their rubber stands were protected since 1994, thus four years after the creation of the reserve, when some IBAMA members had informed them of their new rights. Regarding exclusion of non-owners, the answers of the interviewees suggest that reserve inhabitants would be able to expel non-owners if the latter tried to occupy their own or their neighbours' rubber stands. Unless of course, there are other estates in the situation of Guanabara in 1994, in which case it cannot be asserted whether they would fight for their rights like the tappers in Xapuri in the 1980s or be forced to abandon their stands. Regarding the management of the CPR/ERCM, however, the forest dwellers' comments suggest that they either do not manage the reserve or do not know what they are managing and for whom.

Two further observations suggest that the forest dwellers participate little in the management of the ERCM. First, the interviewees do not consider the formal organisations, that should co-manage the reserve with IBAMA on their behalf, as their actual representatives. By October 1997, the co-management contract of the ERCM was not yet concluded (Irving and Millikan, 1997), but when the fieldwork started the formal representatives of the reserve inhabitants had already been established. As mentioned in Chapter VI, because the area and population of the ERCM is rather large, in this reserve there are three entities representing the reserve inhabitants: the Associations of Inhabitants of the Extractive Reserve Chico Mendes of the Regions of Assis

[3] The ownership of the land could not be granted to IBAMA until the land tenure situation of the area had been clarified and the disputes over landed titles solved. To speed up the process, IBAMA recurred to a legal device and made a 'judicial deposit' (*depósito judicial*) of the indemnities to be paid to the owners of the land in the reserve in August 1992. This deposit made it possible for the tribunals to issue the provisory ownership of the land in the reserve to IBAMA (ELI, 1994). The legalisation of the rights of the reserve inhabitants was not possible until IBAMA had achieved the legalisation of the agency's ownership of the land.

Brasil (AMOREAB), Brasileia (AMOREB) and Xapuri (AMOREX). These Associations were created during meetings with reserve inhabitants in 1994 (IBAMA, 1995:21). According to the Utilisation Plan they represent the reserve inhabitants and are responsible for the management of the reserve.

The interviews with the forest dwellers indicate, however, that they consider the rural unions rather than the Associations as their representative organisations. The Associations of Inhabitants of the Reserve were never mentioned on the rubber estates of Xapuri (see Table 7.1); on the rubber estates of Assis Brasil the Association (AMOREAB) was subject to some criticism by the inhabitants of seringal Icuriã but well appreciated by some interviewees on Guanabara. By contrast, the rural unions were the organisations more frequently mentioned by all interviewees and all leaders living in the forest were members of one of the unions. Their level of representation, however, was not the same in all areas. As can be seen in Table 7.3, most of the families in the area corresponding to the unions of Xapuri and Brasileia have members in the corresponding union[4]. On the other hand, in the area corresponding to the Rural Workers' Union of Assis Brasil there are 620 families, but the union only has 60 members in the reserve. Also, in the area corresponding to the union of Assis Brasil there are only 3 union branches, compared with 8 in Brasileia that has approximately half the population. However, the generally held view was that the unions represented them and several key interviewees as well as some forest dwellers saw no reason why the unions should not represent them. Whilst some of these interviewees were union members (and thus could have their own interests at stake) some were not. In general, the interviewees were thus either unaware of the existence of the Associations or referred to them as something that 'people from the city' and IBAMA had established.

The lack of representation of the Associations among the forest dwellers at the time of the fieldwork could be explained by the fact that they had only been created six months before the interviews were conducted. However, in 1997, thus nearly three years after their formal establishment, less than 50% of the reserve inhabitants were members of the Associations (Irving and Millikan, 1997). This suggests that the problems identified during the fieldwork were not only related to the short period of time the Associations had been in place. Three other factors can be held responsible for the fact that Associations had not been successful in representing the forest dwellers. First, their creation did not originate from the rubber tappers' demands. In the context of the PP-G7 negotiations, it was suggested that the unions should not be the formal

[4] The union of Xapuri is the representative of the areas of the reserve in the municipalities of Rio Branco and Xapuri; the union of Assis Brasil is the representative of the municipalities of Assis Brasil and Sena Madureira. To simplify the text, the phrases "the Assis Brasil area" and the "Xapuri area" are used to refer to the areas under the jurisdiction of these two rural unions, rather than to the municipalities' areas.

Table 7.3 - Organisations in the Extractive Reserve Chico Mendes

Rubber tappers' organisations	**Level of Representation and Functions**
Rural Workers' Union of Xapuri	members in ERCM: 700 (out of 4000) families in area: 848 union branches in reserve: 13
Rural Workers' Union of Brasileia	members in ERCM: 250 (out of 1200) families in area: 370 union branches in reserve: 8
Rural Workers' Union of Assis Brasil	members in ERCM: 60 (out of 180) families in area: 620 union branches in reserve: 3
Associations of Inhabitants of the Reserve	total number of members to date: unknown
Agro-extractivist Co-operative of Xapuri (CAEX)[5]	members in ERCM: 120 (out of 320) warehouse branches in reserve: 6
National Council of Rubber Tappers (CNS)	Extractivist issues and negotiation of projects for extractive reserves
National Council of Rubber Tappers - Regional do Vale Acre-Purus (CNS-RVAP)	Responsible for matters of the ERCM
Federal Government Agencies	**Functions**
IBAMA	Establishment and monitoring of reserves' regulations
CNPT	Technical and institutional support for reserves
Main Supporting NGOs	**Functions**
Centro dos Trabalhadores da Amazonia (CTA)[6]	Education, health, community development, economic development

Sources: Instituto de Assuntos Culturais, 1993; GoB/BIRD/CUE, 1994; CNS, 1994.

representatives of the reserve because their objectives were not limited to those relating to the reserve, nor were their members all reserve inhabitants. The organisation representing the reserve inhabitants should represent only the reserve inhabitants' interests and have as its sole purpose the management of the reserve. This view was not shared by all participants in the PP-G7 negotiations and the unions naturally opposed it. However, CNS, IBAMA and the donor countries eventually agreed that although the unions would participate in the management of the reserve in the short term, three associations should be created to manage the reserve in the long term and sign the co-management contract with IBAMA. The forest dwellers thus did not participate in the decision to create the associations and their representatives, the members of the rural unions did not agree with the decision either.

[5] CAEX and CTA have provided considerable support to the reserve inhabitants, an issue that is discussed in Section 4.
[6] See footnote 3.

Second, the Associations were not created to address a problem that the tappers had felt already. The establishment of unions on the rubber estates in the 1970s was also a decision that came from external actors (see Chapter V), however, they responded to a need already felt by the tappers. The unions helped the rubber tappers to address problems that they were trying to solve by themselves. By contrast, the Associations were created to manage the reserve, an activity that most interviewees did not consider necessary or thought that it could be done by the unions. Third, the process of creation of the Associations was not adequate for the tappers. The Associations were established in meetings that took place outside the forest, in the cities of Xapuri, Assis Brasil and Brasileia. Many tappers thus did not participate because they could not afford to travel so far or because they were not sufficiently informed of the existence or importance of the meeting. According to interviewees from Assis Brazil, an additional flaw regarding the process of creation of the Associations was that the organisers of the meeting, members of IBAMA/CNPT and the unions, had insisted in choosing the representatives for AMOREAB in one afternoon. On account of such short notice, they had accepted the leader proposed because they had not had the time to convince their own leader to accept the position. Although interviewees said that the representative of AMOREAB was not doing a bad job, they also stated that they would not have chosen him if given more time to decide because this man did not have the necessary experience and leadership characteristics they considered necessary for such as position.

The evidence collected in the study of other common property regimes suggests that the existence of the Association may disrupt the organisational power of the Unions in the reserve without taking its place. A forest dweller may use the existence of two 'representative' organisations, union and Association of each area, to obtain individual benefits. For example, a tapper faced with a problem with a neighbour may seek assistance from the union while the other tapper may ask support from the Association, taking advantage of the disagreements between the two organisations. Although the fact that the unions' objective were not exclusively those of the reserve inhabitants, could have created problems in terms of conflicting interests (e.g. putting the interests of tappers outside the reserve before those of the reserve) they were part of the institutional framework of the forest dwellers.

The second factor that indicates that forest dwellers do not participate in the management of the reserve is that rubber tappers are divided in two groups: the direct users of the resource (forest dwellers) and the leadership or *lideranças*. The *lideranças* are not the same as the leaders of the various small communities in the reserve. The term leadership is used here (as it was used in the

reserve) to refer to the leaders of the rubber tappers' formal organisations, such as the rural workers' unions, CNS and CNS regional branch (CNS Regional do Vale Acre-Purus). *Lideranças* are in general tappers who participated in the process that led to the establishment of the reserve and there is a marked difference between them and the general population. This was for instance observed at two meetings of rubber tappers in the cities of Assis Brasil and Xapuri, where the ones who led the assembly where part-time rubber tappers or former rubber tappers, all of them members of one of the unions, together with CNPT officials. The majority of the tappers who had come down from the *seringais* hardly intervened in the discussions. According to a key interviewee, an additional reason why it had been decided that the unions should not be the representative organisations of the reserve was to avoid this separation between leadership and reserve inhabitants. However, as shown before, although this objective was achieved regarding AMOREAB, the creation of the Association was not successful in terms of ensuring the forest dwellers participation in the management of the reserve. In Xapuri, moreover, the separation between leadership and forest dwellers was reproduced in AMOREX. The Association' representatives in Xapuri are formed by members of the union who live only part-time in the forest.

The separation between leadership and direct users of the forests is a problem for three reasons. First, there is the risk that the lideranças, who have more contact with outsiders, with potential donors and with CNS in Brasilia, channel the available financial resources to the rubber estates where they come from. This can lead to conflicts with rubber tappers from other estates who feel that they are not being fairly treated. Some interviewees and key informants, for example, commented that some rubber estates received more help in terms of financial aid because the relatives of the leaders of the unions had his family there. It could not be assessed in the context of the fieldwork to what extent this was indeed the case. But the fact was that the estate in question had more schools and health posts than any of the other estates visited. Second, the separation of the leadership favours family members of the leadership to take other leadership positions. For example, in 1995 the current and previous leaders of the union of Xapuri were relatives and thus coming from the same estate. This can lead to members of some estates taking decisions regarding other estates in the reserve. Third, as leaders stop living on the rubber estates and practising extractivism they cannot know the daily problems involved in the management of the forests (Ostrom, 1990). Various key informants commented that the difference between leadership or *lideranças* and forest dwellers in general has increased with the separation of functions, extractivism and management of the reserve. The director of AMOREAB also commented that since he had been elected to represent the reserve, he spent most of the time

travelling to meetings in the city with tappers from other areas and hardly had the time to be on his *seringal*, let alone collect rubber.

Rules, monitoring and the utilisation plan

The literature on robust common property regimes suggests that in these regimes co-owners have devised rules specifically designed for the protection of the resource and appropriate to local conditions. The rules are in general clear, easy to enforce and resource co-owners should be able to change them. The Utilisation Plan of the Chico Mendes Reserve, drafted in 1994 and approved by IBAMA in April 1995, meets all these conditions. However, the responses of the forest dwellers interviewed indicate that there are important deficiencies regarding the rules of the reserve.

According to the legislation on extractive reserves, there is one specific plan for each reserve (IBAMA, 1995), which should be made by the reserve inhabitants. At the time of the fieldwork the Utilisation Plan had already been established. The Utilisation Plan of the ERCM, according to the Plan itself, was designed with the participation of many reserve inhabitants. A number of meetings with the reserve communities took place with the aim of preparing the proposal for the Plan. The Proposal for the Utilisation Plan was discussed later in three meetings with the reserve inhabitants, (IBAMA, 1995: 21). Still according to the Utilisation Plan, all the reserve "inhabitants are responsible for the execution of the Plan, as co-authors, co-responsible in the management of the reserve and the only beneficiaries of it. In a more direct way, the Associations of Rubber Tappers of the Extractive Reserve Chico Mendes, the rural workers' unions of Assis Brasil, Brasileia, Xapuri and Sena Madureira and the CNS answer for the plan" (IBAMA, 1995:23).

However, none of the interviewees considered him or her self as co-author of the Plan. When asked who had made the laws for the reserve, in general they answered that it had been IBAMA. Otherwise, they considered the rules as established by God or as natural laws. Two years later, according to a report from 1997, the majority of the reserve inhabitants still had not internalised the Plan's rules and they continued to see them as made by outsiders (Irving and Millikan, 1997). In fact, the Plan of the ERCM is based on the proposal presented by the representatives of the Alto Juruá Reserve (Feitosa, 1995). Comparing the Plans for the two reserves, it was observed that they take into consideration certain differences between the two reserves. For example, in the case of the Alto Juruá there is only one Association representing the reserve inhabitants, whereas in the Plan of the ERCM it is stated that there are 3 Associations and that the unions are also responsible for the management of the reserve. However, in both Plans it is stated that the

inhabitants of the reserve should form a commission responsible for monitoring the reserve, a proposal that, as is discussed later, does not suit the ERCM.

The specific aim of the Utilisation Plans is to secure the sustainable use of natural resources (see Chapter VI) and the rules stated in the Plan of the ERCM are clearly geared towards securing the conservation of a jointly used CPR. One such rule regards the commercialisation of land. One of the main reasons why the state owns the land and tappers have only usufruct rights to the resource and thus cannot sell land is, as discussed in Chapter VI, to prevent tappers from selling the stands to non-extractivists. The aim of the rules regarding transference of rubber stands is thus the protection of the common CPR. According to the general legislation on extractive reserves and to the specific rules of the Plan of the ERCM, tappers can only transfer rights of use to the rubber stands. That is, they cannot sell land but can interchange rubber stands with other extractivists.

The rule concerning land is clear and easy to enforce (as the tappers do not have private property rights they can not sell them). The rule not to sell land is also appropriate to local conditions because all tappers interviewed firmly believe that land should not be sold and they do not sell land. However, this rule was not designed by the forest dwellers with the specific purpose of protecting their common CPR.

The large majority of the rubber tappers interviewed considered that trading rubber stands did not and should not include commercialising land. When asked what they commercialised when trading rubber stands, interviewees responded that they commercialise the rights to live and use the stands, i.e. they trade the usufruct rights to the stands. The prices are based on the amount of work invested in the stand and on the quality and quantity of resources in the stand, rather than on the land area of the stand. The work invested in the rubber stand are the 'improvements' (*benfeitorias)* the tappers made to the rubber stand, thus the house, the number of rubber trails cleared and ready to work, the fruit trees, the agricultural plot, a cleared field, animals and work utensils. The number and quality of the rubber trees, also influences the price of the stand, although tappers do not see themselves as the owners of the rubber trees - at least not in the same way as they see themselves the owners of their houses and cattle. Forest dwellers were also specifically questioned on the issue of selling land. The large majority of the forest dwellers thought that land was not something to be sold and only a small minority said they could not sell land because that was the law of the reserve. An even smaller minority said that they would like to own land because they would be able to sell the rubber stand for a higher price. However, the higher price of the stand when land is included in the value was also mentioned as being a

disadvantage, because then they could not afford to 'own' a rubber stand. One of the interviewees said that if he had a private property right to the plot he would be more secure against outsiders trying to take the land from him. Another said that if he was the actual owner of the rubber stand he could do whatever he wanted with the land, but he could not specify what it was that he could not do with the present state of affairs.

When asked why they do not trade land, however, none of the interviewees gave as a motive the conservation of the forest. Many interviewees did not know that the state was the owner of the reserve and those who knew did not know that state ownership was largely a device to prevent defection (tappers selling their plots to non-extractivists). On the Xapuri estates (see Table 7.1), when asked who was the owner of the reserve most interviewees answered that they did not know. Many put forward the possibility that it would have been Chico Mendes, before he died "and now there is a president there that keeps changing all the time". Some said that the owner of the reserve was the people who lived there, but they were never totally sure about the ownership of the reserve. Some other interviewees mentioned that perhaps the owner was IBAMA since, according to them, it was this agency that had established the laws of the ERCM. On the rubber estates of Assis Brasil, most interviewees did not know who the owner of the reserve was. Some suggested that the land belonged maybe to IBAMA, but could not explain why that was the case.

The reason why tappers consider that land should not be sold is thus not the protection of the natural resource but rather their historical (economic, social and cultural) background. A key informant commented that this perception of land was probably related to the fact that cattle ranchers, when they compensated the rubber tappers for taking their stands, would only pay for the improvements made to the land, rather than for the land itself - which would have been considerably more expensive. To justify the price offered for the lands the cattle ranchers would say to the rubber tappers that they had never bought the land on which they were living[7]. However, on rubber estates where the population had had hardly any contact with cattle ranchers, the interviewees also considered that it was only the result of their work that they should sell. The answers and explanations as to why they did not sell land vary, but the large majority of the interviewees seemed to consider the very idea as absurd. The two most common answers to the question 'why land cannot be sold' was that land belonged to God or to Nature. Some of them said that God had not sold the land to them, and so why should they sell it. The large majority of interviewees considered that they could not sell anything but the result of their work, such as the rubber trails they had cleared, rather than, for example, the rubber trees. Some interviewees also

[7] According to Brazilian law, if someone has usufruct rights to the land, compensation only covers the improvements made in the holding.

said that they could not sell the land because they had not bought it, and in fact, tappers never owned the lands where they worked and never sold land. Many interviewees added that no one ever sold land in those areas. As mentioned in Chapter III, many of the rubber barons themselves often did not legally own the land, they just used it. Given the characteristics of the forest, the use that was made of it (extractivism) and the isolation of the region, commercialisation of land was not common in the Amazon region before the 1970s. Hence, the notion of land as a marketable good was for the majority of the interviewees an alien concept.

Regarding the rules that deal directly with environmental issues, they are also appropriate to local conditions. The large majority of the interviewees agreed with the rules and could explain why they agreed with them. From their explanations the rules also seemed clear. Like the rule about not selling land, these rules were not designed by the forest dwellers with the specific purpose of conserving a common resource. The interviewees, however, were fully aware of their importance for the conservation of the forest, although they did not always justify the rules with environmental arguments.

For example, in the Utilisation Plan, Article n.8, it is stated that the rubber and Brazil-nut trees should not be cut down (IBAMA, 1995:24). Many interviewees, although not making references to the Utilisation Plan, commented that these trees should not be cut down because they were necessary for their work. However, forest dwellers considered that the main reason for not clearing rubber trees was that they did not belong to them. Like land, trees belonged to God or Nature.

Article n. 15 states that only 10% of the rubber stand can be cleared for agricultural or other purposes (IBAMA, 1995:25). As we saw in Chapter III, most of the Amazonian soils are very poor; if small patches of the forest are cleared for cultivation, the nutrients stay in the system and if the land is afterwards left fallow for a sufficiently long period, the forest regenerates. Although the majority of the forest dwellers interviewed were not certain as to the percentage of clearing they could do in their stands according to the Utilisation Plan, they knew why it was not advisable to clear too much forest and explained why they should not do so. For example, several forest dwellers explained the importance of the forest for practising agriculture. Interviewees from rubber estates Dois Irmãos and Icuriã explained the importance of the standing forest for agriculture through a comparison with the agricultural settlements. According to them, it is better to have an agricultural plot in the reserve rather than in these settlements. In the settlements it is necessary to clear a larger area of forest to obtain the same amount of produce that could be obtained in a smaller clearing in the reserve because in the settlements (*colônia*) most of the

forest is secondary vegetation (*capoeira*). An interviewee from rubber estate São Francisco[8] also explained the difference between a rubber stand with a field (pasture) only and one with some forest left. According to this tapper, a plot of land with some forest left on it has more value than a plot only with a field. In the latter they cannot plant anything because once the land is covered with pasture for cattle it is not longer possible to grow vegetables on it. The tappers' knowledge of the value of the standing forest could also be noticed in the comments of some interviewees on Ceará, one of the poorest, if not the poorest region of Brazil, whose main problems are year- long droughts. According to one interviewee from rubber estate Floresta and one from Icuriã, it was not advisable to cut down too much forest in their stands, otherwise there would be also droughts in Acre.

The rules stated in the Utilisation Plan are thus necessary for the conservation of the forests, they are clear, and they are known and approved by the tappers, thus adequate to local conditions. A different set of resource users with a different conception of landed property rights, would not have easily agreed and comply with the rule 'not to sell land', even if the threat of outsiders luring them into buying their plots was the same one that the tappers faced. However, the interviews with the forest dwellers also indicate that the rule 'not to sell land' was not designed by the rubber tappers with the specific purpose of securing the jointly used CPR but that it is part of the tappers' cultural values. This carries with it the risk of resource depletion because of two interrelated factors. First, according to the literature on common property regimes, cultural values tend to be weak when faced with economic pressure and market values. There are indications that this has already happened. According to Rueda (1995), upon the creation of the extractivist settlement projects some tappers, influenced by the colonists, had wanted private rights to their stands, rather than usufruct rights only. Second, given a change in circumstances the tappers may take longer to adapt their rule to the new situation and this can endanger the conservation of their CPR. For example, now that the land is owned by the state, one of the main threats to the conservation of resources in the reserve are loggers attempting to buy the tappers' usufruct rights to their rubber stands. Whether the tappers will develop rules and enforcement mechanisms to deal with this new factor in their lives is an issue which is explored in Section 7.3. On the other hand, regarding environmental rules, although they are also part of the tappers' cultural values, it appears more likely that they would adapt these rules to changes in the circumstances because they know the utility of the rule, even when they do not justify the rules in environmental terms[9].

[8] This rubber tapper was interviewed in a colocação on Icuriã estate where he was visiting some relatives.
[9] Section 3 will discuss whether the forest dwellers can easily change the rules if they want to.

The main problem regarding these rules is, however, how to monitor and enforce compliance with them.

Robust regimes do not rely only on social pressure, they also have explicit mechanisms to monitor, which may be embedded in the rules and enforce compliance with the rules (see Chapter II). Monitoring can be done by the direct users of the CPR or by contracted agents but monitors must be accountable to the co-owners of the resource. Apart from monitoring mechanisms there should also be enforcement mechanisms, such as sanctions against defectors, which should be preferably gradual.

The Utilisation Plan includes a number of specifications regarding monitoring. According to the Plan, monitoring of the rules is the responsibility of each tapper, who should monitor his/her and the neighbours' stands. In the context of the RESEX sub-project, as seen in Chapter VI, there are provisions for training tappers to be environmental monitors. A Commission for the Protection of the Reserve should be constituted and answer directly to the Association[10]; the rural unions, Associations and IBAMA are also responsible for monitoring the reserve (IBAMA, 1995:27). Sanctions are gradual, the tappers who breaks a rule should first be admonished by the association and only after repeating the offence three times the case will be taken to IBAMA and the transgressor may loose his or her rights to the stand. Regarding transference of stands tappers can only do so if the community approves the deal. If a tappers leaves his rubber stand, a tapper from outside the reserve can come and occupy the stand but must have the approval of the Association (IBAMA, 1995:27).

As with the reserve boundaries, the Associations and the rules of the reserve, the answers of the forest dwellers interviewed suggested that the actual situation of the reserve regarding monitoring is radically different from what the Utilisation Plan suggests. At the time of the fieldwork the Commission for the Protection of the Reserve had not been constituted but the activities aimed at training environmental monitors had already started. The main problem, however, was that the large majority of the interviewees were not interested in monitoring compliance with the rules. They did not want to be environmental monitors and enforce the rules themselves. They held that monitoring should be the responsibility of IBAMA. Some interviewees also thought that IBAMA could monitor better than they could and they explicitly said that they did not want to incur the

[10] Fiscalização da Reserva, 27. "Cada seringueiro é um fiscal de sua colocação e das outras colocações, cabendo a ele não só zelar por sua colocação, como também observar para que as normas deste 'Plano de Utilização' estejam sendo cumpridas pelo conjunto dos moradores". 28. "Será constitutuída uma Comissão de Protecção da Reserva ligada directamente à Associação. Essa Comissão será composta por cinco membros eleitos em Assembléia Geral da Associação". 29. "O regimento da Comissão de Protecção da Reserva será elaborado pelo Conselho Deliberativo da Associação e aprovado em Assembleia Geral" (IBAMA, 1995:27).

costs that monitoring the reserve themselves had. For example, on rubber estate São Pedro, an interviewee explained his unwillingness to monitor by saying: "The man from the state comes and goes, while a member of the community has to go on living/interacting with the person who broke the law".

Some interviewees also considered that they did not need to monitor because everybody complied with the rules. Forest dwellers in fact rarely mentioned fellow tappers who had broken the rules and seldom protested about having to comply with the rules[11]. The only exception was in rubber estate Icuriã, where some interviewees complained about some neighbours who were hunting with dogs and the neighbours complained about the new rule of the reserve that did not allow hunting with dogs. There was a certain level of social pressure to comply with rules regarding boundaries between rubber stands, and in fact out of 100 interviews only one could recall a case of conflict between neighbours on account of the boundaries between rubber stands. On all rubber estates visited, tappers were also concerned as to who somebody would sell a stand on the estate, especially when there is something in the stand that belongs to the whole community. They would not sell the stand to someone who did not 'fit' into the community. On rubber estate Guanabara for instance, an estate where, as will be seen later, there is little community organisation, a case was mentioned of a newly arrived tapper having been expelled from his stand because the other inhabitants did not like him. However, it was not clear whether they had expelled the newcomers because he was not sustainably using the stand or because of other reasons[12].

However, there are several factors that indicate that monitoring compliance with the rules, as suggested in the theoretical framework, is also necessary in the ERCM. First, there is evidence that the reserve inhabitants do sometimes break the rules. In more isolated rubber estates, for example, there have been confrontations between some tappers in the reserve and IBAMA officials because the former had been logging (ELI, 1994). On rubber estate Floresta, there was a tapper who had fenced off a forest path but other tappers were trying to prevent him from doing so. On this estate, where many interviewees were concerned about newcomers to the community, there was a tapper, living on the border of the estate, who was using the stand mainly for agricultural purposes. The tappers interviewed, however, were not aware of this situation and those who knew did not comment on it either: it was not 'their business'. Also on *Seringal* Floresta, interviewees mentioned a neighbouring stand that had been sold to an unpleasant

[11] Questions on whether the interviewees considered monitoring necessary and on whether they know anyone who had broken a rule were not asked consecutively.
[12] When asked why they had expelled the new comers the two interviewees said that he was not a nice person and that they did not like him. Although the researcher attempted to find out why they did not like him with both direct and indirect questions, the only answer on this matter was that he was from Peru and that they did not like foreigners. When asked whether he tapped rubber, the answers were confused.

neighbour but they did not say what they would do about it, or if they would do anything. The community approval regarding transference of stands is thus a rather informal business, which does not always prevent newcomers from using the resources unsustainably.

Second, whereas some enforcement mechanisms regarding some rules are embedded in the rules, and thus do not require explicit monitoring mechanisms, the large majority of rules do require some sort of monitoring. For example, rules regarding selling of land are easy to enforce, as the potential buyers cannot get legal titles to the land because the reserve belongs to the state. By contrast, rules regarding the sale of stands to loggers need to be explicitly monitored as loggers do not necessarily need legal titles. Other rules, such as not hunting with dogs and hunting only for consumption purposes, can be easily monitored because, given the intertwining of stands, tappers can easily check if their neighbours are hunting too much or using dogs. However, enforcement mechanisms are also necessary since as seen above social pressure is not always sufficient. The rule on the amount of land which tappers can clear for agriculture needs not only enforcement mechanisms but also monitoring mechanisms. Whereas it is easy to monitor tappers who have close relations with their neighbours (they visit each other and thus can see how much land each of them clears), specific mechanisms are necessary for monitoring how much land isolated tappers clear in their stands.

Finally, monitoring must be the responsibility of the tappers because given the large area of the reserve and the difficulties in accessing all rubber estates, it would be extremely difficult and costly for an external agency to monitor and enforce the rules. Also, even if an external agency was willing to invest in monitoring the reserve (because the conservation of resources in the area does not benefit only the tappers but also the international community), it would be unlikely to succeed. Apart from all the limitations of state management outlined in Chapter II, without the rubber tappers perceiving that it is in their interest that everybody complies with the rules, potential free riders could easily devise ways of eluding external monitors because they know the resource better. There is substantial evidence in the literature on common property regimes of commoners breaking rules in spite of state monitoring of the resource.

A substantial degree of monitoring can be done by the reserve inhabitants without a large amount of additional work. For example, tappers living in the boundaries of the reserve can easily verify that outsiders do not enter the area without always having to leave their stands to do so. Monitoring the use of the resources by fellow tappers is also relatively easy because given the intertwining of stands, tappers can verify how other tappers use the forest in the context of their daily activities. Enforcement of rules and application of sanctions would involve a higher cost

than monitoring because of potential conflicts with members of the community. However, if all reserve dwellers are aware that if the resource is depleted they would be the first ones to suffer because they have little alternatives outside the reserve, the cost of monitoring would be lower (because most tappers would support the monitor) and would be off-set by the benefit of conserving the CPR. For this to happen, however, tappers must become aware that the conservation of their own individual stands depends on the conservation of all the stands in the reserve and that they are the ones who can secure that best.

A combination of factors can explain the lack of interest in monitoring. The fact that the tappers did not devise the rules themselves is one of them. The rules they perceive as IBAMA rules they consider that IBAMA has the responsibility for enforcing them. Also, as they do not fully perceive that the conservation of their own stands depends on everybody following the rules, they are not willing to bear the cost of enforcing the rules on their neighbours. One of the reasons why they do not realise the importance of monitoring each others' behaviour is also that their resources have never been endangered by fellow tappers. It should also be noted that historically tappers have worked individually in their own stands and the management of the resource as a whole has always been the responsibility of outsiders, like the patrons, at the time of the *aviamento* and the middlemen. Key informants also commented that the unions, in the perception of the tappers, often took the 'paternalistic' role of the patrons, and that now IBAMA is to a certain extent being perceived in the same way. The tappers' unwillingness to monitor is also related to the unclear separation between responsibility for monitoring and actual monitoring. One of the reasons interviewees gave for not wanting to monitor is that this would create problems with the neighbours. However, if external agents were hired by the rubber tappers to carry out the monitoring, this problem would be solved. Finally, lack of interest in monitoring, in spite of the efforts made by the state, the *lideranças* and in the context of the RESEX sub-project, is probably related to the tappers' perception that there is no reason why they should carry the costs of monitoring if outsiders can do it.

Conflict resolution mechanisms

Conflict resolution mechanisms are also necessary for the robustness of a regime. In the Utilisation Plan there are no specific recommendations for addressing conflicts between resource users. However, from the regulations concerning breaking of rules (see previous pages) it can be deduced that, if there are different interpretations of a rule, the Commission and the Association should decide whether there has or not been an infraction.

The interviewees' responses considering conflict resolution mechanisms were apparently contradictory. The large majority of the interviewees, when questioned on what they would do if there were a dispute over utilisation of rubber trails said that they would recur to one of the organisations listed in Table 7.3. To which organisation they would go depended on which had a stronger presence in the area. On rubber estates Floresta and Dois Irmãos, which are in the municipality of Xapuri, where the presence of the union is quite strong, the interviewees said that if faced with a hypothetical problem with a neighbour they would go to the union to solve it. On rubber estate Icuriã, in the municipality of Assis Brasil, all interviewees answered that in the case of such a problem they would go to seek help at IBAMA. Some said they would speak first with the neighbour, but then added that they considered that IBAMA could solve the problem better because 'to outsiders people obey'. Rubber tappers on *seringal* Icuriã also said that if not IBAMA they would ask help from another outsider, at the police station or at the union, because people there knew better than they did. Those who had participated in the recent meetings of the Association of Inhabitants of the Reserve mentioned the directors of one of these associations as the people they would go to if faced with a problem. On rubber estate Guanabara, also in Assis Brasil, rubber tappers said the same, that they would go to the Association to solve the problem, or mentioned the name of the member of the rubber estate that had participated in the recent meetings as the person to seek help from.

However, in spite of the above responses, there was evidence that tappers also tried to solve their conflicts among themselves. For instance, at the time of the visit to the São Pedro estate, tappers were discussing among themselves certain problems they were having with the co-operative in town (CAEX) as well as the behaviour of some members of the estate. On rubber estate Floresta, as mentioned before, there was a problem concerning a tapper who had blocked a forest path to prevent his animals from being taken away or fleeing. All interviewees were discussing what to do among themselves, although on the other hand there were expectations that the leader of the community, who did not live in the forest and was a full time member of the rural workers' union of Xapuri, would in the end restore order. On rubber estate Icuriã, which is the one that had the most developed common property arrangements, discussions on various matters were also taking place in the households visited. These discussions, however, took place among small groups of neighbours (5 or 6 families). Any problem involving a larger group of tappers was solved by recurring to external or semi-external organisations.

To summarise the examination of the interviews with the inhabitants of the ERCM suggests that the reserve does not have the characteristics of a robust regime. The boundaries of the resource and group of co-owners are formally well defined but not known by the co-owners themselves.

There are rules specifically aimed at the conservation of the CPR but they were not designed by the rubber tappers with the specific purpose of securing the conservation of their common resources. There are no monitoring mechanisms which ensure compliance with the existing rules. Most importantly, forest dwellers participate very little in the management of the reserve, although they value the forest and know the characteristics of the resource.

However, the lack of participation of the reserve inhabitants cannot be blamed on the state (or the *lideranças*) wanting to take control over the tappers' forests. There are several indications that the objective of state agents and former rubber tappers is the management of the reserve by the reserve inhabitants. First, apart from the rules that are part of the Brazilian environmental legislation, most rules in the Utilisation Plan were not designed by external actors but are similar to the ones the tappers' had before the establishment of the reserve[13]. Second, all formal documents of the reserve (e.g. Utilisation Plan, legislation on extractive reserves, reports for the Pilot Project) emphasise that the reserve belongs to its inhabitants and that the direct users of the resource are co-responsible for the management of the reserve. Third, there are a number of initiatives to enhance the tappers' capacity to manage their resources, such as training of environmental monitors, the creation of Associations of representatives and the remaining activities reviewed in Chapter VI. Fourth, the interviews with *lideranças* and members of IBAMA also indicate that their objective is not to take over the management of the reserve but to enhance the capacity of the forest dwellers to manage their own resources. Fifth, during the fieldwork several meetings between lideranças or state officials and forest dwellers were attended and in all of them the emphasis was that the reserve inhabitants should take their own decisions and manage their resources.

The fact that at the time of the fieldwork the reserve had only been established for 5 years and that many initiatives to encourage tappers to manage their resources had been in place for one year only, can partly explain why they participated little in the management of the reserve. The research carried out in the area, however, suggests that the core reason for this problem may be that forest dwellers have a different understanding of their space and institutions from that of the *lideranças* and state agencies. (Other reasons will be discussed at the end of the chapter).

For outsiders the relevant management unit is the reserve; accordingly they have, for example, established rules for all the inhabitants of the reserve. In the meetings between tappers and 'outsiders' attended by the author, the emphasis of the discussions was always on the reserve:

[13] The only rules that are not part of Brazilian law or the tappers' rules are those concerning regards hunting with dogs and hunting only for consumption purposes. These rules were deemed necessary because hunting with dogs scares the other animals away and there are now more opportunities for tappers to commercialise game.

'This is your reserve and you have to manage it together'. For the forest dwellers, however, the relevant management unit is first their rubber stand, second the area where they and their neighbours live, which may be a whole rubber estate or part of one. The interviewees' comments on neighbouring estates, and especially on estates that are several days walk away from their own, suggested that they see the inhabitants of these areas as 'foreigners'. A comment interviewees often made was 'on estate so and so they are all Indians'[14]. Although CNS has made alliances with the Indian tribes (see Chapter V), the forest tappers interviewed tended to consider Indians as people different from them. An interviewee in Guanabara who was originally from Icuriã commented that she did not mix with the people from Guanabara who were 'weird' people and had contact only with her previous neighbours in Icuriã. For the forest dwellers, the reserve was thus not 'their reserve', nor the inhabitants of the reserve 'their community'. For the interviewees their CPR is the rubber estate where they live, which is located inside a reserve; for them this means that the ranchers cannot occupy their rubber stands and that they have to follow 'IBAMA laws' in the same way that they followed the patrons' laws before. It does not mean, however, that they can manage the reserve or that they are responsible for the conservation of the entire reserve and not only their own rubber stands. In other words, for the forest dwellers the reserve is outside their jurisdiction.

To ensure the conservation of natural resources in the ERCM it is thus necessary to overcome the following problem. On the one hand, given the characteristics of the forest, a robust regime requires the conservation of the entire reserve and thus of a large group of co-owners but, on the other hand, the reserve inhabitants do not perceive the need nor their capacity to manage the entire reserve. The next two sections will argue that the reserve has the potential to become a robust regime if there is more emphasis in the development of a system of nested enterprises (Ostrom, 1990) based on the articulation of common property regimes on the different rubber estates that compose the reserve. The research conducted on five rubber estates suggests that the potential for robust regimes to develop within the *seringais* is higher than for the reserve as a whole. Once tappers develop small regimes, the need to articulate their use of the estate with the use of neighbouring estates is likely to become more apparent. The state and 'lideranças' can then encourage arenas for discussion among representatives of the various estates instead of promoting the management of the entire reserve as a single unit, which is, as mentioned above, beyond the perceived jurisdiction of the forest dwellers. Naturally, at the meetings organised in the reserve, tappers from different rubber estates meet. However, at none of the meetings attended by the researcher there were references for articulating the management of different rubber estates. The

[14] The interviewees said that the inhabitants of other estates were 'caboclo' and when questioned on what they meant by it answered that that 'caboclo' were Indians, adding that Indians did not work very hard nor formed

chapter thus proceeds to explore the factors that suggest that there is potential for robust regimes to develop on the rubber estates.

7.3 Common property regimes on the rubber estates

This section argues that the likelihood of common property regimes developing within the rubber estates is higher than in the reserve due to the following reasons. In four of the five estates visited there were incipient common property arrangements. These arrangements could not be considered to be robust regimes. There were, however, indications that they had a strong potential of becoming so because many of the factors highlighted in the theory as conducive to the development of robust regimes could be discerned on the *seringais*. In the reserve, by contrast, there was no indication that tappers had any common property arrangements apart from the formal co-management regime. Moreover, at the level of the reserve there were fewer factors conducive to the development of robust regimes than within each rubber estate.

The rubber estates' communities have developed incipient common property arrangements to address three issues: use of common areas (e.g. forest paths, lakes and streams), common facilities (e.g. warehouses, schools and health posts) and commercialisation of their produce.

Forest paths can be jointly used by all those who need them but they need to be cleared regularly, in general two or three times a year, otherwise the fast growing vegetation covers them and they become extremely difficult to walk on. On four of the five rubber estates visited, communities met regularly to clear the paths. However, there are no rules concerning when the paths should be cleared and who should participate in this activity. Everybody has access to the paths and there are no mechanisms in place to prevent them being used by outsiders or by members of the community who do not participate in the clearing. Interviewees said that 'everybody' helped and in some rare instances made references to households that did not. The latter were not very much appreciated in the community but no further sanction was applied to them. Interviewees from these households gave different accounts of their situation. One said that he had in the past actively participated in the union and in stand-offs, but that now he had been left aside, they were taking decisions without him and that is why he refused to participate. The other interviewee from a non-participating household was the son of the owner of the stand. This tapper said that he really enjoyed participating in common works and sometimes did, but that his father did not believe "in all this community business".

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communities like they did. Outside the rubber estates the term 'caboclo' refers to an individual of mixed origin, Indian and White, and rubber tappers are referred to as such.

On some of the rubber estates visited there were common facilities, such as schools, health posts and warehouses. Institutional arrangements regarding these facilities ranged between common property and restricted access. On rubber estate Icuriã there is for example a rice mill owned by four families and only these families have access to the mill. Community Primavera, also on Seringal Icuriã, formed a co-operative (in fact, the community was formed through the establishment of the co-operative) and owns animals for transporting the goods, a pasture for the animals and a warehouse. Only the formal members, who pay a quota, can commercialise their goods through the co-operative. The leader, who is also the one who transports the goods to the city, is elected by all members for a two-year period. Every two weeks the members gather to clear the pasture together. When asked about monitoring and sanctioning devices interviewees answered that no one failed to participate but that if someone did not pay their quotas for a long time the defaulter would have to stop using the services of the co-operative.

On rubber estate São Pedro the common facilities are two schools, two health-posts, a pond for aqua-culture, a vegetable plot, a radio, a warehouse and animals for transporting the goods. All these facilities were obtained through CAEX for all the inhabitants of the rubber estate or for all those who wanted to participate. Each community manages its schools and health post and according to the teachers and health agents they co-operate with each other. The other common facilities are mainly managed by one of the communities, Itapiçuma who is the one that participates most in meetings and common works, such as cultivation of the plot. There were no rules however regarding participation in these matters and when asked who participated, interviewees said, "everybody participated". Some families from the Margem, however, commented that most facilities went to Itapiçuma and not to them, while families in Itapiçuma said that the facilities were for all the members of the estate but that tappers in the Margem did not want to participate. The boundaries of the group of co-owners are thus not well defined.

Several observations suggest that there is significant potential for the above incipient common property regimes to become robust regimes, capable of ensuring the sustainable use of the CPR in the long term.

First, whereas the 'reserve inhabitants' form a large and heterogeneous group, and there is little contact among families living in different parts of the reserve, families on the rubber estates tend to form small and relatively homogenous groups, with a more or less stable set of members who expect to continue interacting over time, have relationships which are direct and multiplex, and are mutually vulnerable actors (Singleton and Taylor, 1992). Chapter II argued that these factors alone would not result in the development of robust regimes but that all other factors being equal,

resource users meeting Singleton and Taylor's (1992) requirements were more likely to develop a regime than a large and heterogeneous group. Factors such as role of the state, dependency on the resource for their survival, knowledge of the ecological features of the CPR and autonomy are the same for these communities and for the 'reserve inhabitants' since the rubber estates are part of the extractive reserve. Hence, given the features of the inhabitants of the estate, robust regimes can more easily develop within each estate than at the level of the reserve.

On four of the five estates visited the interviewees considered themselves as belonging to a community (see Table 7.4). Communities on the estates are usually formed by 4 to 25 families, living in the same area. The size of the area varies but usually families are, at most, 5 hours walk from a meeting point. These communities are formed either by all the families of the estate or by a sub-group of families. However, even when the community is formed only by a sub-group of families, interviewees knew who the inhabitants of their estate were and in the only estate where interviewees did not say they belonged to a community, *Seringal* Guanabara, tappers also knew who the estate inhabitants were. All interviewees also saw the estate inhabitants as a group they belong to, whereas they never commented on the reserve inhabitants in such terms. A common statement made by the forest dwellers was to say 'on my *seringal* we have or we do something' even if they saw their community as formed by only some of the families on the estate. By contrast, when they referred to the reserve they never said 'we, the inhabitants of the reserve'.

Table 7.4 Communities on the rubber estates

Rubber estates	Communities
São Pedro	São Pedro – 25 families Itapiçuma – 10/11 families Non-Itapiçuma – 14/15 families
Icuriã	Primavera – 24 families Rice Mill – 4 families Gospel communities – 5 families each
Dois Irmãos	Dois Irmãos – 17 families Gospel communities – 5 families each
Floresta	Rio Branco – 5/15 families
Guanabara	No indication of community

Source: author

When asked which community they belonged to, interviewees answered that they belonged to the group of families living on the estate or to a sub-group depending on which group they have stronger social links with. That is, if they only engaged in common activities with a few families they considered their community as formed by those families only. On Seringal São Pedro, there are two sub-groups (see Table 7.4). One is formed by a group of families that meets at stand

Itapiçuma which is located in the centre of the estate (community Itapiçuma). The families of the second group live near the river that goes to Xapuri (community *da margem* or river bank community). There are meetings which the families from both communities attend. Families from Itapiçuma, however, also engage in common activities among themselves, whereas families from the Margem rarely engage in common activities without the participation of community Itapiçuma. Accordingly, interviewees from Itapiçuma said they belonged to community Itapiçuma, formed by 10/11 families. Families from the Margem said that they belonged to community São Pedro, formed by the approximately 25 families of the estate. On Seringal Icuriã, there is a co-operative called Primavera constituted by 24 families, a number of gospel communities formed by 5 families each, and a group of 4 households that owns a rice mill. When asked to which community they belonged, some interviewees answered community Primavera, and others said their community was one of the gospel communities - although they were also members of the co-operative. The same type of answers were heard on rubber estate Dois Irmãos; some interviewees said they belonged to the community Dois Irmãos, formed by the 17 families of the rubber estate, and others said their community was the gospel community.

The families forming each of the estate-communities as well as each of the smaller communities are quite homogeneous. They all practice the same activities, be it rubber tapping or collection of Brazil nuts. The families in the area also have a similar history; for example, all had the same patron in the past, or had to face a similar degree of risk in relation to ranchers occupying their rubber stands. The communities, to which the interviewees said they belonged to, have a more or less stable set of members; most families in each area have been living there for generations although as there is trading and inter-changing of rubber stands families do move in and out of a community. Relationships among families are direct, although due to the distance between the houses they are not always frequent. Their relationships are sometimes multiplex, as in the case of communities Primavera and Itapiçuma, whose members meet for work, leisure and religious activities. Some other groups meet exclusively on festive occasions, to organise a ball for instance and others meet only in the gospel reunions. The 'mutual vulnerability' of families varies. The respect and friendship of the other members of the group is important on those estates where families have considerable contact; on those, like Guanabara, where they hardly see each other, it is not such a relevant issue.

Second, the potential of rubber estates to be managed as common property is higher than that of the reserve because all forest dwellers know the boundaries of the *seringal* and its inhabitants (the co-owners). Hence, tappers would know what to manage and for whom. Regarding the jointness conditions of the estate, they are similar to those of the reserve and thus conducive to the

development of common property. The resource can be jointly used as long as the activities practiced do not require the clearing of the forest cover. An increase in population could threaten the joint use of the resource. However, as is the case with other common property regimes (see Chapter II), tappers can encourage migration and restrict utilisation of the forest by the members of the group if such an increase in population occurs. The development of new sustainable activities in the forest, which is one of the components of the RESEX sub-project (see Chapter VI), can also change the conditions of the CPR; for example, agroforestry may allow for a higher number of resource users than rubber tapping.

Third, whereas interviewees did not have interest in monitoring the use of the reserve they had monitoring mechanisms regarding common facilities on the estates, which do not appear to have been 'accidental'. When interviewees were asked where they thought new facilities should be located they explicitly said that they should be in the stand of a leader or someone who was trusted by the fellow tappers. The issue of trust was particularly stressed on *Seringal* São Pedro, where interviewees mentioned the case of a tapper who had taken over the common facilities. The interviewees on this estate were discussing how to make sure that an incident of this kind would not be repeated.

The location of facilities is not based on a spatial differentiation between 'common areas' and 'private areas' but on the distribution of resources on the estate and on the configuration of the estate in terms of stands and inhabitants. This arrangement facilitates monitoring. Schools, health posts and warehouses are located in private rubber stands and thus the owner of the stand can easily monitor access to it without additional work. Also, the stands where the facilities are located tend to be meeting places for the community or 'cross-roads' where everybody tends to go for other motives. The members of the group can thus also regularly check the use of the facility in the context of their current activities. For example, on rubber estate São Pedro, one of the schools and the vegetable plot were located in Itapiçuma, which is at a cross-roads, thus a central place of the estate, which is where the community meets and where the leader of the community lives. The co-operative warehouse was in the stand next to the river – access to this estate is better via water. The co-operative representative, one of the leaders of the area, also lived there. There was a school located a few rubber stands away. On rubber estate Floresta, all the facilities were located in the stand where the rubber tapper who initially formed the community had lived (the present leader of the community lives only part time in the forest). This stand had been the meeting point of the tappers of the area long before the construction of the common facilities that were now there. On rubber estate Icuriã, the facilities were in several different rubber stands. The school was not too far away from where the teacher lived, and the co-operative warehouse, as

well as the field for the animals were in the rubber stand that is closer to the path that connects the area to the river Iaco[15]. The generally held view of the interviewees was that common facilities had to be located in the stand of the leader of the community or a long-standing member of the group, someone that was trusted by the fellow tappers.

Finally, another factor that suggests that tappers can develop common property regimes to ensure the conservation of their rubber estates regards the issue of 'perceiving the need for it'. As discussed in Chapter II, the first requirement for a resource management regime to develop is that the need for such a regime arises and that resource users perceive that need. For example, if the resource is close to depletion but co-owners attribute this to mythological factors they are unlikely to develop rules and monitoring mechanisms to secure the conservation of the CPR. The interviews with forest dwellers confirm the assumption made in Chapter V, that rubber tappers have not perceived the need for implementing mechanisms to harmonise their own use of the CPR. Tappers never mentioned the conservation of the common resource as one of their problems or aims. On the other hand, regarding matters where they perceive the need to co-operate, they engage in collective action.

Several observations suggest that rubber tappers have institutionalised co-operation when they perceive the need for it. First, the families that get together to clear the forest paths are those who use the forest paths most. In those areas where the tappers are highly dependent on the middlemen, for example on rubber estate Guanabara, tappers showed no interest in having cleared paths; according to the tappers there clearing the forest paths was the problem of the middlemen who are the ones who used them most. On those estates such as Icuriã, Floresta and Dois Irmãos where there are co-operatives for the commercialisation of the produce, the tappers have a high interest in the conservation of the forest paths. Most interviewees on these estates considered the paths as belonging to the community and justified their ownership on the grounds that they are the ones who clear them. They did not think it was necessary, however, that outsiders or community members who did not participate were excluded from using the paths. However, if paths are used by the inhabitants of the estate, tappers not only clear them but also defend them. On rubber estate Floresta, for example, the majority of the families were ready to take action against another tapper that had obstructed a common path that they all used. On the other hand, no one on this estate seemed concerned that there was a rubber stand that was being used mainly for agricultural purposes. Whereas the problem created by the obstruction of the

[15] Seringal Icuriã is formed by two parts which are divided by a large area where nobody lives because there is hardly any water there. The area of co-operative Primavera is in the southern part and the goods are taken out of the forest through river Iaco, which is in the northern part of the estate. The warehouse is thus located at the origin of the path that connects the southern and northern parts of the estate.

path was clear to all forest dwellers, the unsustainable use of a stand, as long as it did not interfere with their own stands, was not perceived as a pressing problem.

Second, comparing participation in different common works it was also observed that, if the facility could be used by a large number of people, more tappers participated. Thus more people participate in the construction of a bridge used by many families, than in the construction of a school that is only going to be useful for those who live at most two hours away from the site. On rubber estate Icuriã, for the building of a bridge up to 60 people were recorded as participating. For clearing a forest path used only by the two families connected by it, only those two families worked. However, many interviewees in Icuriã participated in communal works that were not for their own advantage, and later they were given a hand in their own works by some of those they had helped. Although young rubber tappers sometimes participated in common works because of the socialisation involved in these activities, tappers in general participated if they believed that participation brought enough advantages to leave aside their own private work in the rubber stands. When interviewees who did not participate in common endeavours where asked why they did not co-operate with the others, they answered that they could not afford to abandon the work on their own rubber stands. In case of sickness - taking someone in the hammock to the nearest city - everybody, even those that did not participate in other activities helped. This can also be explained in terms of tappers perceiving the need for helping, since everybody would need the help of their fellow tappers in case of serious illness.

Third, several interviewees commented that the reason why certain families do not participate in common works is that they do not perceive the need for it. For example, on rubber estate Floresta there was a school, a health post and a nut-processing site, which had been constructed by a sub-group of the estate inhabitants. However, all estate inhabitants who lived nearby had access to them, including those who at the time of the construction were living in the area but did not participate in the building of the facilities. As we saw above, monitoring access to the facilities is not difficult, which suggests that tappers are not opposed to non-participants having access to the facilities. When asked why families who did not build the facilities could use them (an example of free-riding), two forest dwellers on rubber estate Floresta commented that this was not a problem because the supposed free riders did participate now in collective works[16]. According to these interviewees, people usually do not participate in common work because they do not see the advantages of it, but once they see it they co-operate with the others. The community on this

[16] One of the interviewee who said this had been one of those who had participated in all communal works from the beginning. Not only had he accompanied the whole process of the development of the community from the start, he also lived in the rubber stand where the communal facilities were located, and where the meetings took place. The second interviewee was a member of the rural workers' union of Xapuri and had had some experience in encouraging tappers living on isolated rubber estates to clear the forest paths in common.

estate started with five families working together but now the group has expanded. According to the interviewees, when the others saw the result they also joined. On rubber estate Icuriã, when talking about the inhabitants of the estate who did not participate in the communal works, the interviewees said that this was so because these people had not had the opportunity to observe the benefits that came from working in common. The same answer was given on other rubber estates when asked why, in further away areas, people did not have any common arrangements.

Fourth, whereas families do not monitor the use of the rubber stands (for which, as mentioned earlier, there is no apparent need) they do help each other in the private stands, where the work involved is clearly too intensive for a single family. When a large amount of work needs to be done, e.g. the yearly clearing of the agricultural field, the family calls the neighbours, and they will work together. They are, according to the interviewees' own words, exchanging 'work days'. The owner of the plot that was cleared will owe 'work days' to those who helped him[17]. Although there are no explicit rules regarding common work in the rubber stands, social pressure and the need for reciprocity makes it necessary for tappers to help their fellow tappers if they had received help on their plots before.

This section has explored the potential for the development of robust common property regimes on the rubber estates focusing on 'internal factors'. It has been argued that tappers have not developed robust regimes for the conservation of their CPR (the estate) because they have not felt the need for it. The estates' inhabitants have engaged in various common property arrangements to deal with issues where the need for co-operation is clearly perceived. The section has also shown that most internal factors conducive to the development of common property could be discerned within the rubber estates. Families on the rubber estates form groups which meet most features that enhance the capacity of co-owners to set up resource management systems. The jointness and exclusion conditions of the estates indicate that they can be held as common property and that, given the structure of the estates, individual monitoring is relatively easy. In other parts of the thesis (namely Section 7.2 and Chapter V) it has been shown that tappers are highly dependent on the resource and that they know the ecological limits of their forests.

These factors suggest that tappers <u>can</u> develop common property regimes and that if they have not done so this is because the need has not been apparent. The need to establish co-operatives to break their dependency on, and exploitation by, the middlemen has, however, certainly been

[17] Most interviewees were men, and most leaders are men too. However, there are some exceptions, such as a former female rubber tapper, Marina Silva, who after being a leader on her estate, is now a senator for the state of Acre. As a general rule this thesis uses the term 'he' rather than 'he or she' to simplify the writing, as well as to avoid giving the impression that there is equal political participation of men and women.

perceived (most tappers referred to this problem even without being asked about it) but they have rarely developed such arrangements. In other words, the fact that the need to secure their harmonious use of the resource has not arisen may explain why they did deal with this particular issue, but it does not explain why they have not established co-operatives and arrangements to improve their management of the resource. The factors summarised in the paragraph above do not explain either why some groups have developed incipient common property arrangements and others have not. Tappers on both estates Icuriã and Guanabara live equally far from their neighbours and both groups have been historically dependent on the middlemen. However, there is at least one reasonably robust regime on *seringal* Icuriã whereas on Guanabara tappers do not get together even for clearing forest paths. On rubber estate Floresta not all tappers form a community of well defined resource users; whereas those near rubber stand Rio Branco meet regularly for a number of purposes, other tappers on this estate hardly participate in any common activity and do not clear paths together.

The research conducted in the reserve suggests that external factors play a crucial role in explaining the lack of robust regimes and the development of the incipient common property arrangements on the rubber estates. The subsequent section thus focuses on the role of external factors at the level of the rubber estates. (It should be noted that in this section we examine how external factors have influenced the development of arrangements among the tappers rather than in opposition to outsiders, since the latter issue has already been extensively explored in Chapter V).

7.4 External factors influencing the development of robust regimes on the rubber estates

Chapter II suggested several external factors that influence the development of common property regimes. One is the level of autonomy commoners have: commoners who have little autonomy are less likely to develop institutions than those who are autonomous in relation to the state. Other important external factors mentioned in the literature and discussed in the subsequent pages are access to information, direct help from outsiders and the role of the state.

The autonomy of the tappers is rather recent, although their lack of autonomy has not been related to state interference. Whereas most robust regimes examined in the literature have been in place for at least decades and often for centuries, on the rubber estates common property arrangements have existed only since the 1970s. At the time of the rubber barons, the estates were managed by the rubber barons or the appointed managers of the estates, and thus the tappers did not have autonomy to develop their own arrangements. Since the abandonment of the rubber estates by the *seringalistas*, the autonomy of the tappers has been relatively enhanced.

On the one hand, the tappers' autonomy increased because they were no longer subject to the *aviamento* system. Moreover they felt the need to provide certain services that had previously been the responsibility of the barons, such as clearing of forest paths. Helping each other to clear the agricultural plots was also something that only became necessary and possible with the end of the rubber boom. While the barons were in charge of the estates, they often did not allow tappers to cultivate their plots (see Chapter V) and when they did they would not have allowed the common clearing of plots that would have diminished the production of rubber. According to de Paula (1991), the presence of the middlemen also helped to curtail the dominance of the patrons. However, the middlemen may also have limited the tappers' autonomy and hindered the development of co-operation among the extractivists. The middlemen, for instance, took over the clearing of forest paths, which they used for trading on the rubber estates. They often kept the tappers in debt by charging inflated prices for their goods and paying considerably less than the market price for rubber. In many areas, given the distances among houses and the individual character of tappers' work the main social contact of the tappers is with middlemen and, according to some interviewees, they often advise the forest dwellers against any form of association, which they said, would make them lose their stands[18].

According to most key informants lack of autonomy is the main reason which explains the absence of common property arrangements among the rubber tappers. Their historical dependency on external agents, in the words of these interviewees, has hindered their capacity to take initiatives and assume responsibility for the management of their resources. In fact, it was often observed during the fieldwork that forest dwellers had a tendency to rely more on outsiders than themselves. When asked who had suggested any specific common work (e.g. who decided to build the facility or who suggested that paths should be cleared in common) forest dwellers answered in most cases that the idea had come from an outsider. On all rubber estates visited, there was a general tendency for people relying on an outsider or a leader of the community, who usually has more contact with outsiders than the other inhabitants of the estate, for making the proposals. This observation was confirmed by the comments of two interviewees on rubber estate Floresta, who said that to speak up in meetings rubber tappers need someone to encourage them, there is need for a leader for the meeting. However, in the meetings attended inside the reserve it could be observed that when a proposal was made by a member of the community or an outsider with whom they were familiar, tappers tended to speak up if they did not agree. On the other

[18] It should be noted, however, that some middlemen are tappers themselves. On rubber estate Icuriã, for instance, a middleman/tapper was one of the more active participants of the activities for the creation of the Association of Inhabitants of Assis Brasil, whilst he had never participated in co-operative Primavera.

hand, at meetings in town with several outsiders (e.g. members of IBAMA or the union who they do not know) forest dwellers hardly ever intervened.

Tappers' attitude regarding outsiders, however, is not only related to their historical lack of autonomy; their limited access to information also appeared to play a role in their lack of initiative. When questioned why all ideas had come from outsiders, interviewees commented that outsiders had more knowledge than they had themselves. In fact, forest dwellers often commented on their isolation, and on how those people who came from the city knew better than them what was going on. A key informant explained that tappers usually do not speak out in the presence of outsiders because they tend to feel intimidated by those that have more knowledge. A technician from IBAMA, who has been working with the rubber tappers for a number of years, also commented that "rubber tappers do not like to give their trust to another rubber tapper, they prefer to give it to an outsider that already has a bit of knowledge, someone who they think has more knowledge than them". On rubber estate Icuriã, where several inhabitants of the area participate in decision making, interviewees showed considerably more knowledge of community matters than in other areas (as it could be observed during an interview in which several inhabitants of this estate took part). The marked satisfaction with which some interviewees on Seringal São Pedro mentioned that both the schoolteacher and health agent were rubber tappers could be understood as an additional indication that if they had more access to information and knowledge they would rely more on their fellow tappers than on outsiders.

Since the establishment of the reserve in 1990, the tappers' autonomy to manage their resources has only been relatively enhanced. On the one hand, external actors have not imposed external rules on the tappers. Also, they try to encourage the tappers to participate in all decisions regarding the reserve and in particular the rubber estates; for example, the forest dwellers are the ones who decide which facility they would like to have within the options available. The formal co-management system of the reserve also leaves the tappers sufficient autonomy to develop additional rules and monitoring and enforcement mechanisms within the stipulations of the Utilisation Plan. For example, in the Utilisation Plan the only specification on the use of common areas is that the community is responsible for them (IBAMA, 1995:26) and that these areas should be used according to the regulations made by the community in the area.

On the other hand, however, the formal co-management system of the ERCM hinders the autonomy of the reserve inhabitants in a number of ways, as illustrated in the following examples. First, outsiders encourage tappers to become environmental monitors for the entire reserve. This initiative may hinder the development of more effective mechanisms at the level of the estate

(where some incipient arrangements exist already) because the tappers can rely on environmental monitors from other estates to ensure the conservation of their resources. This way they do not incur the costs involved in carrying the monitoring and enforcement themselves. Another example concerns the Associations; tappers, instead of developing institutions to manage their rubber estates may, as in the case of monitoring, rely on these organisations, in which they are not represented, to spend the time and effort necessary for managing their resources. Third, according to the Plan, for the reserve inhabitants to change a rule a proposal must be presented by at least 10% of the families inhabiting the reserve (i.e. 200 families) and the proposed change needs to be approved by a minimum of 400 families. As the groups in the rubber estates tend to be formed by at most 25 families, a change in the rules would be likely to be a lengthy process. It should be noted, however, that the Plan's stipulations regarding change of rules are not likely to interfere with rules regarding access to common areas or common facilities within rubber estates, since the right of communities to address these issues is recognised in the Plan. The difficulty for the tappers would rather be to change the provisions made by the plan regarding monitoring the use of resources. None of the other rules addresses institutional arrangements but only environmental issues, such as how much land each tapper can clear or whether a tapper can extract wood.

Fourth, as tappers tend not to speak at meetings, especially if outsiders are present, the decisions sometimes end up being taken by the outsiders, even if the latter encourage them to give their opinions. For example, on rubber estate Icuriã IBAMA officials and tappers were looking for an empty rubber stand for the resources that would come with the PP-G7, although as we saw above all other facilities are located on private stands and there were no evidence of this having caused any problems. Whether the location of the new facilities in an empty stand was a requirement made by outsiders could not be ascertained from the interviews, but there were no indications that the location of the facilities on private stands was considered by the forest dwellers to be a problem. Also, regarding the elections of representatives for the Association in Assis Brasil, although tappers were asked to vote they were not given sufficient autonomy to choose a representative because they had to choose on the terms set by outsiders.

The lack of robust regimes in the reserve in 1995 cannot be solely blamed on the lack of autonomy tappers have had since the establishment of the reserve. Although the reserve was created in 1990, training of environmental monitors, creation of Associations, implementation of the Utilisation Plan and RESEX sub-project activities began only four years after the creation of the reserve. At the time of the fieldwork, the autonomy of the tappers had thus only been restricted for one year and in the previous three years they had not developed robust regimes. The lack of robust regimes in reserves is related to a combination of internal and external factors,

such as the individual nature of the tappers' work, their historical dependency on patrons and middlemen and their limited access to information. However, it can be postulated that implementing institutional arrangements in the reserve without the tappers having felt the need for them and, moreover, arrangements that are not adequate to the local conditions of the rubber estates, is unlikely to promote the development of robust regimes in the reserve. First, given the tappers' lack of experience regarding the common management of their resources and that they have been used to outsiders managing their resources, the approach of external actors may just result in the tappers transferring their relationship with the patrons to the new outsiders. Some key interviewees commented that this was happening already. Second, the approach of external actors has led tappers to believe that IBAMA and the lideranças manage the reserve, in which case they do not have to incur the costs that managing CPRs have, they can just use the resources to their own individual benefit. Third, although tappers do not voice their complaints, they easily ignore outsiders' suggestions with which they disagree unless there are effective enforcement mechanisms in place.

Autonomy alone, however, is not the only factor that can enhance the development of robust regimes on the rubber estates. The examination of the five rubber estates visited suggests three interrelated factors that have played a positive role in the development of common property regimes on the *seringais*: direct help from external actors, contact with the outside world and access to information.

There are several indications that the presence of external actors on the rubber estates has been fundamental in the development of common property regimes. For example, the presence of members of the Catholic Church on the rubber estates has been particularly important. Most of the communities on the estates visited had been formed at the initiative of the Church and were initially Christian Grassroots Communities or Gospel Communities (see Chapter V). For example, community Itapiçuma, on rubber estate São Pedro, was initially a gospel community; on rubber estate Floresta, the same group that got together to build the nut-processing site meets regularly to pray. The tappers' leaders, both those living in the forest and those who work full-time for the unions, had been members of these communities and had attended the literacy courses organised by the church on the rubber estates.

The importance of the role of the church in extractivist areas can be exemplified by comparing the cases of Icuriã and Guanabara, two neighbouring rubber estates. As described in the previous section, on rubber estate Icuriã, tappers have developed a number of common property arrangements, there is a high level of co-operation among households and in case of problems

they seek help from members of their own community. By contrast, on rubber estate Guanabara, tappers are completely dependent on the middlemen for the commercialisation of their produce, they are considerably poorer than their neighbours in Icuriã, and there was no evidence of co-operation between households, not even for clearing paths. Tappers from Icuriã and key informants, when questioned about the differences that were observed between the two estates, suggested that in Icuriã tappers were better organised because a priest, Padre Paulino, had lived and worked there for many years, whereas in Guanabara this priest's presence had been sporadic. According to all interviewees on Icuriã estate, Padre Paulino had been the one who had encouraged them to clear the forest paths in common and to set up Co-operative Primavera to avoid dependency on the middlemen. The rice mill that is owned by four households of Icuriã had also been acquired via the church: two nuns working with the priest had bought it for those four families. Finally, according to some interviewees, these members of the church had also organised meetings in the north part of the estate (*Margem do Iaco*) when stand-offs were being staged in that area.

The Rural Workers' Unions and an NGO, CTA (*Centro dos Trabalhadores da Amazônia*, Amazon Workers' Centre), which was established in 1983 with the specific purpose of giving support to the rubber tapper population, have also played a significant role in encouraging the forest dwellers to develop common property arrangements. CTA in co-operation with the Rural Workers' Union of Xapuri has helped the tappers to set up schools and it developed primers specifically designed for children living in the forest. This NGO has also had an active participation in the formation of health agents among the forest dwellers and the establishment of basic health posts in the forest. In addition, CTA provides seedlings and cutting to the tappers to help them diversify their production and improve economic development. Finally, CTA together with the Rural Unions and the support of international organisations[19] set up in 1989 a Brazil-nut factory at Xapuri, which developed in a co-operative, the Agro-Extractivist Co-operative of Xapuri (CAEX). In 1993, this co-operative had 6 warehouse branches on the rubber estates and 120 associated members inside the reserve (ELI, 1994). The forest branches of the co-operative were part of a decentralisation initiative to overcome the successive problems that the co-operative had faced; on account of which its results have fallen below expectations[20].

None of these initiatives had attempted to establish institutional arrangements for the management of the rubber estates. However, most of the common facilities on the estates had originated from the proposals of CTA and Union members and were managed or partly managed by the direct

[19] WWF, the Ford Foundation, ECOTEC, InterAmerican Foundation, GTA, CNS, STR, IBAMA, PMACI and the universities of Rio, São Paulo and Acre (ELI, 1994).
[20] See Hall, 1997b: 117.

users. For example, the communal vegetable plot on *seringal* São Pedro had been proposed by CTA technicians, although it was the community that had decided to have an agricultural plot rather than an orchard, which was the alternative proposal. The construction of the nut-processing site on *seringal* Floresta had also resulted from discussions that took place outside the forest concerning the decentralisation of CAEX. The rules of the nut-processing site, according to the interviewees, were also decided outside the rubber estate, but they all agreed with them and some changes had been incorporated. For example, one of the processing machines had been located in the house of a married woman with two small children to ensure that she could take care of the children while doing the work. IBAMA members have also through their work on the estates encouraged tappers to develop common property; for example, on rubber estate Guanabara communal works started only in 1994 prompted by IBAMA officials, who suggested clearing the forest paths in common.

The existence of a leader on the estate was also a very important factor in promoting the development of common property and leaders were tappers that had more contact with the outside world than the other inhabitants of the estate. Through their contact with the outside world they also had more access to information and were in general more knowledgeable. On the five rubber estates visited, interviewees mentioned during the conversations someone who they considered to be the leader of the area. Interviewees mentioned the leaders, for example, when asked about who took the initiatives for arranging a meeting or getting together to work in a group. Besides, when the interviewees did not know the answer to a question they often said to ask the leader, who, they said, knew better than them[21]. The leader was often the one who took the initiatives for meetings and communal works. In addition, it was often the case that the initiative for forming a group to work together, in other words, the establishment of the seeds for the development of a community, came from an individual who performed the role of leader of that group of tappers. This was, for instance, how community Rio Branco on rubber estate Floresta was initially formed.

A leader tends to be a rubber tappers who has more knowledge and experience than others have and who either lived outside the estate or who had more contact than the others with external actors visiting the estate (e.g. with members of the church). The leader of rubber estate Dois Irmãos was a full time member of the Union and only lived part-time in the forest. On rubber estate Floresta, the leader only lived there part-time. Neither of these two leaders can be considered complete outsiders, as they are both former tappers and their families live in the

[21] The interviewees did not refer specifically to the leader, but there was the name of a person who always appeared to know more, and to take the initiatives. As the person tended to be the same for all the interviewees in the same area, the researcher asked if this person was the leader of the community. Answers varied from those who said yes, to those who said that there was not a leader although that person was the one who knew best and suggested most decisions.

forest. The leaders of Icuriã, the former union representative, the school teacher and the head of Co-operative Primavera, all lived on the estate. However, all of them had had extensive contact with either members of the church or the unions. Both forest dwellers and key informants commented on the importance of a leader and the link with the outside world that the leader establishes. One evening, when talking with a heterogeneous group of men in the city of Brasileia - rubber tappers and graduates working for the reserve - the importance of the existence of a leader, of someone to take the lead, was spontaneously mentioned as one of the factors necessary for the development of a community, in the sense of a group of people that gets together to solve their common problems and who work in common when necessary. A rubber tapper described a leader as someone who does things not only for his own benefit but also for the others. People start trusting him. It is equally important to be socially articulate and thus to speak with people. The leader (said also this interviewee) is also the one who makes the link with the nearest city, which is where news and information can be obtained.

Third, there are more common property arrangements on rubber estates that are more easily accessible than on isolated rubber estates. Several key informants commented that distance from a road or city was an important factor in the development of co-operation among tappers. Comparing the rubber estates visited according their distance from a road or city, the same conclusions were reached. The most distant rubber estates were those where common property arrangements were most rare, and hardly any common facilities such as schools and health posts could be found in these areas. Of the five rubber estates visited the one that had most common facilities (and where tappers seemed to discuss community issues most frequently, as gathered from the interviews comments on their meetings) was Dois Irmãos, which is approximately 3 hours walk from a road. This rubber estate had two schools for 17 families, a health post, a warehouse and all the interviewees were literate. On the other hand, the inhabitants of rubber estate Guanabara, which was one day walk from the nearest city, did not perform any activity in common. On this estate, people were also totally dependent on the middlemen and although a co-operative had been formed some years ago it had not lasted long. Forest dwellers from all estates, when questioned about the differences in communal organisation and existence of common facilities on the different estates, indicated isolation as a factor for explaining the difficult situation of Guanabara and other estates deep in the forest. On rubber estate Floresta, where there were several common facilities and an organised community, interviewees mentioned other more distant rubber estates where things were very different from their own estate: they did not have any form of community organisation, they still sold to the middlemen, and they lived very isolated. Some members from the union, who were doing the census of the ERCM, commented that in more distant areas they had had to walk leaning over because the forest paths were

virtually non-existent. The absence of forest paths always reveals that tappers have not developed any form of co-operation to improve their lives.

Which city the rubber estate is closer to is another factor influencing the level of outsiders' presence. The nearest city to Guanabara is Assis Brasil, which is one day by car from Rio Branco - the capital of the state - and inaccessible during the six months of the rainy season. Rubber estate Icuriã, also from the municipality of Assis Brasil, although it had a high level of community organisation, did not have any health post, and one of the schools was not functioning. On the other hand, rubber estate Dois Irmãos is near Xapuri, which is only four hours away from the capital of the state of Acre, and the city where Chico Mendes lived, thus according to several interviewees, attracts more international attention and development projects. The difference between the rubber estates which are closer to Xapuri and those that are in the municipality of Assis Brasil, was observed as well in the two meetings held in each cities. Both assemblies took place in the same week - thus differences in working pressure did not apply - and had the same purpose, explaining what the PP-G7 sub-project on reserves was about. The meeting in Xapuri was led by a member of the rural union who was a former rubber tapper, and still lives in the forest, and there was substantial participation of the forest dwellers. On the other hand, the meeting in Assis Brasil was led by a member of CNPT, the state agency responsible for the reserve, and there was hardly any spontaneous participation of the rubber tappers.

Accessibility is a positive factor for the development of common property regimes on the *seringais* because of several interrelated reasons. The closer a rubber estate is to a road or to a city, the more likely it is that outsiders would have been there. Also, the most accessible rubber estates were the most affected by the invasions of the cattle ranchers. Hence, in these areas more people participated in stand-offs and benefited from all the experience of co-operation that these movements brought with them. Rubber tappers living on estates which are only a few hours away from a market centre can more easily take the time to travel there, for example, to commercialise their produce. They are thus not as dependent on the middlemen as tappers who live a day or more away from a market place. Travelling to a city increases their access to information and they are not restricted to the news brought in by the middleman. Contact with other tappers travelling on the rubber paths and with people with different experiences in the city also increases their access to information and their possibility of discussing issues with fellow tappers. A tapper living several days away from a market centre cannot afford to lose workdays to take the produce to a market centre. By selling its produce to the middlemen he is also poorer than the one who can sell the rubber or Brazil nuts for a higher price in the city. The isolated tapper will also have to collect more rubber to obtain the same income than a tapper who trades his produce for a higher

price and will have less disposable time to participate in common works with fellow tappers. Finally, and perhaps the most important factor, isolated tappers have less access to information and to potential help from external actors.

The various factors that this section has shown as conducive to the development of common property - autonomy, direct help from external agents, accessibility and presence of leaders – are all related to the issue of information. Lack of information is one of the factors that explain tappers' reliance on outsiders for proposals and initiatives, since outsiders have more information. The leaders of the estates are also those who have more information. Information on better production techniques, on how to set up co-operatives and on the advantages of clearing their own forest have all been factors which promoted co-operation and that were obtained via contact with outsiders.

7.5 Conclusion

This chapter has sought to explore the property rights institutions of the ERCM and to assess whether this institution can ensure the sustainable use of the forest. In doing so, this chapter has also provided an analysis of how internal and external factors influence the conservation of jointly used resources in the context of the reserve. This section summarises the main findings of this chapter and attempts to answer some of the questions raised in previous chapters.

The sustainable use of jointly used CPRs depends on the existence of a robust regime. If such a regime is not in place, however, it may be because the need for it has not arisen, in which case one has to examine whether there is potential for such a regime to develop.

The inhabitants of the ERCM have rules regarding the use of natural resources in their stands and of common areas, such as forest paths. They respect the boundaries of each other's stands and have monitoring mechanisms to ensure that common facilities are not destroyed and overused. Regarding the environmental rules the only enforcement mechanism they have is social pressure. The existence of these mechanisms suggests that a 'tragedy of the common' is not an imminent threat to the resources in the reserve. That is, resources are not open access and tappers respect the limitations regarding each other's resources. However, their institutional arrangements do not meet all the requirements of a robust regime and this could in the long term endanger the conservation of the tappers' forests, especially if incentives to clear their stands increase. Tappers have not developed rules with the specific aim of ensuring their harmonious use of the forest and their enforcement mechanisms are only based on social pressure, which this chapter showed has often not been sufficient to prevent defection. Moreover, tappers do not know the boundaries of

their resource and of the group of co-owners and do not participate in the co-management system that has been formally established. If the situation stays as it is, the forests can thus be overused because of the following problems. First, outsiders may enter the reserve through non-inhabited areas. Second, rubber tappers may sell their stands to loggers and other individuals who do not practice sustainable activities. Third, tappers themselves may switch to non-sustainable activities.

This chapter has also shown that there is potential for the reserve to become a robust regime if a system of nested enterprises develops. The conservation of the tappers' forests requires a large number of co-owners because of the indivisibility of the forest. Isolated common property regimes on the rubber estates would not be robust because the conservation of their resources would be at risk if tappers in neighbouring estates do not also use their forests sustainably. The difficulties involved in the conservation of the reserve as a whole and in the sustainable use of each rubber estate are different but interdependent. Hence, independent regimes could not ensure the conservation of the entire area but, at the same time, a single set of mechanisms would not address the specific problems of each estate. For example, at the reserve level the relevant issues are the regularisation of landed property rights and ensuring that outsiders do not enter through non-inhabited areas. These issues influence the sustainable use of resources on the rubber estates. However, on the *seringais* there are also other issues that cannot be solved in the same way for the entire reserve because, given the heterogeneity of the different communities of the reserve, each group is likely to need different mechanisms to solve these problems. For example, on rubber estate Floresta a certain level of free-riding tended to increase participation in common works. By contrast, on rubber estate Guanabara even a small level of free-riding might discourage tappers to participate because of a previous experience with free-riders on the estate. In the 1970s, Padre Paulino encouraged the tappers to set up a co-operative. This arrangement, however, was short-lived because the tappers in charge of managing the co-operative used the common resources to their own advantage.

Another reason why a system of nested enterprises would be adequate for the reserve is that attempts at developing the reserve into a robust but 'single' regime have not been successful. This is partly because the inhabitants of the reserve form a large group and are relatively heterogeneous, which, as highlighted by Hall (1997b), are two factors that can hinder the resolution of the free-rider problem. The main problem, however, seems to be that tappers are not aware of the fact that the conservation of their rubber stands depends on the harmonisation of the use of the forest by all the reserve inhabitants. The fact that tappers see inhabitants of other rubber estates as 'foreigners' and the management of the reserve as a whole beyond their jurisdiction also contributes to them not participating in the management of the reserve. The

reserve inhabitants' lack of experience in managing their natural resources in common also renders the development of a robust regime difficult. However, the potential for the development of robust regimes at the level of the rubber estates is substantial and higher than for the reserve as a whole. On the rubber estates there are incipient common property arrangements and it is easier to strengthen existing regimes than to develop a regime where there is none. For example, on the estates, tappers have developed monitoring mechanisms, although they do not have robust enforcement mechanisms. Moreover, on the estates, families form small and homogenous groups, whose members meet regularly, co-operate with each other when the need for doing so is perceived and, sometimes, attempt to solve conflicts between themselves.

Once tappers develop robust institutions to harmonise their various common property regimes the risk of resource depletion in the reserve would decrease considerably. Moreover, it would be easier to encourage the various communities to co-operate after they have experience of resource management and through the management of their estates, they become aware of the need to co-operate with the inhabitants of neighbouring estates. Although the tappers are heterogeneous they also present features which would help them to co-operate once they have started the process on their own estates. For example, they all are dependent on the conservation of the forest for their survival and share a common memory of the advantages of co-operation. They also know the ecological limitations of their resources and tended to value the forest[22].

Chapters IV and V raised some questions which the analysis of the ERCM can help to answer. One was whether the external context is facilitative for the tappers living in the ERCM. The external context of the tappers in the 1990s is considerably more facilitative than in the 1980s. Regarding the protection of the tappers' exclusive rights to their resources, both the legal framework on reserves and the RESEX sub-project provide substantial support. Entrance of outsiders into the reserve does not result from lack of secure rights but from individual tappers selling their usufruct rights to outsiders. This problem is thus part of the difficulties that commoners face regarding their own harmonious use of the CPR. The legal framework and the RESEX sub-project also include initiatives to help the reserve inhabitants to develop mechanisms to harmonise the sustainable use of resources in the reserve. Tappers are encouraged to have meetings, they are provided with material means and information. External actors – lideranças and IBAMA officials – also travel regularly to the reserve to encourage tappers to participate in common activities, e.g. to build a bridge or a school. However, external actors' initiatives to

[22] Some rubber tappers interviewed, for example, mused on how nice it would be to live in the city; however, they usually added that for this they would have to be more qualified, otherwise living in urban areas would be considerably worse than living in the forest because they would not, for example, have access to clean water. Once the decision to stay in the forest was made, tappers strongly believed that it was better to live in the forest than in areas that had been cleared.

support the tappers are partly undermined by the fact that they also hinder the reserve inhabitant's autonomy to develop their own institutions to ensure the conservation of the forest and that their help is not always adequate to the tappers' institutions. That is, rather than only providing incentives for the development of common property, external actors have also attempted to establish the features of robust regimes. External actors hinder the tappers' autonomy because they have tried to implement institutional arrangements before the reserve dwellers perceive the need for them. Moreover, as these arrangements are based on the entire reserve, which the tappers' do not perceive as their resource, external actors have hindered the tappers' initiative to strengthen their own arrangements on the rubber estates. The majority of the interviewees rely on IBAMA and the mechanisms established by the state and the lideranças for the management of their resources.

Chapter VI considered whether tappers can have autonomy. That is, given that the external context in the 1990s is different from what it was in the 1970s, the weak common property regime of the tappers may no be longer sufficient to ensure the sustainable use of the rubber estates. As the reserve inhabitants form a large group and families often do not have regular contact, can their resources be conserved without the expedient implementation of institutional arrangements such as the Utilisation Plan and the creation of Associations to represent the reserve inhabitants? Also, given that the reserve has to be managed as well as the rubber estates, is it possible to wait until the tappers have developed small common property regimes before encouraging them to participate in the management of the entire reserve?

The research conducted in the ERCM suggests that the main threat to the tappers' forests does not lie in the weakness of their regimes but rather in their poverty, and thus the need to formalise the tappers' rules in the Utilisation Plan was not a priority. Moreover, by formalising the rules as the tappers' rules, external actors have, as discussed in this chapter, hindered the capacity of the forest dwellers to develop responsibility for the management of their resources. In doing so, formalising the rules, establishing the Associations and training environmental monitors has not contributed to create a robust regime and thus ensure the conservation of the CPR. On the contrary, it has hindered the development of such a regime and thus put in jeopardy the sustainable use of resources in the long term. This is not to say that the co-management system of the reserve should not have conditioned the tappers' rights to their sustainable use of the resource. But there is a difference between establishing rules with which commoners (or private owners) have to comply, and presenting institutional mechanisms as the tappers' mechanisms, which limits the genuine development of mechanisms by the forest users themselves.

The fact that the reserve inhabitants form a large group of dispersed families renders the development of common property more difficult than if resource users form small groups. However, as mentioned earlier, other large groups of resource users have also developed regimes when the need for doing so became apparent. Regarding the management of the entire reserve, this chapter has also argued that the rural workers' unions could have carried out this task better than the Associations. The tappers see the unions as their representatives and in spite of the fact that the union leaders have to a certain extent distanced themselves from the forest dwellers they still have close contact with the inhabitants of the reserves. While not the ideal solution, the unions represent a better option than the Associations and a better alternative to the problem that attempts at integrating tappers in the management of the reserve.

In conclusion, the examination of the ERCM indicates that the sustainable use of the forests by the reserve inhabitants is influenced by both internal and external factors. External factors result in turn from developments in the wider context. For example, both the positive and negative aspects of the reserve co-management system are related to overall ideas about resource management. An overall shift appears to have occurred in the sense that now it is more widely accepted that local populations can manage their resources. However, the idea that external actors can actually establish the way in which local populations manage their resources seems to be still present among IBAMA officials and the donors of the Pilot Programme, as well as among the leadership of the rubber tappers.

Chapter VIII

Common property regimes: the interaction of local, national and international factors in the sustainability of common pool resources

Introduction

The present thesis has sought to examine the process that led to the establishment of extractive reserves in Brazilian Amazonia and the characteristics of the Extractive Reserve Chico Mendes, taking into consideration local, national and international factors. In so doing, the thesis has represented the first in-depth analysis of extractive reserves using, as an analytical framework, the theory on common property regimes. Previous researchers have shown that private property and state management of common pool resources are not the only and often not the best means of preventing resource depletion since common property can also ensure the sustainable use of CPRs. The conditions under which common property regimes can promote the conservation of CPRs has been the subject of considerable research. Frameworks have been developed to identify the features of robust regimes and the factors that determine when users of a CPR are more likely to develop such regimes. Some scholars (Ostrom, 1990; Edwards and Steins, 1998) have pointed out that the conservation of jointly used CPRs does not depend exclusively on internal factors (such as users' and CPR characteristics); the external context can also influence the development and robustness of common property regimes. In the literature on common property there has, however, been more emphasis on examining the internal factors that influence the joint use of CPRs than in exploring the interaction of internal and external factors, especially when the latter include developments in the international arena.

This thesis has examined the joint use of a CPR looking at a wider range of factors than those usually considered in the existing literature. Apart from the characteristics of the resource users - the rubber tappers - and their resources, the thesis has also reviewed the evolution of national policies, developments in the international arena, and explored how the interaction of all these internal and external factors have influenced the tappers' use of their CPRs. This final chapter will sum up the analysis presented in the previous chapters and, in light of these findings, will evaluate the literature on common property regimes. To conclude, the chapter will discuss some potential limitations of the thesis and suggest areas for further research.

8.1 The sustainable use of CPRs: common property regimes as a potential solution

Chapter II outlined two different arguments regarding CPRs. One is the 'tragedy of the commons' thesis, which postulates that unless there is no scarcity jointly used CPRs are in risk

of depletion because individuals will not consider the full cost of overusing the CPR. Broadly speaking, scholars sharing this view can be divided in two groups. Advocates for state control maintain that the difficulties involved in the conservation of a CPR are similar to those that characterise the provision of a public good and, therefore, private agents cannot secure the sustainable use of the resource. Advocates of private property consider that the resource should be privatised because then the owner will carry the full cost of depleting the CPR. The other line of argument is that joint users of a CPR can develop a variety of property rights arrangements to secure the sustainable use of the resource. Depletion of jointly used CPRs only occurs if the co-owners cannot secure their exclusive rights to the resource or if they cannot develop mechanisms to ensure their own harmonious use of the resource.

Chapters V and VII examined the rubber tappers' use of the forest from the late 19th century until the mid-1990s, having reviewed their external context in Chapters III, IV and VI. Originally, the tappers used the forests under the control of a rubber baron or patron. From the 1920s onwards, the patrons gradually began to abandon the rubber estates and the tappers were left to their own devices. During the period between the abandonment of the estates by the barons and the arrival of cattle ranchers in the 1970s, the rubber tappers jointly used the forests and there are no indications that they depleted their common resources.

The conservation of the forests during the period in question has been considered to support the theory on common property regimes, that is, the argument that joint users of a CPR do not necessarily overuse their resources. However, the sustainable use of the rubber estates until the arrival of the ranchers cannot be explained as due to the existence of robust common property regimes. Between the 1920s and the 1970s the land tenure structure of the tappers may be defined as a 'weak' common property regime (Ostrom, 1990). That is, the boundaries of the CPR and of the group of co-owners were well defined. For instance, if a newcomer attempted to establish himself in the area, inhabitants of the rubber estate would make sure that the new tapper left the area if they did not approve of his presence. There were also rules regarding the use of their natural resources. However, these rules had not been designed by the tappers to ensure their harmonious use of the common resource. They rarely monitored compliance with the rules and the only enforcement mechanism in place was social pressure, which was weak and not present in all areas. In addition, the tappers in general did not co-operate in the management of the common areas, e.g. by opening forest paths together. The CPR or rubber estate could be best described as a set of intertwined 'private' rubber stands, where boundaries among the stands were respected and some resources were common but not managed in common.

The conservation of the forests until the arrival of the ranchers can be explained with reference to Hardin's 1968 analysis of the commons. According to Hardin (1991), the 'tragedy of the commons' only occurs under conditions of scarcity, otherwise a CPR can be commonly used by several individuals without being depleted. This was indeed the case of the Amazon forests before the government policies of the 1970s triggered a massive increase in the demand for land in the region (Chapter III). The rubber estates were virtually isolated and apart from sporadic tappers wanting to move into the area or the middlemen, whose interest was not in the direct use of the forests, the rubber tappers living the forests were the only ones who had an interest in the use of the CPR. For them, the tappers, the forest was abundant. The use of each rubber stand was limited by the labour capacity of the household. Once the children were able to tap rubber themselves, there were enough rubber stands for them to move out without overusing the parental stand.

The conservation of the rubber estates' forests before the arrival of the ranchers can also be explained using the arguments of the property rights school, or the advocates of private property. Each rubber stand was private property in the sense that the owner of the stand had most of the rights to the *colocação*. He was the only one who had the right to use the stand and he could sell the stand (albeit not the land, though this was not in the interest of the tappers anyway). The owner of the stand thus carried both the benefits and (most of) the costs of destroying the rubber stand. If the rubber trails were overused, he would get a lower price for his stand and would have to clear new trails if he wanted to move to another stand.

Although the conservation of the rubber estates until the 1970s can be explained using both these arguments, the joint use of the forests by the tappers also provides broad support for the theory on common property regimes. First, extracting as much as possible from a CPR is not always the dominant strategy of resource users, even in the absence of monitoring mechanisms imposed by the users themselves or the state. The tappers' incentives to deplete the resource were lower than those of the cattle ranchers because for the former the value of the resources was directly related to their conservation. The value of their stands would decrease if they overused their resources whereas the value of the ranchers' holdings increased if they cleared the forest. This suggests that it cannot be assumed that the dominant strategy of users of a CPR (private or joint users) will always be to extract as many units as possible from the resource. Whether individuals try to do so is related to their economic and cultural context and on how natural resources are valued in that context.

Second, an external agent is not always necessary to enforce compliance with resource use arrangements. The 'private' property rights to the rubber stands were not enforced by an external agent but were respected by all users of the CPR. Although there was no scarcity of

resources, a tapper could attempt to occupy the neighbouring rubber stands, which would have involved less work than clearing non-occupied areas of the forest. In the same way that the barons obtained control over large areas of the forest, individual tappers could have attempted to do the same, but there were no indications that they did. (There is very little information on the tappers' lives at the time, and from the interviews it is not possible to make definitive statements).

Third, on the rubber estates, common property was a better option than either privatisation or state control of the resource. Privatisation of the rubber estates was attempted but with no success. The indivisibility of the CPR, in particular the intertwining of the rubber trails, was one of the reasons that contributed to the little success of private plots. However, it should be noted that the tappers' cultural and historical background also made privatisation of the estates a difficult matter. Although tappers had always had individual rights to their stands, the notion that fruit trees and other parts of the CPR were not accessible to all was a concept which they could not easily adapt to. Private ownership of the entire estate also involved a number of problems. Private owners in the 1970s would not have secured the conservation of the CPR because this was not in their own interests and the tappers would have become landless. Hypothetically, the estates could have been bought by someone wanting to exploit rubber in the area. This was in fact attempted in the 1950s, however, without the strong control of *aviamento* the system was not feasible (Hecht and Cockburn, 1989). State control of the entire area also presented several shortcomings. In the late 1970s, when the tappers began fighting for their CPRs, the state was not interested in the conservation of the CPR whereas for the tappers the maintenance of the forests was a priority. In the early 1990s, it can be safely assumed that the conservation of the forest was in the interest of the state. However, if the state would take over the management of the reserve it would have to devise rules for using the forests, monitor and enforce these rules, and monitor the state agency responsible for the reserve. Apart from the high costs of these activities, state control cannot ensure the tappers' compliance with the rules established, an issue that will be addressed later when reviewing the problems that state interference has had in the reserve.

The case of the ERCM provides also a clear illustration of how diverse property rights institutions can be and this is why the insights of different theoretical frameworks may be applied. The property rights structure of the ERCM involves elements of private, state and common property, and this distribution of rights between state, 'communities' and individuals is, for a number of reasons, more advantageous to the tappers than other alternative property rights institutions. The presence of each of these elements has a justification based on the history of the tappers, on the characteristics of the rubber estates and on circumstantial factors related to the external context. The irregular distribution of resources in the forest and the use of

the resource by the tappers, that historically has involved individual work in the stands and common use of other areas, made either strictly private or communal[1] property institutions inadequate. Contextual socio-political factors, such as the struggle for land in the Amazon region, where small peasants are sometimes forced, through legalistic or violent means, to sell their plots, was also a motive for proposing state property of the land in the reserve. The fact that the reserves were established amid international pressure for the conservation of the Amazon rainforest and in the context of the government's environmental policy were a further motive behind state property: through state property, it was argued, reserves could be more easily justified as environmental units. Specific cultural factors also played a role in determining the property rights features of the Reserve. For the majority of the tappers, 'private ownership' of the stands does not include either the right to sell land or the right to clear the forest cover. Other users of CPRs, e.g. agricultural colonists whose aim in migrating to Amazonia was the acquisition of a private plot of land for agriculture, may not have agreed with a property rights system which did not include rights to sell the plot nor rights to clear the land. Property rights institutions can thus take on a number of different characteristics, depending on the features of the CPR, its direct users and the socio-economic, political and historical context where resource and resource users are embedded.

8.2 The development of common property regimes

After arguing that common property regimes can secure the sustainable use of CPRs, Chapter II examined the factors that influence the development of such regimes. It was suggested that whether common property develops depends on the interaction of different factors relating to the characteristics of the resource, the users and the external context. The development of common property regimes is influenced by the potential of the CPR to be held as common property; for example, how difficult it is to exclude non-owners from the resource. The resource users must also perceive the need to establish a resource management regime, which in turn depends on the resource being scarce and the users' knowledge of the resource features. How dependent resource users are on the CPR, and the size and homogeneity of the group of commoners are also factors to consider. The state, non-governmental external agents, the socio-political context and the legal setting can affect the joint use of CPRs by triggering changes in the circumstances and by influencing the commoners' capacity to address changes induced by internal or external developments.

In reviewing the development of common property among the tappers, Chapter V paid special attention to their attempts to secure exclusive rights to the rubber estates and Chapter VII

[1] As mentioned in Chapter I, communal property requires that both the resource system and the resource units are common; on the other hand, common property involves common rights to the resource system but private rights concerning the resource units.

examined the development of institutional arrangements regarding their own use of the resources. Most factors suggested in the theory on common property regimes could be discerned in the case of the rubber tappers.

Given the exclusion and jointness conditions of the Amazon forests and the rubber estates in particular, common property is a feasible solution. As is the case with all CPRs, exclusion from the tappers' forests presents some difficulties, which result from the large size of the CPR (considering the CPR as all the forested lands with extractivists living there). However, it is possible to define a particular area (e.g. a rubber estate or the extractive reserve) and restrict access to outsiders. If the area defined is sufficiently large to ensure the ecological processes that maintain the forest (e.g. pollination), tappers can ensure the conservation of their resources and be only marginally affected by the use of the surrounding forests. The jointness conditions of the rainforest are also conducive to a common property regime because the forest is not easily divisible.

Several observations suggest that rubber tappers perceiving the need to develop a regime was one of the most important factors in the development of their common property regimes. Before the arrival of the ranchers, tappers had never attempted to establish strong exclusion mechanisms. Once the need to secure boundaries was clear because the forests were scarce if shared by ranchers and tappers, they engaged in effective collective action to ensure their exclusion rights to the estates. On the other hand, they never attempted to develop mechanisms to ensure their own harmonious use of the CPR and none of the interviewees considered this as necessary. As many key informants and forest dwellers commented, common property arrangements in the ERCM were also related to whether tappers perceived the need for them. For example, the highest records of participation could be observed in those initiatives that most tappers could benefit from. Clearing the forest paths in common also takes place only in those estates where the paths are used mostly by the tappers rather than by the middlemen. Whereas there are monitoring mechanisms regarding the use of common facilities - an issue that all interviewees considered important - there are none to ensure that tappers sustainably use their rubber stands, a matter with which forest dwellers were not concerned.

Being highly dependent on the CPR was also a factor that influenced the development of common property in the tappers' forests. The rubber tappers are highly dependent on the forest for their survival because outside the forest, they have little alternative means of subsistence, partly because they do not have the necessary skills to find work in the cities. In at least two instances, a direct relationship between tappers realising their dependency on the forest and engaging in collective action to protect their forest could be observed. First, resistance against the ranchers began after tappers had experienced poverty in the cities and were thus fully aware

of their dependency on rubber tapping and their forest resources. Second, tappers began demanding the right to stay on the rubber estates after they had realised that even if ranchers paid them monetary compensation for their rubber stands they still could not make a living outside the forest.

It is generally agreed in the literature that a factor conducive to the development of common property regimes is the users forming a community which is small (around 150 users maximum) and relatively homogenous. There is, however, a debate as to how determinant this factor is. According to Singleton and Taylor (1992) only a group which is small, whose members are homogenous, have direct and multiplex relations beyond their collective action problem and are mutually vulnerable, can endogenously solve their CPR problems. On the other hand, Ostrom (1992) argues that, first, a group meeting these characteristics may not be able to secure the conservation of their CPR if the external context is obtrusive. For example, if the state does not recognise the users' common property regime, small communities may not be able to ensure the conservation of their resources. Second, large and heterogeneous groups can also develop common property regimes although if all other factors are equal, small groups are more likely to do so.

The evidence collected in relation to the Chico Mendes Reserve suggests that the existence of communities as defined above may indeed not be sufficient for users of a CPR to develop robust common property institutions. Before the arrival of the ranchers, the inhabitants of each rubber estate formed small and relatively homogeneous groups, and they had a varying degree of direct and multiplex relationships. Could they have solved their problem concerning exclusion of outsiders from their CPR if they had had more direct contact with each other? This is a moot point that can only be speculated upon. The research conducted, however, suggests that even if tappers had more direct contact without external help they would not have been successful in obtaining secure rights to their forests. First, tappers resisted eviction – because they did not have alternative sources of livelihood – but their power was limited by the fact that they did not know that they had a legal right to resist eviction. The presence of outsiders informing them of their legal rights and providing them with organisational know-how was fundamental in strengthening their resistance. Second, the ranchers were more powerful than the tappers and had support from official organisations such as the police. Moreover, the ranchers were backed up by the government's interest in cattle and dismissal of the tappers' economic activity and property rights. It was through the help of external agents that the tappers made contacts with powerful allies (especially international environmental NGOs) and obtained sufficient political leverage to ensure protection for their rights. If external agents are more powerful than co-owners of a CPR, even if these co-owners meet the requirements set up by Singleton and Taylor (1992) they are thus very likely to need external help to secure the conservation of their CPR.

Not only may communities not be able to deal with a 'controller' state but small communities may also not be able to resist more powerful private agents.

Do users of a common pool also need external help to harmonise their own use of the CPR if they form small groups as defined above? The examination of the ERCM suggests that the factor distinguishing communities that have and have not developed common property arrangements on the rubber estates is not the number and homogeneity of its members but the amount of external help they have received. Tappers in poorer communities tend to be those that have not received external help and in these communities extractivists are more likely to bend to outside pressure for destroying the resource system, e.g. by selling timber, than tappers in more 'well off' communities. If left to their own devices, small groups may take a long time to perceive the advantages of common management of a CPR rather than only using the resources in common. Also, they may not have sufficient financial resources for any initial investment necessary for a common endeavour, for example, buying animals to set up a co-operative, or for taking days off work to clear a forest path or to take their produce to the nearest city. Their knowledge of the resource may be good, as they have been using it for a long time, but they may not be aware of the full potential of the resource. The incentive provided by outsiders pointing out what they can achieve together, and providing the basic material means (e.g. animals for transporting the product) can be crucial in promoting the development of common property regimes.

Regarding the issue of whether large groups can develop common property, the research conducted in this thesis suggests that a large group is sometimes necessary for resource users to be able to develop a robust regime. For example, tappers thought it necessary to involve tappers from various rubber estates in participating in the stand-offs because otherwise small groups would not have the power to fight the ranchers. Regarding the conservation of the resources in the ERCM small groups cannot secure the sustainable use of the resource because of the ecological interdependency of the forest. Regarding whether large groups can develop common property arrangements, the examination of the reserve provides inconclusive evidence. On the one hand, the lack of a robust regime in the reserve can be pinned down to the fact that the reserve inhabitants form a large group. On the rubber estates within the reserve, communities have developed common property arrangements whereas no such attempt has occurred at the level of the reserve. This difference can be attributed to the fact that with small groups the need to co-operate is more apparent. Also, small groups in the reserve have developed an identity as a group; which is also more likely to happen among individuals that meet regularly than within anonymous and large groups. On the other hand, it can be argued that the reason why the reserve inhabitants have not developed common property arrangements for the entire reserve is that they do not see the need for it. The fact that tappers have little experience in resource

management and that they believe the state is responsible for the management of the reserve may also explain the absence of a robust regime for the entire reserve.

Hence, as postulated in Chapter II, the development of common property regimes does not only depend on internal factors but also on external factors. The case of the extractive reserves provides considerable evidence on this matter. The development of these institutions cannot be explained only though the characteristics of the rubber estates, the tappers and their informal institutions. The triggers that led to collective action (abandonment of the rubber estates by the barons and arrival of cattle ranchers) were externally produced. Likewise, the capacity of the tappers to deal with the changes in circumstances was influenced by external factors, not only help from external actors, but also government policies, the legal setting and the socio-political context at the national and international levels.

The Brazilian government policies have played a significant role in the development of the tappers' common property regimes at various points. During World War II, the establishment of a contract between the rubber tappers and the patrons enhanced the tappers' capacity to resist complete domination by their patrons. Later, in the decades between the second half of the 1940s and the 1970s, the state can be considered 'indifferent' with regard to the rubber tappers. During this period the state did not hinder the tappers' institutions by attempting to manage their resources and did not support their rights. In this context, and without the strong dominance of the rubber barons and the *aviamento* system, the tappers were able to develop their own arrangements to jointly use the forests. In the 1970s, however, the government policies provoked a radical change in the tappers' circumstances, which seriously threatened the capacity of the tappers' institutions to secure the conservation of the forests. The arrival of the cattle ranchers on the rubber estates was not a fortuitous event; it was the direct result of new government policies for the region. The state also contributed to the depletion of the tappers' forests because it did not protect their usufruct rights against the newcomers and it promoted economic activities which require the removal of the forest cover. The destruction of the forests in the 1970s and early 1980s, thus cannot be explained by internal factors only. The factors that led to the incipient destruction of the tappers' forests were all externally related: government policies, opening of roads, arrival of outsiders and lack of secure property rights.

The legal setting was another factor that has influenced the tappers' capacity to ensure the conservation of their resources. When the tappers began their struggle to protect the boundaries of their forests against outsiders, the existence of a legal item recognising usufruct rights to resource users helped them to prevent the ranchers from expelling them from the rubber stands. On the other hand, the absence of any legal item recognising the existence of common property rights rendered their struggle to secure their exclusive rights to the forests difficult. In the late

1980s, the enactment of a new constitution made the legal setting of the tappers considerably more facilitative. In relation to this, it could be observed that not only legal items directly relating to common property can be helpful for commoners. The stipulations of the new legislation regarding environmental protection also helped the tappers to obtain a stronger legal claim, the extractive reserves, to secure their exclusive rights.

The process that led to the establishment of the reserves was, from the beginning, embedded in developments in the socio-political and economic context in the national and international arenas. In the last decades of the 19th century, international demand for rubber was the factor that attracted the tappers to Amazonia. Later, international political developments, namely World War II, temporarily stopped the tappers' autonomy, by bringing back to the rubber estates the former patrons and *seringalistas*. In 1985, the transition to democracy in Brazil, the fact that land reform was on the political agenda and that other grassroots organisations, such as the landless movement, were voicing their demands, provided the right context for the tappers to organise a national meeting. Socio-political changes in the international context, such as the growing interest of public opinion with environmental issues and deforestation in particular, also played an important role during the second half of the 1980s. The NGOs' campaign against the MDBs was influenced by the political setting in the industrialised countries, and in this way changes of governments in the North, for example, influenced the tappers' struggle for exclusive rights to their resources. The creation of extractive reserves was also an initiative embedded in the national and international context at the time. The changes that were occurring in Brazil, the international pressure on the Brazilian government to conserve the Amazon rainforest and the upcoming United Nations Conference on Environment and Development created a supportive political and legal environment for the tappers to obtain an answer to their demands.

The tappers' capacity to ensure the conservation of their CPRs was also influenced by general trends in society regarding the use of resources by local communities and concerning matters not directly related to common property regimes. In the 1970s, for example, the problems that unsustainable exploitation of tropical forests carried with it, were not as widely recognised by governments and public opinion as they were in the 1980s. The government policies in the 1970s and early 1980s and the support MDBs gave to various environmentally and socially destructive projects in Amazonia were thus embedded in the overall understanding of natural resources at the time. Support for the tappers' regimes in the 1990s, e.g. through the Pilot Programme, is also related to the changes that had occurred in society regarding common property regimes and activities such as extractivism, which instead of being considered 'backward' were now seen as 'sustainable'.

Finally, it should be noted that not only the external context influenced the tappers' capacity to ensure the conservation of their resources, but that the tappers themselves also influenced the external context. For example, the tappers' struggle against the cattle ranchers helped to publicise the negative impacts of deforestation of the Amazonia in the industrialised countries. More important still, the tappers' struggle was the determinant factor that changed the legislative framework. The enactment of the decrees on Extractivist Settlement Projects and especially on Extractive Reserves made the legal setting of Brazilian commoners in general considerably more facilitative.

8.3 The capacity of the Extractive Reserve Chico Mendes to ensure the sustainable use of the forest

Although common property regimes can ensure the conservation of jointly used CPRs, they do not always do so. Chapter II suggested that the two most important requirements for resources held in common property to be conserved are the existence of a robust regime and that resource users have sufficient autonomy to manage their resources. Chapter VII examined the Extractive Reserve Chico Mendes and assessed whether resources in the reserve are likely to be sustainably used in the long-term. In exploring the ERCM, Chapter VII suggested that the reserve is not a robust regime and that the reserve inhabitants do not have sufficient autonomy to manage their resources. However, the chapter also suggested that the conservation of forests in the reserve depended not only on the development of a robust regime and the state leaving sufficient autonomy to the reserve inhabitants. External help to encourage the forest dwellers to develop robust regimes and to address the issue of poverty are equally important requirements.

Features of the ERCM

Robust regimes tend to have: clearly defined boundaries, rules specifically aimed at the conservation of the CPR, monitoring, enforcement and conflict resolution mechanisms.

As Ostrom, Gardner and Walker (1994) point out, to define the boundaries of the resource is one of the most difficult tasks involved in the management of a CPR, since CPRs are by definition resources from which it is difficult to exclude non-owners. To define the boundaries of the resource and/or the group of co-owners it is necessary to ensure that only a limited number of resource users have access to the CPR. Once the boundaries are well defined and co-owners have exclusive rights to the CPR, they know what they should manage and with whom they should engage in collective action to secure the conservation of the CPR. The boundaries established by the co-owners should correspond as far as possible to the physical boundaries of the resource. For example, users of a downstream fishery may define the boundaries of their

CPR by restricting access to the harbour they use but the resource may still be depleted if they do not harmonise their use with that of fishers upstream.

The ERCM has clearly defined boundaries and the inhabitants of the reserve have exclusive rights to their resources, recognised by the law and protected by the state. The forests in the reserve can thus only be used by a limited number of individuals. The boundaries that have been established for the reserve are also adequate to the physical characteristics of the forest. That is, the area of the reserve is quite large, which prevents the problem of tappers on one rubber estate using their resources sustainably but not being able to conserve them because tappers in neighbouring estates overuse their forests.

However, there is a serious shortcoming regarding the reserve boundaries, namely the fact that the reserve inhabitants do not know the boundaries of the reserve or of the co-owners. This will not necessarily create problems regarding exclusion of outsiders because the forest dwellers know the boundaries of the rubber estates, which form the reserve. Hence, by restricting access to their estates, they prevent outsiders from entering the reserve. However, the rubber tappers do not know what they should manage and with whom they should manage the reserve. This problem is enhanced by the fact that the forest dwellers consider the inhabitants of other estates apart from their own as 'foreigners' with whom they have little affinity. An additional but lesser difficulty concerning the boundaries of the CPR is that in the same way that an isolated rubber estate could not survive, the reserve is also affected by the use that is made of the forests surrounding the reserve. Hence, land policies in the areas surrounding the reserve also have an impact on the common property arrangements in the area. For example, INCRA's plans to set up agricultural settlements in the area surrounding the reserve can change the incentives of the reserve inhabitants regarding the use of their resources. This problem has already occurred in other reserves. INCRA set up projects without carrying out first environmental impacts assessments specifying how these projects could affect the resource in the reserve. If a predatory mode of production takes place next to the boundaries of the reserve, this may, for instance, encourage the tappers to practice similar activities (Irving and Millikan, 1997).

The central goal of rules in robust common property regimes is the conservation of the CPR and they are highly specific to the local conditions. These rules are designed by the resource users, although technical information provided by outside experts can help identify the necessary rules. Rules should preferably be clear, easy to enforce and co-owners should be able to change them if necessary.

The rules of the ERCM, stated in the Utilisation Plan, are specifically aimed at the conservation of the natural resources in the area. Apart from the rules which are based on the Brazilian

environmental legislation, all other rules are those the tappers have always followed since their arrival in Amazonia in the late 19th century and are thus appropriate to the local conditions. These rules are necessary for the conservation of the natural resources in the area. When the Utilisation Plan has been followed, this has improved the environmental quality of the area (Irving and Millikan, 1997) and forest dwellers consider most of them necessary for the conservation of their natural resources.

However, the rules of the ERCM did not result from a conscious effort by the reserve inhabitants to secure the sustainable use of their resources, a fact which can create some problems regarding the long-term conservation of the forests. Resource users may not adapt their rules to changes in the circumstances, which require different or stronger rules to ensure that the resource is not depleted. There are indications that this could be a problem in the reserve. For example, all tappers agree with the rule which states that they cannot sell land but not because they consider it necessary to ensure the conservation of their resource. Not selling land is part of their cultural habits. With the establishment of the reserve, the danger that non-extractivists may buy land in the reserve to engage in non-sustainable activities is no longer present, because tappers do not have legal rights to sell their land. However, outsiders may attempt to buy the tappers' usufruct rights to practice logging. If the forest dwellers had established the rule 'not to sell land' with the specific purpose of protecting their common resource it could be assumed that they would be more determined to prevent the selling of land to loggers. However, as they did not devise any rules for ensuring the conservation of their common resources they have not attempted to adapt their cultural rules to the new circumstances. Instances of tappers selling the land to loggers have already occurred.

The theory on common property suggests that for a regime to be robust it must have specific monitoring and enforcement mechanisms. Social pressure may secure compliance with the rules if the group of resource users is small and if co-owners are checked by shame. However, if the group is large (as in the case of the reserve), social pressure will not be sufficient. In addition, social pressure is an effective enforcement mechanism if resource users care for their fellows' opinions. If incentives to free-ride are high, social pressure, even in small group may be insufficient. In robust regimes, both monitoring and enforcement is the responsibility of the co-owners, who have a direct interest in the conservation of the CPR. Monitoring enforcement of the rules fulfils the double task of ensuring compliance with the rules and increasing the incentives of co-owners not to free-ride. Each co-owner knows that the other members of the group cannot free ride on his or her efforts to secure the 'common good' and that if he or she attempts to free ride the possibility of being caught is high.

The Utilisation Plan stipulates monitoring mechanisms and states that resource users should participate and be responsible (together with IBAMA) for monitoring compliance with the rules. However, as is the case with the reserve boundaries and the rules, the formal structure of the reserve is not mirrored in the actual institutional arrangements of the forest dwellers. The only enforcement tappers engage in is social pressure, and this does not occur in all areas. Moreover, the interviewees were not interested in monitoring the reserve, especially regarding their fellow tappers' use of the forest. Accordingly, environmental monitors have had some success preventing logging by outsiders (Hall, 1997b) but not much concerning tappers' lack of compliance with rules (Irving and Millikan, 1997).

The tappers' lack of interest in monitoring can put the conservation of the natural resources in the reserve at jeopardy. If tappers practice logging or clear too much forest in their stands for agriculture, cattle ranching or other purposes the stands of their neighbours will be affected. Whereas at the moment there have been only isolated cases of tappers breaking the rules, increased opportunities to do so (e.g. by more loggers attempting to enter the reserve) may expand the level of defection among tappers, especially if the tappers see that those who have logged in their stands are better off than those who followed the rules. The capacity of the state to monitor compliance with rules is limited. First, the cost of external agents monitoring the entire area is very high because the area is large and difficult to access. Second, tappers know the area better than any external agent does and thus potential defectors can find ways of breaking the rules without being caught by the monitors. Third, as the literature has often alluded to, monitoring compliance with the rules may not be a priority for the state agents, as they are not directly affected by the depletion of the CPR. It is thus necessary to monitor the monitors' work. These problems would be diminished if the tappers take responsibility for monitoring. As they live in the area they could also check monitors more easily than an external agency. In addition, the reserve inhabitants would be badly affected if the resource was depleted so they would be less subject to incentives to ignore a break in the rules. If someone broke the rules they would be free-riding on those tappers who comply with the rules so the latter would have a primary interest in ensuring that no one defects. These arguments only apply, however, if tappers realise that the conservation of their stands depends on the conservation of all stands in the reserve and that external agents cannot ensure the conservation of the reserve without their participation.

There is no generally recognised authority or mechanism for solving conflicts in the reserve. There were several overlapping conflict resolution mechanisms in the reserve, which suggests that conflict mechanisms are unlikely to be effective in solving disputes between tappers. On the one hand, the Utilisation Plan states that the Associations of Inhabitants of the Reserve are responsible for addressing the problems arising from lack of compliance with the rules. Rubber

tappers, however, if faced with a conflict with a neighbour seek help not only from the Associations but also from the rural workers' unions and IBAMA. If these various organisations do not share the same opinion regarding how a hypothetical conflict can be solved the conflict is unlikely to be expediently solved. Once it is, the conflicting parties are unlikely to feel their problem has not been fairly addressed because, for example, they may consider the union as their representatives and the solution may have been the one proposed by the Association. Tappers also try to solve conflicts between them but this mechanism is not formally recognised. Solutions arising from informal contacts are not likely to be effective and can be easily undermined by decisions from organisations that are not entirely formed by the forest dwellers.

Autonomy

Resource users having sufficient autonomy to manage their resources is important for the conservation of CPRs held in both robust and weak regimes. Autonomy is important for the following reasons. First, if outsiders develop the institutional arrangements for the use of the CPR these arrangements may not be adequate to the local conditions. If this is the case resource users may not agree with the rules and defect, which, as seen before, is easier if monitoring is not the responsibility of the resource users. Second, as commented by Ostrom (1990:213), "once national or regional governmental officials indicate that they consider their responsibility to solve CPR problems, one can expect local appropriators to wait for the government to handle their problems".

The case of the ERCM provides a clear illustration of how outsiders may restrict the autonomy of resource users even when their objective is rather the opposite. The aim of the state, the lideranças and the RESEX sub-project are clearly that the reserve inhabitants should manage their reserve and not take control over the tappers' resources. However, as forests in the reserve are jointly used and tappers did not have robust regimes it was believed that unless they developed such a regime they risked falling into a tragedy of the commons. Circumstances have changed since the early 1970s (e.g. access to the rubber estates is now easier than before) and there are new incentives for tappers to deplete their resources. It was also believed that tappers could not expediently develop a robust regime if left to their own devices. The reserve inhabitants form a large group, are quite isolated from each other and have little experience in managing their resources in common. Hence, to ensure the conservation of the forests in the reserve, outsiders in co-operation with the rubber tappers' organisations formalised the tappers' rules in the Utilisation Plan and encouraged them to form associations to manage the reserve. In addition, they developed monitoring mechanisms for the reserve, in particular training of environmental monitors among the tappers.

However, external actors' initiatives have hindered the reserve inhabitants' autonomy to manage their own resource because, first, the formal institutional arrangements were not devised by the forest dwellers themselves. This problem partly results from the assumption that participation of the leadership in the design of the institutional arrangements of the reserve is equivalent to the direct users of the resource developing their own arrangements. However, this is not the case. *Lideranças*, for example, tend to see the reserve as a single unit whereas the forest dwellers do not. The *lideranças* know the central features of the tappers' institutions but they do not live on the rubber estates. Hence, they are not familiar with the specific issues affecting each particular estate and are not directly affected by the management of the resources. Moreover, as several key informants commented, the *lideranças'* proposals sometimes incorporate political ideals and objectives which are not in accordance with the characteristics of the reserve's inhabitants.

Second, as the forest dwellers did not devise formal institutions of the reserve, some of the latter are not adequate to the local conditions. For example, many rubber tappers have developed incipient monitoring mechanisms within their estates; however, they do not have effective enforcement mechanisms. Training environmental monitors for the entire reserve is not likely to solve the problem of enforcement until the tappers perceive the need for doing so. Moreover, tappers may start relying on the environmental monitors and IBAMA to ensure that the rules of the reserve are observed in their community, instead of strengthening their own enforcement mechanisms. The creation of the Associations of Inhabitants of the Reserve is another example of an institutional arrangement that is not adequate for the reserve. First, the reserve inhabitants are represented by the rural unions and the creation of an additional representative organisation was not perceived to be necessary by the forest dwellers. Second, the associations do not take into consideration the fact that in the ERCM there are at least as many communities as rubber estates, thus 50 communities. The creation of associations at the level of the rubber estates would have filled a gap in the reserve, the lack of organised communities on the estate. The creation of organisations to substitute the rural unions, however, may undermine the latter without taking their place.

Third, by attempting to implement robust institutions and institutions which are not based on the tappers' informal institutions, e.g., mechanisms for harmonising the use of resources at the level of the reserve rather than the rubber estates, there is the risk that tappers rely on outsiders to manage their resources. Tappers perceive IBAMA as the new owner of the reserve and therefore the entity which has the responsibility of managing the entire area. Developing a robust regime involves considerable effort. Commoners must identify their needs with respect to the resource, participate in meetings to decide what should be done and discuss with fellow tappers what to do, which can create disagreements and problems with neighbours. The actual management of the CPR also requires time, which they have to deduct from their individual work in the rubber

stands. Hence, if commoners believe that an external agency can provide the 'common good' they are likely to rely on this as long as it does not interfere with their use of the CPR. Why should they lose work days devising monitoring devices and monitoring if they do not see the need for it and when they do, they believe others - environmental monitors which are not part of their group or IBAMA officials - can do it for them? Moreover, as the main concern of the tappers is the use of their rubber stands and external institutional arrangements do not interfere with this, they do not need to oppose the role of external actors on the rubber estates. The fact that, at the time of the fieldwork, the formal institutions were very recent may partly explain the tappers' lack of interest in the associations, the rules and monitoring. However, by 1997 the tappers still had not internalised the rules of the reserve and their participation in monitoring was limited (Irving and Millikan, 1997).

The assumption that tappers left to their own devices would not expediently develop robust regimes and the reserve could be depleted is only partially correct. In the long-term, the conservation of the reserve's forests requires the development of a robust regime for the entire area. Tappers are likely to need help to do this because of the factors mentioned earlier and because the evidence suggests that external help has always been a determinant factor for the development of common property arrangements on the rubber estates. However, as seen above, external help which interferes with the resource users autonomy is unlikely to ensure the development of robust regimes in the reserve. Hence, by hindering the tappers' autonomy, external actors may hinder the tappers' capacity to ensure the conservation of their resources rather than prevent a potential 'tragedy of the commons'. Moreover, in the short term, the development of a robust regime for the entire reserve was not the most pressing requirement for ensuring forest conservation. The reserve can be conserved if the resources are conserved at the level of the rubber estates. On the estates visited, the tappers had mechanisms that ensured a considerable level of compliance with the rules and the potential for them developing robust regimes was higher than at the level of the reserve. Families on four of the five estates had developed incipient common property regimes to address the issues that concerned them, they also formed small communities, whose members are relatively homogenous and have direct and multiplex relations. Although the size and homogeneity of the group are not determinant factors, if all other factors are then similar small groups appear more likely to develop common property regimes.

External help

The previous paragraphs suggested that the development of a robust regime and tappers' having sufficient autonomy to manage their resources are, as suggested in the literature on common property regimes, two important requirements for the conservation of the reserve's forests. It

was also suggested that the reserve inhabitants need external help to develop robust regimes. However, the research presented in this thesis also indicates that the development of a robust regime to harmonise the tappers' use of their resources is a necessary but not sufficient condition to ensure the conservation of the reserve's forests. The sustainable use of the tappers' resources also requires that forest dwellers receive external help to develop robust regimes to enhance directly their social and economic welfare and to address the problem of poverty in the reserve.

The four main threats to the conservation of the reserve's forests are: tappers switching to predatory logging, cattle ranching or other activities which are not ecologically sustainable; tappers selling their usufruct rights to non-extractivists; tappers abandoning their stands; and outsiders entering the reserve through deserted areas. To address any of these four problems the development of monitoring and enforcement mechanisms for the reserve is necessary but not sufficient. Instances of logging in the reserve, either by tappers or by outsiders who bought the stands, have occurred in isolated areas. Taking Guanabara Estate as an indication of how tappers live in more distant areas, it can be safely assumed that logging occurs partly because the estate inhabitants live in considerable isolation from each other and have no monitoring mechanisms, let alone enforcement mechanisms. In estates like Guanabara the economic conditions of the tappers are particularly poor and this serves as an incentive for tappers to engage in activities that may increase their economic returns even if only in the short term. The interviewees in *seringal* Guanabara considered their economic situation and in particular their dependency on the middlemen particularly afflicting and expressed interest in moving to the cities, which they could attempt if they had some financial resources. On the other hand, their poor economic conditions are also related to the absence of any common property arrangements. For example, on estates where tappers have developed common property arrangements to commercialise their produce they are considerably better off than in Guanabara.

Switching to cattle ranching seemed to be the result of incentives different from those for logging and the absence of effective enforcement mechanisms was the main reason why it occurred. From the interviews, it was observed that those who engaged in cattle ranching were relatively well off tappers. Two cases were encountered, both in an estate where tappers had incipient common property arrangements to clear the forests paths and manage their common facilities. The first one lived in the border of the estate and was a 'tapper' who had a tradition of being a colonist (small peasant) and who did not live full-time in the reserve. He was there only during the week and strongly disliked the forest. In this sense the problem was the existence of a semi-outsider (his parents had been rubber tappers and he had other relatives in the reserve). In the second case, the family was an active member of the community, who was participating more and more in common activities. Rearing cattle, however, was seen as a more glamorous

activity than tapping rubber and one that gave considerably more profit. The community could have prevented these two situations, however, they expected IBAMA to do something about it and, in fact, they did not consider these two situations as problems affecting them. In a way, their attitude was that it was not their business what those tappers did in their stands.

Tappers abandoning their stands - which appears to be one of the most common problems of the reserve - threatens the conservation of the forests because for outsiders it is easier to enter the reserve through deserted areas. Tappers actively protect their own stands and would help to protect their neighbouring stands. However, their interest in monitoring the entire reserve, including the deserted areas, is low. Although the development of monitoring and enforcement mechanisms would help to prevent entrance of outsiders through isolated areas, improving the economic conditions of the tappers would prevent them from leaving the reserve and facilitate monitoring. Tappers leave their stands because their economic conditions are so poor that in spite of all the problems they know they will encounter in the cities they prefer to attempt to make a living there.

The improvement of the tappers' economic conditions is partly related to the development of robust regimes to manage common facilities and co-operatives to commercialise their produce. However, they also need help to have better access to education and health. Robust regimes can ensure the management of schools and health posts but without external help tappers cannot train teachers for the schools or obtain medicines for health posts. One of the reasons that some interviewees gave to move to the cities was that there they could hope to educate their children and have access to medical services.

The literature on common property regimes suggests a number of ways in which external actors, e.g. the state and international donors, can provide support for commoners. For example, the state can set up arenas for discussion and conflict resolution, provide technical and expert information on the characteristics of the resource, capacity building activities and provision of small scale infrastructure. In addition, external actors can also provide help to improve the economic and social conditions of commoners. External help, however, must neither hinder the resource users' existing institutional arrangements nor limit their autonomy for developing common property regimes.

The inhabitants of the ERCM receive support from some NGOs, namely CTA, but their main source of external aid is the RESEX sub-project of the G7 – Pilot Programme for the Conservation of the Brazilian Rainforests, which was reviewed in Chapter VI. At the time of the fieldwork, the programme was only beginning to be implemented and it is thus not possible to evaluate here the impact of the PP-G7 in the ERCM. However, in light of the evidence collected

concerning the characteristics of the reserve and of the last appraisal of the Programme in 1997 (Irving and Millikan, 1997), the adequacy of the sub-project can be assessed.

On the one hand, the RESEX sub-project includes several initiatives which are conducive to the development of the reserve into a robust regime and that address the problems faced by the inhabitants of the ERCM. The sub-project provides help to regularise the formal property rights structure of the reserve. In so doing, it strengthens the tappers' exclusive rights to their resources. The RESEX sub-project also includes initiatives to enhance the tappers' capacity to harmonise their use of the common resources. For example, it promotes meetings among the inhabitants of the reserve and provides support for these meetings. There are also training programmes to strengthen their managerial capacities and investment in physical infrastructure. The project also carries out research on the productive capacities of the area, a matter which the tappers could not do without external help. Most importantly, the RESEX sub-project supports initiatives regarding health and education for the tappers, and the development of ecologically sustainable activities which can improve the tappers' economic situation.

On the other hand, however, the RESEX sub-project also includes initiatives that hinder the tappers' autonomy to manage their resources. In doing this, it weakens rather than enhances the reserve inhabitants' capacity to develop robust regimes. Two of these initiatives were already discussed: the training programmes for monitors for the entire reserve and the creation of the Associations. A third one is that to strengthen community organisation, the sub-project includes two different items; one to strengthen representation of the reserve and the other to strengthen community management of the reserve. Whether this division of responsibilities will be necessary at a later stage is a moot point. However, at the time of the fieldwork, this separation of functions presented several problems.

First, the creation of leaders for representation and management does not evolve from the existing conditions on the rubber estates, since communities in the areas are still at an early stage of development. On most rubber estates, tappers are only just now being acquainted with what the reserve is (many do not know, for instance, that it is owned by the state), and the creation of two administrative levels will be seen as an outsiders' requirement that they may not disapprove of but to which they do not feel committed either. Second, the separation of these two functions is likely to increase the existing gap between leaders (most of them living outside the forest) and the direct users of the resource. This problem was observed during the interviews in 1995 and was still a problem two years later, according to the 1997 report on the reserve (Irving and Millikan, 1997). The increased bureaucracy of the reserve results in the official representatives having to spend most of their time travelling and attending meetings in the town and leaves them little time to carry out their productive activities in the forest. This means that

they spend less time in the forest, their contact with their neighbours is reduced to the discussion of reserve matters, and their interests naturally become different. Third, the separation of functions is likely to increase the bureaucracy and hierarchy of projects, since it will be necessary for the forest dwellers to deal first with the appointed person responsible for managing the reserve, then with the representative of the reserve and in the end with the external organisations responsible for the ERCM.

Developments in the wider context

The conservation of the forests in the ERCM is also affected by developments in the wider socio-political and economic context, although not to the same extent as the tappers were before their rights were legally recognised. When the only recognition for the tappers' rights was INCRA's internal decree on Extractivist Settlement Projects, a change of director in INCRA could result in the removal of the decree. Once an extractive reserve is created, however, its status cannot be easily removed even if the government changes its policy towards extractivists populations and common property institutions. To remove a decree creating an extractive reserve it is necessary to have parliamentary approval and the aim of the area regarding environmental protection cannot be eliminated even with parliamentary approval. The existence of CNS, in spite of its shortcomings (Hall, 1997b) also enhances the reserve inhabitants' capacity to address changes in the wider socio-political context as this organisation aims at representing the tappers' interests in the wider political sphere.

However, although the tappers' exclusive rights to their forests can only be cancelled if they engage in non-sustainable activities, the capacity of the reserve inhabitants to conserve their forests can be influenced by developments in the external context. The RESEX sub-project and the changes in the government policies for rubber and the development of new markets for extractivists products can illustrate this influence. The inclusion of the RESEX sub-project in the Pilot Programme and its delays in being implemented have been the result of developments in the Brazilian and international political arena. Whereas the anticipation of UNCED advanced the sub-project, the subsequent developments contributed to the near stagnation of the project and as a consequence to a delay in the support the tappers received from the G7. The change in government in Brazil in 1992 and the reduced interest of the G7 in deforestation issues after the conference thus had an impact on the reserve dwellers.

Changes in the government policies regarding the price of rubber also affect the tappers' capacity to ensure the sustainable use of their resources. The national policy for the support of rubber production has been gradually withdrawn since the 1980s (FoE/GTA, 1997). To secure a market for domestic rubber production, the government had made it compulsory for the industry

to buy first national rubber. In addition, a tax (TORMB) was levied on imported rubber in order to equalise the prices of the national and imported product. The revenues from this tax were invested in the rubber-producing sector, but rarely in the 'wild' rubber sector. In 1990, however, the rubber tax TORMB was withdrawn as a result of the new government policy for the sector and the demands of the industrial sector, which could buy rubber at a lower price from abroad. Rubber tappers demonstrated in Brasilia asking for governmental support for rubber. Their demands were partially met in 1997, when the government agreed to sustain the subsidies for rubber production by paying the equivalent of the tax that was previously charged to industry. However, there is still no security that the tappers will find buyers for their produce, since their rubber has to compete against rubber from plantations in the South of Brazil which is cheaper (FoE/GTA, 1997; Allegretti, 1994). The decrease in the price of rubber has been considered to be one of the factors explaining the abandonment of the reserve by the tappers, who can no longer make a living from rubber. For alternative economic activities to become viable, CNS estimates that a period of 10 years would be necessary.

The development of new markets for the over six thousand plants in the Amazon which recognised pharmaceutical and cosmetic uses (CNPT/IBAMA, 1998) would also alter the economic possibilities of the reserve inhabitants. The opportunity of improving their economic conditions without engaging in destructive activities would serve as an additional incentive for the forest dwellers to take a higher interest in ensuring that their fellow tappers do not overuse their stands. Initiatives such as PRODEX, the first governmental credit line aimed at supporting extractivism (Hall, 1997b) can also enhance the capacity of the reserve dwellers to ensure the conservation of their resources. For example, one of the main problems the tappers had was their dependency on the middlemen. Although the lack of co-operatives in the reserves is not only due to lack of financial means for the initial investment, this is one of the factors that render the creation of co-operatives difficult.

8.4 Policy-making suggestions for the ERCM

The examination of the ERCM in light of the theory on common property regimes suggested that the development of the reserve into a robust regime required external help but that so far this help has not been completely adequate. In turn, some suggestions are proposed regarding how the external support that the reserve receives could be more effective in enhancing the tappers' capacity to ensure the conservation of their resources.

First, external aid could be more effective if it did not attempt to implement common property institutions but only provided incentives for common property to develop. For example, an initiative which has helped to catalyse co-operation among the forest dwellers has been the

organisation of informal meetings between tappers inside rather than outside the reserve. To increase access to information by presenting it in terms that they easily understand can also enhance the tappers' interest to develop mechanisms that ensure the conservation of the forest. Information should be available inside the reserve and not only in the nearby cities. External actors could provide regular information on, for example, financial resources available to the tappers and what tappers from other estates are doing. If the forest dwellers have forums of discussion and easy access to information, they may attempt to develop co-operatives to improve their returns from the selling of rubber, a problem which all interviewees perceived. Once they develop experience in the common management of their resources through the co-operatives, the theory on common property suggests that if the conservation of the forest becomes a threat they are likely to address this problem expediently.

Second, external actors should not attempt to encourage tappers to develop a common property regime for the entire reserve. Instead they should increase their support for small groups of families living on the rubber estates who have established regular co-operation and provide incentives for isolated families to develop co-operation between them. External actors should organise meetings on each rubber estate rather than meetings for the inhabitants of various estates. Tappers would be more willing to participate in estate-based meetings because this would involve less loss in terms of work in their rubber stands. They also would feel less intimidated if only one external actor was present in the meeting and, if all remaining participants were people from their own estate. Even in estates where tappers have not developed co-operation between all estate inhabitants they know all their neighbours and feel on an equal footing with them, they would thus be more likely to express their views. Meetings should become regular; however, rather than suggesting regular meetings it may be more productive to encourage tappers to have a follow-up after each meeting. If external actors regularly visit the rubber estates to provide information, this can also serve as a catalyst for forest dwellers to meet on a regular basis. Meetings should be organised in co-operation with informal leaders on the estates. Rather than stressing the issue of monitoring the reserve, external actors should provide information on the impacts that deforestation of individual stands has for all the stands on the rubber estate. To encourage tappers to develop mechanisms for enforcing rules without them having mentioned the need for it may be counter-productive for the development of common property. The research indicated that tappers are willing to accept a certain level of free-riding on their common works because from their experience they see that this encourages more tappers to start participating in common works.

Third, external aid should be tailored to address the different needs of each estate or community. The evidence presented in Chapter VII indicates that there are strong differences regarding common property arrangements on the rubber estates. This implies that the potential threats to

the CPR differ between estates and thus not all communities require the same type of external help. For example, the inhabitants of rubber estate Guanabara meet very rarely and are highly indebted to the middlemen. They thus need external help to organise meetings between the estate inhabitants and to discuss how they could establish a co-operative to stop their dependency on the middlemen. On rubber estate Icuriã, on the other hand, tappers already have a co-operative and the level of contact among the various families is high. The inhabitants of this estate thus do not need help to organise meetings but rather to obtain health posts and improve their production techniques.

Finally, external agents can facilitate the development of the reserve into a robust regime by encouraging articulation between the various estates, that is, the development of a system of nested enterprises based on the local arrangements of each estate. The observations collected in the ERCM suggest that given the ecological indivisibility of the reserve and the rubber tappers' informal institutions, the reserve cannot be managed as a single unit. Interviewees had a sense of ownership in relation to common resources on their rubber estate, not in relation to the reserve. On the other hand, the sustainable use of individual rubber stands is influenced by the conservation or depletion of neighbouring stands. However, there is not, in the formal structure of the reserve, any attempt at articulating the embryonic common property regimes of the communities living on the rubber estates. The management of the reserves is to a large extent done as if the reserve was a single common area formed by various rubber estates, instead of taking as a starting point the existence of various common areas which happen to be interdependent. A problem with this approach is that, as mentioned earlier, it alienates tappers from taking responsibility for their resources by encouraging them to participate in an anonymous group with which they do not feel affinity. An alternative approach would thus be to articulate relations between the estates, after developing common property regimes at the level of the estate or small groups of neighbours.

8.5 The interaction of local, national and international factors in the sustainability of CPRs

A central argument of this thesis has been that the development and robustness of common property regimes depends not only on internal factors but also on the external context. That is, whilst issues such as size of the group of users, excludability and jointness of the resource are important considerations, developments taking place in the wider context also require careful examination. The importance of the external context has often been stressed in this thesis. The following paragraphs will only discuss some aspects related to the external context that arose from the examination of the ERCM but that may be relevant for common property regimes in general.

First, the role of the state in relation to common property regimes is not limited to being 'facilitative', 'controlling' or 'indifferent'. An 'indifferent' state for example may be as negative to the users of a CPR as a 'controller' state. An 'indifferent' state, if coupled with external pressures on the CPR, may be as injurious for an established common property regime as a 'controller' estate, regardless of the characteristics of the users and their CPR. A 'facilitative' state, on the other hand, may play a range of different roles. State agencies can support an existing institution by, for example, providing arenas for conflict resolution, or they can develop incentives for the commoners to enhance the robustness of their institutions. There is considerable scope for the state to act in relation to CPRs, as long as it does not impose an utilisation of the space that conflicts with the commoners' established rights of access to their resources. For example, by promoting private access to resources which are common, or encouraging common access to what so far has been privately used the state may jeopardise robust property rights arrangements.

Second, commons are likely to be influenced not only by the overall approach of the state to common property but also by the balance of power between different state agencies at any one point in time. The state is not always a monolithic entity, that is, it is not necessarily only 'controlling' or 'facilitative'. The case of the tappers shows that the state is composed of different agencies, and that not all of these have the same approach to local resource users. In 1985, for example, one branch of the government, Pro-Memória, provided support for the tappers while the rest were ignoring them. That is, while one state agency was 'facilitative', the others were 'indifferent'. Comparing the attitudes of INCRA and IBAMA towards PAEs and extractive reserves also suggests that state agencies vary in their attitude towards common property institutions. Although both are state agencies and had similar formal objectives concerning the tappers, the limited success of PAEs and the already more successful Reserves indicate that their attitudes towards the management of CPRs and extractivist populations differed.

Third, international factors may play an important role in relation to common property regimes. The inclusion of the international context in the examination of the rubber tappers' institutions originated in the fact that the tappers' forests are part of a globally important natural resource. However, the research conducted indicated that the role of the international context in relation to the tappers' institutions was not only related to the ecological value of the Amazon Rainforest. The growing interest of the international community in environmental matters and deforestation in particular, the political leverage acquired by the concept of sustainable development with the Brundtland report and the launching of an international conference on environment were also factors which influenced the development of extractive reserves. Factors

such as these are also likely to affect resource users whose CPRs are not part of globally important resources.

Fourth, the examination of the external context in relation to common property regimes should preferably not be limited to the features of the national or international setting at a given point in time. The robustness of common property institutions depends on the interaction of local actors with the external context over extended periods and the interests of local and international actors may vary over time. For example, one of the factors that can contribute to the development of robust regimes is the possibility of local groups making alliances with international actors concerned with environmental issues, as exemplified by the MDB campaign. However, the motivations of both groups are different. Whereas local populations are interested in the resource for meeting their needs, global actors (mainly from industrialised countries) are interested in environmental conservation after meeting their needs. As Redclift (1992) comments, when specifying differences between environmental interests in the North and in the South, in industrialised countries environmental issues are often seen as production versus environment, while in the South, in particular among the rural poor, environmental conservation is a requirement for production. In both cases, the conservation of the resource will be related to their other priorities. For example, the tappers' interest in the forest depends on their economic alternatives. Public opinion concerning Amazonia in industrialised countries depends on economic factors e.g. if there is a recession at home they are less likely to be willing to contribute financial resources for a programme to conserve the rainforest. The factors that determine the interests of local and global groups are thus different and, accordingly their interests and priorities may not always coincide as they did in the late 1980s. The conservation of a CPR will thus depend not only on the existence of a facilitative context at a particular moment, but also on the local users' capacity to ensure the conservation of their resources even when external actors' support fades.

Fifth, commoners who depend on tropical forests for their survival are likely to be affected by the conflicting views on forests of governments in the South and some actors in the North. As shown in Chapter IV, the debate on forests in the international arena has often been characterised by the issue of sovereignty. On the one hand, developing countries where tropical forests are located, argue that they have the sovereign right to take decisions concerning their own natural resources. On the other hand, industrialised countries argue that, given the global impact of deforestation, they should have a say in the management of forests. The existence of this debate may be a positive factor for commoners because national/international support for local initiatives does not jeopardise national sovereignty and can, to a certain extent, be dealt with without altering the international economic system.

8.6 Limitations of this thesis and potential for future research

This thesis has represented the first in-depth examination of an extractive reserve, using the literature on common property regimes as an analytical framework. This analysis provides an insight into the complexity of the property rights arrangements of extractive reserves and their potential for conserving the resource system. The following should, however, be noted. First, there are substantial differences between the ERCM and the eight other extractive reserves in Amazonia. The reserves differ in terms of area, population and spatial arrangements. The Chico Mendes Reserve is considerably larger and it is inhabited by more families than any of the other reserves. The largest other reserve, Alto Juruá, is approximately half the area and population of the ERCM and ER Extremo Norte de Tocantins is inhabited by only 300 families (von Behr, 1995). The inhabitants of some reserves live in small villages rather than in isolated huts, as the tappers in the ERCM do, and thus contact among members of the group is easier. The processes that led to the establishment of each of these reserves are also very locale-specific. Consequently, the inhabitants of each reserve have a different level of experience in terms of co-operation and management of common resources. In some areas, for example, the *aviamento* system was in place until shortly before the establishment of the reserve (Alto Juruá) and thus extractivists never had the autonomy to manage their resources. Whilst in the ERCM the main trigger for co-operation was the arrival of cattle ranchers, in Alto Juruá resistance took place against the tappers' former patrons (de Almeida and Menezes, 1994; Feitosa, 1995). In the Extractive Reserve Rio Ouro Preto, extractivists had to prevent small colonists rather than large landowners from occupying their forests (Alves, 1995).

Given these differences, the analysis does not allow broad generalisations concerning the actual and potential capacity of extractive reserves to ensure the conservation of the forest. For example, the common property regimes of the other reserves may be more or less robust than in the ERCM and a system of nested enterprises may not be suitable to all of them. Nevertheless, many of the issues raised in relation to the ERCM would be worth investigating in relation to the other reserves. For example, do the state, lideranças and the PP-G7 curtail the autonomy of tappers in other reserves? The application of the theoretical framework used in this thesis to examine the capacity of all reserves to promote the conservation of the forest might provide interesting results. Another useful area of research would be to examine how the developments in the national and international context reviewed in Chapter IV influenced the different extractive reserves in Amazonia. A comparative study of how the same external context influences different groups of commoners could shed further light on the issue of how the external context influences the conservation of jointly used CPRs. The evidence produced in this thesis could feed into such research in providing a starting point for the identification of how external factors may influence the conservation of jointly used resources.

Second, the overall objective of setting up extractive reserves was to promote sustainable development. The tappers' demands in their national meeting in 1985 included access to health and education and support for production, besides legal support for their property rights institutions. The decree establishing extractive reserves clearly states that the objective of the reserve is both natural resource conservation and 'social development for the inhabitants of the area'. Whether extractive reserves contribute to sustainable development in Amazonia has been naturally at the core of the debate on reserves. This thesis has made a substantial contribution to this debate by examining whether the reserve has the capacity to ensure the sustainable use of the forest. However, whilst the robustness of the institution is an important requirement for the conservation of the forest and therefore for achieving sustainable development, it is not, on its own, sufficient for either.

The conservation of the forest is as much related to the robustness of the common property arrangements as to the socio-economic conditions of the tappers. The latter include the price of rubber, as well as access to medical services and education, issues which are partly determined by external factors outside the reserve inhabitants' control. A robust institution is not a guarantee for sustainable development. The theory of common property regimes tends to focus on the features that these institutions must have to secure the conservation of the CPR. However, there are no indications that robust regimes, that have allowed the common use of the resource for long periods without depleting it, promote sustainable development for the co-owners, who in some cases (albeit not in all) are poor. The potential of the ERCM to become a robust institution is thus no definite indication that the tappers' material conditions can improve. It might thus be useful to develop the existing frameworks on common property to examine features of these regimes which are not directly related to the conservation of the CPR but that are necessary to improve the commoners' living conditions.

Ultimately, the conservation of the forest in extractive reserves depends to a substantial extent on the level and type of support tappers receive from external agencies. Support for the rubber tappers in the context of the Pilot Programme and other projects is, however, temporary, as the objective of these projects is for tappers to become self-sufficient. The aim of these projects is thus that tappers contribute to the conservation of the Brazilian Amazon without the help of external actors. From this perspective, a new question arises: to what extent can it be expected that the reserves' inhabitants and other commoners in Amazonia permanently contribute to the conservation of a globally important resource, without the international community carrying any of the costs?

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Appendix 1
Fieldwork methodology

Interviewing the inhabitants of the Extractive Reserve Chico Mendes

All interviews were conducted by myself and involved five visits to the Reserve over a period of five months. Given the large area of the reserve and its number of inhabitants I had to choose a selection of rubber tappers to interview, which could provide an overall picture of the entire reserve. In choosing whom to interview, however, I had to work with imperfect information. The literature on extractive reserves published prior to 1995 tended to depict them as homogenous entities. Consequently, it was only after arriving in Acre that I was able to identify differences within the reserve. This shortened the time available for selecting estates, which had to be done in parallel with my visits to the reserve. Moreover, there was no comprehensive information about the rubber estates and it was only at the conclusion of the fieldwork that I was able to obtain a map of the reserve, which in turn contained a number of errors. Hence, it was through conversations with members of the rural workers' unions and development workers that I was able to identify the estates composing the reserve and the differences between them. The generally agreed view of all persons I talked with in Acre was that the level of accessibility of the estates was the main distinguishing factor. Some people, however, considered the accessibility of the estates in relation to Rio Branco (the state capital), and others in relation to the nearest city or road from which the estate was. I chose thus to visit estates with different levels of accessibility in relation to Xapuri (close to Rio Branco) and to Assis Brazil (distant from Rio Branco). I am aware, nevertheless, that considering additional factors in the selection process, e.g. number of inhabitants of each estate, may have given a different sample of estates.

The main factor which influenced my selection of estates was, however, my inability to enter the reserve alone. The choice of estates was restricted to those visited by members of the rural unions and development workers and to knowledge of their intention to enter the reserve. Moreover, it was also necessary that the person entering the reserve was willing to take me on the relevant journey. In one case, members of the union were planning to go into a remote area of the reserve and I expressed strong interest in going with them. However, they only agreed to take me half way because they believed I could not endure walking in the forest for several days and in areas where were forest paths were not regularly cleared. This meant that although some of the estates visited are of difficult access (Icuriã and Guanabara) I could not include in my sample those areas that were several days away from the nearest cities, which might have provided a bleaker vision of the level of common property institutions in the reserve.

Initially, the duration of stay in the reserve depended on the length of the other person's visit because it was not possible to find my way out without external help. Thus, I could only stay four days on the first two estates visited (São Pedro and Floresta), while in Icuriã and Guanabara I stayed for a longer time and obtained more detailed information. This did not affect the overall conclusions of the thesis because information on the different estates was cross-checked through interviews with the key informants and conversations with other people who also have a good knowledge of the reserve. Nevertheless, this may explain why in Chapter VI there are more references to Icuriã and Guanabara than to the other estates.

In spite of these problems, the estates visited represent areas with different levels of accessibility and proximity to different cities. As can be observed in Table 6.1, I visited three estates near Xapuri and two near Assis Brasil. Of these five estates, Dois Irmãos and Floresta may be considered to represent accessible estates, as each of them is five hours walk from Xapuri. Seringal São Pedro, the first estate visited, may be considered a distant one - it its one day by boat from Xapuri. Both estates in Assis Brazil are distant. It takes one day by car from Rio Branco to Assis Brazil. Icuriã, however, was of relatively easy access taking only five hours walk from Assis Brazil compared to the 12 hour walk to reach Guanabara. My own observations during the visits to these estates as well as the interviews with their inhabitants appear to confirm the fact that accessibility is a crucial factor distinguishing the different estates, as I argue in Chapter VI.

Interviews lasted on average one hour. In those houses where I stayed overnight, however, interviews tended to last longer, as people would often provide more information during casual conversations after dinner. Several interviews were not with one individual rubber tapper but with a family or group of extractivists. In these cases, I could obtain different opinions of the same issue and more detailed explanations of certain matters. If one did not know the answer the others would explain and all of them felt more at ease than if interviewed alone. The first two interviews took place with a tape recorder and a list of questions. This method, however, was not effective for obtaining information since people only answered "yes", "no" and "I don't know" to the questions. It soon became apparent that tappers gave such laconic answers because they were intimidated by the presence of a tape recorder and the direct questions. I thus interviewed the tappers through more or less informal conversations and substituted the tape recorder by a notebook, a method which does not allow for perfect accuracy in recording answers but provides a considerably higher amount of information. I took notes during or after the interviews, depending on whether this disturbed the interviewee. The best technique was to initiate a casual conversation (e.g. by asking for how long the person had been living there) without a notebook. Afterwards, once the interviewee appeared to be comfortable with our conversation I would ask if he or she would mind if I took some notes because what he/she was

saying was very interesting. A few interviewees showed suspicion at my suggestion, in which case I quickly tried to renew the flow of conversation and took notes afterwards. In the large majority of cases, however, interviewees readily accepted that I took notes.

Casual conversations were also useful to obtain information that the tappers would not give if questioned directly. For example, when I asked whether they had problems on the estate, e.g. conflicts over rubber trails or lack of compliance with the established rules, tappers always answered that there were no such problems on their estate. However, during the conversations with tappers from the same estate and especially if I was staying overnight in their house and if the interview was with the entire family, there were spontaneous references to different problems. In some cases, the main interviewee said that there were no problems and the others disagreed. Nevertheless, it may be the case that there were more problems in the reserve than those mentioned in the text because some tappers were asked directly about this issue.

The interviews were conducted in order to gain answers to the main topics of interest, namely the structure of the reserve in terms of property rights, organisation and relationship with outsiders, but the specific questions asked in each case varied and it was not possible to obtain the same information from all interviewees. This was due to two reasons. First, during the fieldwork new questions developed, which were naturally not asked to the first interviewees, such as the present role of the union on the rubber estates, the existence of more than one community in each estate, and the role of leaders. Hence, the sample collected may present some bias in the sense that the more complete and adequate interviews took place in Icuriã, Guanabara and Dois Irmãos which I visited after already conducting a substantial number of interviews in other areas. Second, if the interviewee had already been talking for an hour or more and was giving signs of wanting to end the conversation, I could not insist on exploring questions that were not mentioned during the interview. This problem was, however, compensated by the fact that, when this occurred, it was because the interviewee had already given important information about other issues.

Interview guidelines for reserve inhabitants and key informants

- Identification and background of the interviewee
- Who owns what and why
- Limits to property rights
- Process that led to the establishment of the reserve
- Why common property
- Perception of forest/natural resource
- Relationship with other inhabitants of the estate and of the reserve

- Relationship with the state and other external actors (e.g. NGOs)
- Decision making process and responsibility
- Compliance with rules
- Quality of life
- Entrance of new members in the reserve
- Interest in alternative economic activities

Interviewing policy-makers

The interviews with Brazilian policy-makers were all conducted by myself. Most interviews took place during a stay of one month in Brasilia. In addition, I travelled through various cities in Amazonia, as well as to Rio de Janeiro and São Paulo to conduct additional interviews. In general, each interview lasted one hour and was tape-recorded.

As outlined in the Introduction, the choice of interviews was based on snow-ball sampling. Interviewees suggested other individuals to be interviewed on the basis that they had a substantial knowledge of the Amazon region and/or because they had always played an important role in Amazonia or environmental politics. One of the criteria for choosing interviewees was asking who had participated at the Earth Summit and who would participate at the next Earth Summit. In some cases, the present position of the interviewees was not relevant. For example, the Secretary for the Environment of São Paulo was not interviewed as a result of his present position but because a number of other interviewees had suggested that he had always been at the forefront of environmental debates in Brazil. Several public servants of the Environment Ministry were also interviewed as the opportunities arose.

The interviews took a semi-structured form following a list of general themes rather than a set questionnaire. The three main themes were those originally proposed, namely problems of Amazonia from a Brazilian perspective, value of Amazonia for Brazil and the attitude of the international community regarding Amazonia. Other questions that arose during the fieldwork were opinions about the risk of internationalisation of Amazonia, the perception of the south of Brazil of the Amazon region and the existence of an Amazonian.

There were no major problems obtaining information from policy-makers apart from a few cases in which the interviewee chose to talk about his own career, rather than Amazonia. These were, however, exceptional cases and it was easy to ensure that all interviewees answered the same questions. Most interviewees also provided additional information.

Appendix 2

List of interviewed policy-makers

António Alves – Funcionário Público 31.10.1995
Secretaria da Cultura de Rio Branco, Rio Branco
(Civil Servant of the Secretariat of Culture, Municipality of Rio Branco)

Carlos Aragón – Coordenador do Projecto RESEX – PP-G7 ..... 25.11.1995
CNPT/IBAMA – Centro Nacional para o Desenvolvimento Sustentado
das Populações Tradicionais/ Instituto Brasileiro do Meio Ambiente e
dos Recustos Renováveis, Brasilia
(Co-ordinator of RESEX sub-project PP-G7, National Centre for the
Sustainable Development of Traditional Populations/Brazilian Institute
of the Environment and Renewable Resources)

Francisco de Assis Costa - Académico 18.10.1995
NAEA – Núcleo de Altos Estudos Amazônicos, Belém
(Lecturer at Nucleus of Higher Amazonian Studies)

Marcos Barro – Director 5.10.1995
FioCruz, Secção Amazonas, Manaus
(Director of FioCruz, Amazonas Section - Research Institute)

Bertha Becker – Professor 15.12.1995
UFRJ – Universidade Federal do Rio de Janeiro, Rio de Janeiro
(Federal University of Rio de Janeiro)
Member of PP-G7 International Advisory Group

Edil Benedito – Coordenador Geral do PP-G7 ..... 7/8.12.1995
Secretaria de Coordenação dos Assuntos da Amazônia, MMA - Ministério
do Meio Ambiente, dos Recursos Hídricos e da Amazônia Legal, Brasilia
(General Co-ordinador of PP-G7, Secretariat for the Co-ordination of
Amazonian Affairs,Ministry for the Environment, Water Resources and
Legal Amazonia)

Maristela Bernardo – Consultora na Área do Meio Ambiente 9.11.1995
Senado, Brasilia
(Advisor to the Senate for Environmental Affairs)

Rubens Harry Born – Coordenador Geral 20.12.1995
Instituto Vitae Civilis, São Paulo
(General Co-ordinator of Institute Vitae Civilis)

Henrique Cavalcanti – Presidente 8.12.1995
Comissão de Desenvolvimento Sustentável, MMA - Ministério do Meio Ambiente, dos Recursos Hídricos e da Amazonia Legal, Brasilia
(President of the Commission for Sustainable Development, Ministry of the Environment, Water Resources and Legal Amazonia)

Enio Cordeiro – Chefe de Divisão do Meio Ambiente..... 8.12.1995
Itamarati, Brasilia
(Head of Department for the Environment of Foreign Office)

Jorge Coutinho, Senador..... 30.11.1995
(Senator) Brasilia

Ana Lúcia Cruz – Funcionária Pública..... 13.11.1995
MMA - Ministério do Meio Ambiente, dos Recursos Hídricos e da Amazônia Legal, Brasilia
(Civil Servant of the Ministry of the Environment, Water Resources and Legal Amazonia)

Katia Dragger Maia – Secretária Executiva..... 20.11.1995
Fórum Brasileiro de ONGs e Movimentos Sociais para o Desenvolvimento Sustentável, Brasilia
(Executive Secretary of the Brasilian Forum of NGOs and Social Movements for Sustainable Development)

FASE (group interview) 6.10.1995
Federação dos Órgãos de Assistência Social e Educacional, Manaus
(Federation of Organisations for Social and Educational Assistance)

Fabio Feldman – Secretário do Meio Ambiente 20.12.1995
Estado de São Paulo, São Paulo
(Secretary for the Environment, State government of São Paulo)

Fernado Gabeira, Deputado 7.6.1995
(Member of Parliament) Brasilia

Maria Teresa Jorge Pádua – Presidente..... 23.11.1995
FUNATURA - Fundação Pro-Natureza, Brasilia
(President of FUNATURA, Foundation pro-Nature)

Vitor Leonardi – Presidente do Núcleo de Estudos Amazônicos 1.12.1995
UNB - Universidade de Brasilia, Brasilia
(President of the Nucleus of Amazonian Studies of the University of Brasilia)

Jean Pierre Leroy – Assessor e antigo director 12.12.1995
FASE - Federação dos Órgãos de Assistência Social e Educacional,
Rio de Janeiro
(Adviser and former director of the Federation of Organisations for
Social and Educational Assistance)

Marilia Marreco – Senior Civil Servant 1.12.1995
MMA - Ministério do Meio Ambiente, dos Recursos Hídricos e da
Amazonia Legal, Brasilia
(Ministry of the Environment, Water Resources and Legal Amazonia)

Eduardo Martins – Director 9.6.1995
WWF/ Brasil - World Wide Fund for Nature, Brasilia

Haroldo Mattos de Lemos - Secretário de Estado do Meio Ambiente 17.11.1995
MMA - Ministério do Meio Ambiente, dos Recursos Hídricos e da
Amazonia Legal, Brasilia
(Secretary of State for the Environment, Ministry of the Environment,
Water Resources and Legal Amazonia)

Humberto Michiles – Presidente 10.10.1995
Assembleia Legislativa de Manaus, Manaus
(President of the State Parliament of Manaus)

Dr. Osório – Director 5.10.1995
INPA - Instituto Nacional de Pesquisas Amazônicas, Manaus
(Director of INPA National Institute for Amazonian Research)

José Augusto Pádua – Coordenador da Area de Florestas 18.5.1995
Greenpeace – Central and South America, Rio de Janeiro
(Section Co-ordinator for Forests)

Bruno Pagnoccheschi – Secretário Executivo 21.11.1995
ISPN - Instituto Sociedade, População e Natureza, Brasilia
(Executive Secretary of the Institute for Society, Population and Nature)

Nelin Reis – Secretário de Planejamento 22.9.1995
Governo Estadual do Acre, Rio Branco
(Secretary of State for Planning, State government of Acre)

Rafael Rueda - Chefe 5.12.1995
CNPT/IBAMA - Centro Nacional para o Desenvolvimento Sustentado
das PopulaçõesTradicionais/ Instituto Brasileiro do Meio Ambiente e dos
Recustos Renováveis, Brasilia
(National Centre for the Sustainable Development of Traditional
Populations/Brazilian Institute of the Environment and Renewable Resources)

Prof. Salazar, Diretor de Departmento 6.10.1995
SUFRAMA - Superintendência da Zona Franca de Manaus, Manaus
(Head of Department, Superintendency of the Free Port of Manaus)

Donald Sawyer – Director 6.6.1995
ISPN - Instituto Sociedade, População e Natureza, Brasilia
(Director of Institute for Society, Population and Nature)

Seixas Lourenço – Secretário de Estado da Amazônia..... 24.11.1995
MMA - Ministério do Meio Ambiente, dos Recursos Hídricos e da
Amazonia Legal, Brasilia
(Secretary of State for Amazonia, Ministry of the Environment, Water
Resources and Legal Amazonia)

Marina Silva, Senadora 15.11.1995
(Senator) Brasilia

Roberto Smeraldi – Coordenador do Programa de Florestas..... 21.12.1995
FoE - Friends of the Earth, São Paulo
(Coordinator of Programme for Latin American Forests)

Eric Stoner – Environmental Advisor 9.11.1995
USAID - United Stated Agency for International Development
Department of the Environment, Brasilia

Emerson Teixeira – Secretário de Planejamento..... 27.9.1995
Governo Estadual de Rondônia, Porto Velho
(Secretary of State for Planning, State government of Rondônia)

Marcelo Tunes - Diretor de Departamento 6.12.1995
Secretaria de Estado da Amazônia, MMA - Ministério do Meio Ambiente,
dos Recursos Hídricos e da Amazonia Legal, Brasilia
(Head of Department in the Secretariat of State for Amazonia,
Ministry of the Environment, Water Resources and Legal Amazonia)

Adalberto Val - Coordenador Geral de Capacitação 5.10.1995
INPA - Instituto Nacional de Pesquisas da Amazônia, Manaus
(General Co-ordinator of the National Institute for Amazonian Research)

Prof. Orlando Valverde – President 19.5.1995
CNDDA - Campanha Nacional de Defesa e pelo Desenvolvimento
da Amazônia, Rio de Janeiro
(National Campaign for the Defence and Development of Amazonia)

Elianna Zacca – Coordenadora de Planejamento Nacional 19.10.1995
SUDAM - Superintêndencia do Desenvolvimento da Amazônia, Manaus
(Co-ordinator of Regional Planning, Superintendency for the Development
of Amazonia)

Appendix 3:

Glossary of Portuguese Terms

Aforamento	"A lease from the state for extractive rights. The boundaries of *aforamentos* were notoriously imprecise, but these usufruct rights were later transformed into de facto land rights as large owners began to sell aforamentos areas for ranching" (Hecht and Cockburn, 1989:271)
Aviamento:	debt bondage system characteristic of the rubber trade in Amazonia
Benfeitorias:	improvements made to the land
Capoeira:	secondary vegetation
Colocação:	rubber stand
Colônia:	Agricultural Settlements
da margem:	near the riverbank
Empate:	stand-off
Estradas de seringa:	rubber trails
Fazenda:	ranch, large holding or plantation
Lideranças:	leadership, former tappers usually living outside the reserve many led the resistance process against the ranchers
Município:	municipality
Patrão:	The patron, the person to whom one sells and from whom one might be able to ask for favours every once in a while (Hecht and Cockburn, 1989:272)
Portaria:	internal decree
Posseiro:	untitled occupier of a plot
Seringal:	rubber estate
Seringais:	rubber estates
Seringalista:	rubber estate owner, rubber baron
Terras devolutas:	"Unsurveyed lands of the state. These can be lands that were never leased or can be land whose leases or claims have not been renewed" (Hecht and Cockburn, 1989: 272).