The Composition of Rubber Tapper Livelihoods in Acre, Brazil: A Case Study of Sustainability and Peasant Economy

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This thesis is dedicated to the memory of Dr. Keith Bakx without whom I would not have started, to Deirdre Hay without whom I could not have finished, and to Dylan and Tobin that they may know the rainforest.

Abstract

Amazonia is both a diverse ecological space and a complex social place in which the conservation of its varied forest and aquatic environments cannot be divorced from the fate of its human inhabitants. Rural society is comprised of a wide range of socio-economic, cultural, and historical groupings that includes several types of peasants or peasantries. One of the most important segments of contemporary rural society in Amazonia consists of traditional or historical peasantries, *caboclo* society or the so called "indigenous rural population".

Events of recent decades in the Brazilian Amazon have shown that the region is susceptible to rapid degradation from modern pressures of development and an expanding population. Approaches to sustainable development need to reflect the diversity and complexity of the regions' social and physical environments. *Caboclos* are important for their historical place in Amazonian social ecology and for their potential contribution to the search for viable solutions to sustainable development.

Sustainability will be achieved on the basis of incorporating sustainable livelihoods into a development paradigm that maintains and improves the social use of resources and the integrity of ecosystems. Rubber tappers in the state of Acre are a type of Amazonian *caboclo*. Their livelihoods exhibit many of the attributes of resiliency and adaptability that characterize peasantries. Resources are used, based on the demands and capabilities of household economies and in recognition of their dependence on the forest and its resources. The livelihoods that rubber tappers pursue are to a large degree, ecologically sustainable; rubber tappers are practitioners of sustainability. The diversity and flexibility of their livelihoods is geared towards low impact, long-term use of forest resources and is highly adaptable to variable socio-political, economic and environmental conditions.

Extraction of forest resources is a major component of rubber tapper livelihoods that encompasses rubber tapping, Brazil nut collection, hunting, fishing and myriad uses of other forest resources. Their livelihoods also include a farming system that is adapted to both the social conditions of rubber tapper society – limited capital and technology, dependence on household labour – and to the ecological constraints of Amazonian environments – weak tropical soils, seasonal changes, and variability. The composition of their livelihoods permits each sector of the household economy to function within local environmental constraints and to escape the need to independently fulfill household subsistence requirements. Extractive reserves provide a locally derived model of socially acceptable, conservation oriented development.

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Notwithstanding the assistance and input of all those concerned all errors and omissions are, of course, my own.

Chapter 1
Introduction

In the last thirty years the destruction of tropical forests has gained widespread attention in scientific circles and the media, among policy makers and governments, and within the general population of both tropical and temperate regions. Typically described as exotic, lush, and verdant landscapes, tropical rainforests are now also known to be repositories of unparalleled biodiversity, important carbon sinks and vital elements in macro-climatic patterns and hydrological cycles (Brown 1992; Browder 1989; Fearnside 1986). In the late 20th century tropical deforestation has become an environmental problem with global implications that bear directly and indirectly on the future ecological health of the planet. More recently it has been recognized that conservation objectives are irrevocably linked to human development and the use of natural resources. Sustainability has become the watchword of economics and conservation.

But what does "sustainability" mean? What is "sustainable development?" The exact definition of these terms continues to be a point of contention among social and natural scientists and others concerned with environmental and resource use issues. For some the term "sustainable development" is an oxymoron while for others "development" remains the operative word and "sustainable" is merely a fashionable prefix (Nugent 1993; Redclift 1987). General principles of sustainability on the other hand are more easily agreed upon and are widely recognized as imperative to the development and use of natural resources. They include the notion that resource exploitation and environmental conservation must somehow coexist. All societies depend on natural resources and environmental services for survival. In many cases, however, use of the former causes damage to the latter. Sustainability requires that resource use not permanently alter or damage ecosystems and the environmental services that they provide. Sustainability also requires that ecosystems and resources be maintained and conserved so as to ensure their availability to future generations (Pearce and Myers 1990; Gow 1989).[1]

The Amazon basin encompasses the largest expanse of tropical forest in the world, some 60 per cent of which falls within the borders of Brazil (Moran 1993; FAO 1990; Fearnside 1986).[2] Since the early 1960s the Brazilian Amazon has experienced

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[1] For the remainder of the thesis, "sustainable development" will be used to signify the concept of sustainability as herein defined.

[2] Throughout the thesis "Amazon", "Amazonia", "Amazonian" and so on refers to that part of the watershed of the Amazon River and its tributaries falling within the borders of the Republic of Brazil.

unprecedented levels of development, the ecological impacts of which have been the subject of much concern and debate, not only in Brazil but to a very large extent in the international community.[3] Deforestation rates may have peaked around 1987 but there is scant reason to believe they will not increase in the future (Moran 1993). Furthermore, the loss of forest cover has not stopped altogether. Amazonian forests continue to fall, only at a slower rate than during the 1980s.[4] If, however, the use and development of Amazonian natural resources is to remain the mainstay of the region's economy then ways must be found to use the forest and, simultaneously, to attain conservation objectives. Sustainability, therefore, must become a central plank of development policy and land use practices in the Amazon.

Commensurate with the serious environmental degradation in Amazonia there has been a more gradual realization of the social upheaval associated with the push for development and modernization of the Amazonian economy. In addition to deforestation and other biophysical impacts of development, Amazonian society has experienced a dramatic increase in the populations of rural and urban poor (Moran 1993). Absolute increases in population levels have been accompanied by a relative increase in poverty as wealth and, in particular, land ownership have become increasingly concentrated in the hands of a small elite. Rural and urban areas have experienced high levels of both intra- and inter-regional migration in recent decades which have exacerbated conflicts over access to land and resources and resulted in widespread rural violence (Schmink and Wood 1992).

To date one of the most important responses to what has been widely termed the "crisis in Amazonia" has been the linking of traditional land use patterns with modern objectives of sustainability and conservation (Nepstad and Schwartzman 1992; Anderson 1990; Posey and Balée 1989). Broadly speaking, traditional land use patterns refer to forest based livelihoods which depend in part on the harvest, collection or other use of forest and aquatic resources in Amazonia, otherwise known as extractivism or extractivist production. Although the term may lack precision, "extractivism" usefully encapsulates part of the general pattern of land and resource use practiced by

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[3] Amazonian deforestation in the West became most apparent when it emerged (however inaccurately) that the Amazon rainforest was at least an important global carbon-sink and more grandiloquently the "lungs of the earth". In other words, when western society began to feel that it could be directly affected by events in the remote and exotic Amazon, only then did the "crisis" begin to attract wider attention from abroad (Moran 1993; Nugent 1993; See Chapter 2, 5).

[4] A figure between 10 and 11 per cent is a respected estimate of the proportion of historic forest cover that has to date been cleared or substantially degraded and currently supports non-forest vegetation or relatively young second growth (*capoeira*). Most researchers acknowledge that estimates of deforestation tend not to include small swidden areas cleared by forest dwellers or other degraded areas that have not been cleared outrightly (Eden 1994).

Amazonia's indigenous and traditional rural populations. Extractivism in this context is often defined as the use (domestic or commercial) of non-timber forest products (NTFPs) of vegetable or animal origin. However, a number of writers, including this author, contend that the domestic use of wood resources is an important caveat to the NTFP designation (Cleary 1993). In some instances extractivism in its modern context may even include small scale mining or timber harvesting for commercial purposes (Cleary 1993).

In general, however, extractivist livelihoods comprise the harvest, use and sale of numerous forest products, swidden agriculture and small-scale farming, hunting and fishing. Under extractivist livelihood systems the forest is used in such a way that it supports a rural population, permits forest resources a role in local and regional economies, impacts minimally on ecological processes and, therefore, on the ability of future generations to partake of the same forest resource base. The impact of these livelihoods on the environment is clearly much less severe than many resource use alternatives currently being deployed in Amazonia.

Social research into the nature and workings of rural livelihoods that employ extractivist production is an important dimension of identifying sustainable solutions to land and resource use. In many regions of Amazonia the harvest of rubber latex from the forest has been a central part of rural producer livelihoods for over a century. Rubber tappers represent an historical social formation in Amazonia whose livelihoods are an example of land and resource use that is in harmony with the objectives of sustainability and conservation.

In the late 1970s, rubber tappers began to organize in resistance to competing and conflicting land uses which were causing the destruction of their forest resource base (Allegretti 1991, 1989; Schwartzman and Allegretti 1987). By the mid-1980s the concept of "extractive reserves" had emerged in the debate around development priorities, sustainability, and conservation in Amazonia. Extractive reserves were proposed by the rubber tappers themselves as a means of protecting large areas of forest and ensuring access to the forest resources upon which their livelihoods depend. It is significant that extractive reserves were a grass roots initiative in contrast to so many rural development schemes which historically have failed due in part to a "top-down" approach that is often inappropriate to local socio-environmental conditions (Bunch 1982).

The movement for the establishment of extractive reserves by the practitioners of extractivism themselves was motivated primarily by socio-economic considerations, that is to ensure continued access to their traditional forest land-base and its resources. To the extent that this coincided with the environmental concerns of external interests, the notion of extractive reserves as a means of achieving sustainable use of the forest was particularly appealing to both foreign and Brazilian academics, governments, media, and environmental organizations. The social ecology of Amazonia, however, is immensely complex and there are no quick fixes or simple solutions to the region's environmental and developmental problems. Not surprisingly, considerable debate has arisen around the notion of establishing extractive reserves and limiting access to forest resources to a particular sector of the population.

In recent years there has been a drastic increase in research dealing with extractivism and non-timber forest products. Some of this research has been concerned with trying to prove the social and economic value of maintaining intact Amazonian forests and contrasting extractivist production with current development practices which have been shown to be quite clearly more drastic (Goodman and Hall 1990; Hecht, Norgaard and Possio 1988; Fearnside 1986). Other researchers have focused almost exclusively on the exchange value of a whole host of so called non-timber forest products or NTFPs and have argued that collectively they add up to a greater return per hectare than other land uses (Nepstad and Schwartzman 1992; Peters et al 1989; Hecht, Anderson and May 1988). Others have argued that improved markets and marketing are the key to realizing the economic potential of the "forest harvest" as this would presumably permit traditional forest producers to make a better living from a wider range of forest resources (Padoch 1992; Plotkin and Famolare 1992; Clay 1992, 1988). Extractivism or extractivist production as a concept of resource use has in essence been reinvented from its former industrial connotations (relating to the extraction of timber and minerals), to describe what has been rather uncritically considered an environmentally benign approach to development (Nugent 1993; Cleary 1990). Extractive reserves, it has been argued, are an important policy tool that can and should be implemented to "save" the Amazon (Schwartzman and Allegretti 1987 among others).

Concurrently, a body of literature has emerged which has been quick to point out that extractivism and extractive reserves are not by any means a panacea to Amazonian development and environmental problems. Historical analysis of extractivist production has suggested that any successful product will, sooner or later, either be exhausted from its natural domain through over-harvesting or will be supplanted by plantation production and/or synthetic substitutes (Torres and Martine 1991; Homma

1989). Amazonian history abounds in examples of such products of which rubber represents the classic example. Another critique of the desirability, let alone the viability, of extractive reserves points to the notable poverty of many rural producers in Amazonia, particularly rubber tappers and others engaged in extractivism in remote forest areas. This, it has been argued, implies that as a livelihood strategy extractivism has poor potential for improving the material well-being of its practitioners (Browder 1992; Torres and Martine 1991). Still another argument has been that extractivism involves an extensive use of land and that extractive reserves, therefore, have poor potential for absorbing surplus rural populations, hinder other development uses of the land, and are ultimately discriminatory of the majority of contemporary rural Amazonians (Browder 1992). Finally, the ecological sustainability of extractivist livelihoods has been questioned on the grounds that there is no proof that the harvest of NTFPs does not harm or at least alter, the environment and, therefore, can extractivist production be considered to actually achieve sustainability (Browder 1992; Torres and Martine 1991)?

The brief discussion above by no means represents exhaustive treatment of the contemporary debate on forest based livelihoods and extractive reserves, much less the thorny issue of "sustainable development" in Amazonia. However, as a point of departure, it sets out some of the historical and contemporary parameters for the task at hand. Extractivism in and of itself, is not the complete answer to halting Amazonian deforestation or solving the region's complex social and economic problems but it can play a vital role in those areas of Amazonia where a tradition of extractivist production or the potential to establish one exists. The social importance of extractivism is at the local and regional levels. As a component of forest based rural producer livelihoods it can help to stabilize rural populations in a context of ecologically sustainable land use.

The current research takes the position that it is the overall composition of extractivist livelihoods that is the key to their sustainability, both in terms of their low overall impact on the natural environment and their survival over time. The most important characteristics of these livelihoods are not the extractivist activities *per se* but the overall diversity and flexibility of the livelihood composition. The basis for diverse and flexible livelihoods stems from a variegated resource base, a diversity of income and subsistence sources, and the ability to apply labour flexibly to different activities in response to changing household needs.

The objectives of the current work are to gain a better understanding of the dynamic role of extractive production in mixed, forest based livelihoods by examining in detail

the composition of rural livelihoods in a specific region of Acre. The discussion will seek to show that the livelihoods of certain Amazonian peasantries – in this case Acreano rubber tappers – through inherent characteristics of flexibility and diversity, cope remarkably well within restrictive Amazonian environments (Nugent 1993) as well as within what has historically been a political economy biased in favour of large capital (Cleary 1993; Moran 1993; Goodman and Hall 1990).

Chapters 2 through 5 address the broader theoretical context of the research and its orientation within Amazonian social science and present the historical antecedents of contemporary rural Amazonian society. In Chapters 6 to 11 the results of the field research are discussed in detail. It is argued that rather than being defined by one or two forest products – that is, rubber and Brazil nuts – *seringueiro* livelihoods are comprised of three broad categories of activities each of which contribute to household economy and subsistence in distinct but interrelated ways. Attention is drawn to the dynamic nature of rubber tapper livelihoods, in particular the diversity of activities and resources upon which they draw for survival and the flexibility they maintain in moving between different spheres of livelihood pursuit. In Chapter 12 the sustainability debate is revisited. It is argued that certain forest based livelihoods, those that include extractivist activities in their composition, are sustainable and have a viable future in Amazonia. Furthermore, extractive reserves are given as a workable example of sustainable forest management. While extractivism and extractive reserves are not to be taken as a panacea, it is maintained that they do offer potential solutions to environmental, social and economic problems in the countryside.

Chapter 2
The Fieldwork: Objectives and Methodology

The causes of the modern crisis in Amazonia are buried in a complex of interconnected historical, environmental, socio-political and economic factors (Chapter 5).[1] Understanding ecological and social processes in Amazonia has been plagued by the fact that the region encompasses a single watershed; this imposes upon Amazonia a level of generalization that belies not only wide ranging ecological diversity, but equally heterodox social and historical realms (Nugent 1993). The pursuit of sustainable development in Amazonia must, therefore, contend with two important issues that traditionally have not been central to development policy or scientific analysis. On the one hand, it is the relationships between nature and humankind, not the determining influence of one or the other, that best explain current socio-environmental problems in Amazonia.[2] On the other hand, discussions of Amazonia *per se* imply a monolithic quality which can hide important regional differences and local variations in social and environmental conditions. The case study that forms the basis of this thesis, therefore, forms part of the collective pursuit of knowledge of Amazonia. It seeks to explain the relationship between human and environmental factors through the examination of livelihood composition and by relating the object of the study to a wider Amazonian context. By focusing on the details of a specific region it reveals some of the complexity of the real world and leads to a better understanding of the possibilities and probabilities of achieving sustainable development in rural Amazonia.

After a year of preparatory research and language training in Britain the author embarked on a field trip to Brazil in November 1992 where research was carried out in three phases. The first phase involved secondary source research in Brasilia and the two major Amazonian cities of Belém and Manaus during December 1992 and January, 1993. This involved primarily a review of the Brazilian literature on sustainability and extractivism. The second phase took place in Rio Branco, the state capital of Acre, from February 1993 until mid-May 1993. Secondary source research was carried out at the Universidade Federal do Acre (UFAC) and other state, federal and non-government institutions. In addition discussions were held with various specialists, union leaders, activists and civil servants. The objectives were to verify my understanding of the

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1 The so called "Crisis in Amazonia" refers to the rapid social and ecological change taking place in many parts of the basin during the 1970s and '80s. In some cases the change was catastrophic. Rates of deforestation and rural violence have been used as indicators of the scale and intensity of the "crisis".

2 See for example Hecht and Cockburn 1989, Schmink and Wood 1992, Nugent 1993 for discussion.

current situation in the countryside and to reaffirm my research plan for the field. Gradually a network of contacts was developed through which it was possible to identify and obtain access to the specific research site. The third phase of the field research comprised over two months spent living in the forest with rubber tapper families.

The methodology of field research rarely consists of one research technique or a single methodological tool (Burgess 1982) and, therefore, from the outset an array of approaches to gathering data was anticipated. Furthermore, as Burgess contends, "in field studies, research design and the collection and interpretation of data take place simultaneously" (1982: 15). Hence, it was neither practical nor desirable to have a methodology "set in stone" prior to entering the field. The goal was to be flexible enough to adapt to the unforeseen without losing track of the central questions being asked in the research. The objective, therefore, was to focus on the collection of qualitative data concerning the composition of rubber tapper household livelihoods and to seek clues to the social, economic and environmental sustainability of such livelihoods. The qualitative approach held a number of advantages for this particular inquiry.

First of all, attempting to quantify every dimension of rubber tapper livelihoods, even if it were possible, is highly impractical in terms of researcher time and resources. Official statistics are problematic and fail to capture the complexity of rubber tapper livelihoods. Qualitative research achieves important levels of detail which are, (a) attainable only through direct contact with individuals and households concerned and, (b) are central to reaching an empirical understanding of the composition of rubber tapper livelihoods. Secondly, variability between households and the dynamic nature of livelihood composition lend themselves to qualitative analysis. The objective is not to find an "average" or "typical" livelihood but to understand the range of possibilities available to a given household and how this effects the social reproduction of the household. Thirdly, qualitative methodologies tend to be more flexible and better able to adapt to changing circumstances in the field. In particular this flexibility provides a receptivity to volunteered information and the respondents own point of view. Data that should not be discounted as merely anecdotal for it provides valuable context and detail.

The variety of research techniques deployed in the field included a canvass of 50 households using a questionnaire survey focused primarily on demographic and production-consumption information. Individual and focus group interviews were used

to explore a number of areas including the application of labour, knowledge, use and relationship with the forest, social and economic relations with society and the market, and local attitudes about the viability and sustainability of their livelihoods. Observation of and participation in numerous daily and seasonal activities provided additional detail, and helped to guide the field work.[3]

The research site was selected in consultation with the group Pesquisa e Extensão do Acre (PESACRE), a semi-autonomous, rural research and extension group and local members of a small rural worker's union representing rubber tappers, agricultural wage workers and colonist farmers, SINPASA. The site, located on the Riozinho do Rola about 100 kilometres from Rio Branco (Figure 2.1) was selected for a variety of reasons. To begin with it was selected because it was not contained within the boundaries of one of the existing or declared extractive reserves (Figure 6.1). Most recent research and especially external aid projects concerned with rubber tappers in Acre have focused on existing or proposed "protected" areas (e.g. CNS 1992; Kainer and Druyea 1992; Dain 1991; Rodrigues 1991; Schwartzman 1989) (Figure 5.1). The area of the mid- and upper Riozinho do Rola was also of interest because of its location relative to the main city, Rio Branco, the implications of which are discussed in greater detail in Chapter 6. Although the region is relatively close to the city it was not previously the subject of social research and was still an active rubber tapping area that was only very recently encountering the effects of wider society and development. The location of the research site provided a microcosm of the variability of situations rubber tappers encounter including, varying degrees of remoteness from transportation routes, the market and other households, flooding versus non-flooding locals, and differing resource mixes.

Finally, there were practical and logistical factors which contributed to the selection of the research area. First among these was the issue of the willingness of the community and its representatives to host a foreign researcher. Personal relationships are central to the kind of investigation being carried out here and without the co-operation and support of the forest community the fieldwork could have been impossible. Secondly, time became a crucial factor after several weeks of planning and preparation were lost. My access to the initial selection of a research site was suddenly precluded by an escalation of tension between resident *seringueiros* and outside logging interests.

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[3] After the fieldwork the household surveys were coded and entered on SPSS software for analysis. Much of the data was categorical. Frequencies, ranges and averages were the primary output of this exercise. The survey information was used to generate many of the graphs and tables, as well as providing a framework for discussion. Interview and observational data were collated by topic, activity or other dimension of household livelihood to facilitate comparison and cross checking between the various research techniques.

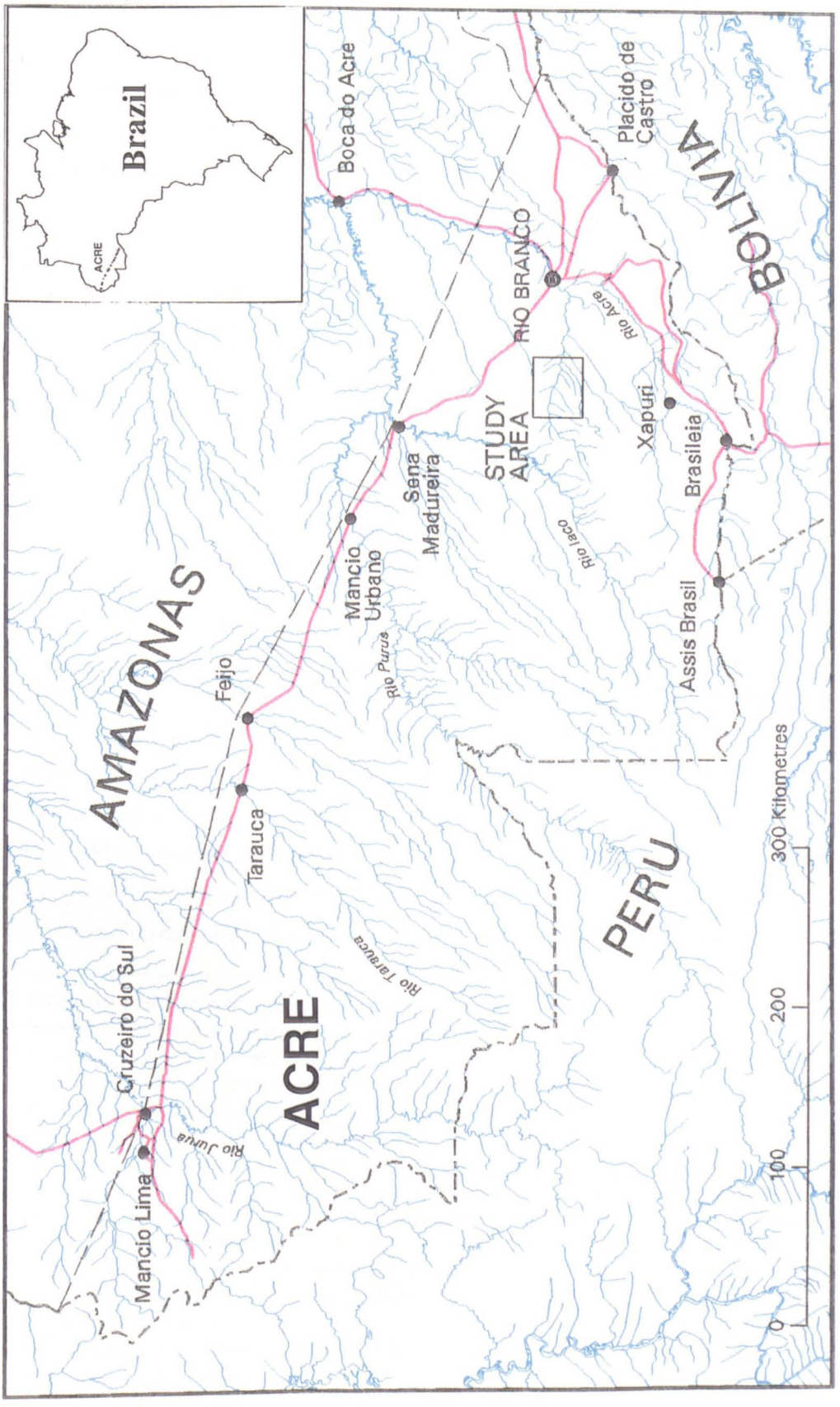

Figure 2.1 Acre state.

Source: Digital map of the world.

In due course two field trips into the forest were undertaken. The first was primarily a reconnaissance mission used to test the questionnaire and become acquainted with local conditions and the rigors and limitations of fieldwork. It also served to introduce the author to members of the forest community, and to receive valuable feedback on the themes and relevance of the proposed research. During the second field trip into the forest approximately 450 kilometres were covered on foot and 52 households were visited. Three-fifths of the households were located along or near to the main river channels, generally not more than an hour's walk apart, while the remainder were rather more sparsely scattered throughout the interior (or *no centro*) often separated by a walk of two hours or more between households. A total of four individuals, selected by the *rubber tappers* themselves, were employed to act as guides throughout the research (see below).[4] About half the time spent with each guide was used in walking through the forest visiting households, filling out questionnaires, and conducting focus group interviews with members of selected households.[5] Each night was spent with a different family, which afforded the opportunity for informal interviewing as well as simple observation of, and involvement in, several aspects of daily life with a number of rubber tapper families.

The distance between households and the necessity of carrying research supplies and personal effects almost exclusively on foot made travel arduous to say the least. Statistical sampling under such circumstances is completely impractical for an individual researcher and I argue, was of no consequence to the research at hand. A census and not a statistical sample was the goal of visiting households in the forest. The objective of the household survey was to generate qualitative data on the nature of the household resource base and general levels of production. The questionnaire

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4 All of my guides or *companheiros*, were male. See below for discussion of gender bias in the research. The issue of paying informants is a divisive one in anthropological research (cf Godoy and Lobowski 1992; Ellen 1984; Burgess 1982). On the one hand, there is concern about how payment might effect responses to research questions and how, if indiscriminately applied, payment may cause strife within the community itself. On the other hand, it is an out-dated philosophy that the social scientist should be able to work in the field, partaking of the food and time of his/her hosts on the pretext that the pursuit of knowledge is in the respondent's own interests and that, therefore, there is no need for material compensation. Clearly there is a distinction to be made between respondents to a questionnaire whose time and goodwill the researcher exploits for only a short period and the key informant who may give tirelessly for days, weeks and in some cases months at a time. In my case there was no question that I would have guides, simply because of the remote location of the research area. Similarly, there was no question that I would compensate them for their time spent away from more pressing livelihood activities. It was established at my first meetings with union representatives that the rate of pay would be that of a rural wage labourer or 1.5 times the official *salário mínimo*. This worked out to about $2.50 per day. N.B. all dollar values included in this volume are in 1993 US. dollars.

5 Interviewees were selected in an ad hoc manner depending on the availability and willingness of the individual or group in question. Consideration was also given to the specific circumstances of a household or special knowledge possessed by certain individuals.

(Appendix B) was broken into 4 sections: (1) household demographics and migration history (of the male head of household), (2) extractive production: from primary commercial products such as rubber and Brazil nuts to forest plant medicines, fish and wild game, (3) Agricultural production including crops and gardens, livestock, and fruit trees, (4) Health and education.

The design of the questionnaire itself and several of the questions were based on two recent socio- economic surveys by the National Rubber Tappers Council (CNS) and by the Technology Foundation of Acre (FUNTAC). These studies were conducted on extractive reserves in eastern Acre, the former carried out on the Chico Mendes extractive reserve (CNS 1992a) and the latter on the two reserves of Cachoeira and São Luis Remanso (Rodrigues 1991) (Figure 5.1). These surveys were used as guidelines because they represented direct field experience in similar circumstances to the current research and because they were drafted by Acrean researchers with requisite knowledge of rubber tapper culture. For purposes of the household survey it was not necessary to "reinvent the wheel" and, more importantly, a degree of comparability with related research was being sought.

The survey was relatively long and took between 45 and 75 minutes to complete. The questions generally called for recollection of quantifiable aspects of production such as rubber sales or the area of land being actively farmed by the household. Each of the 50 household surveys were formally conducted with the head of household.[6] However, it was often the case that other members of the household would gather around and assist in the responses to survey queries. This had the benefit of first, drawing on the collective memory of the household which lent greater accuracy to much of the data obtained. Secondly, the casual group atmosphere in which the questionnaires were conducted provided excellent opportunities for unstructured, focus group discussions (See below).

The survey was strongest in areas of commercial production, such as rubber and Brazil nut output. Respondents also had a strong sense of how much farming effort and investment was needed to meet household needs. Forest plants used for domestic purposes, size and numbers of wild game kills and so on were less readily quantified. Their contribution to household livelihood, while important, was more difficult to predict and more dependent on individual circumstances.

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6 Female/male head of household are awkward and somewhat unsatisfactory labels and so occasionally I will substitute the more humanistic Portuguese terms *dona/dono de casa.*

An important strength of the survey was the size of the census, this being one of the larger and more in-depth household surveys carried out in eastern Acre by an individual and independent researcher in recent years (cf. Almeida 1992). Although 50 respondents is small by statistical standards, seldom is a community of rural producers so dispersed as are the rubber tappers in Acre. While it may be risky to tread the path of induction from such a small census, general principles do not stand alone without some empirical basis. Establishing such a basis through the examination of an entire social system or environment is seldom realistic or practical. Hence, the ubiquity of the case study in social science, especially in the case of anthropology. Although there is ever the risk of slipping into particularism when focusing on the specific, the writing of social history is a collective process (Bakx 1986) and, therefore, a case study does not of necessity have to stand alone in trying to capture all of the elements of a specific society. Much of our knowledge of Amazonia and Amazonian societies is based on the accumulation of knowledge built upon an aggregate of case studies such as this investigation of rubber tappers on the Riozinho do Rola.

Ultimately, the canvass of households produced, not a statistical sample, but a collection of mini-case studies, providing a census of the existing population at a particular point in time and a qualitative account of life and livelihoods of a contemporary, Amazonian peasantry. It is not so much the average levels of production or consumption, but rather the range and diversity of values within which social reproduction occurs that are of interest in seeking to understand the composition of rubber tapper livelihoods. The level of detail provided by the mini-case study helps to uncover the diversity of components and relationships that comprise such livelihoods. The canvass or mini-case study approach emphasizes the rubber tappers' point of view which helps to explain their perception of their livelihood and how they sustain it in the forest. Whatever the objective reality of rubber tapper life, it is often their subjective view of the world that determines livelihood decisions and the choices they make.

Interviews were an especially important method for collecting information in the field and for their complimentary role to the household survey. Anthropological research typically involves a substantial degree of interaction between the researcher and the researched, however, the process and objective of research is often a foreign concept to the majority of the community in question.

Interviews essentially involve the transferal of information by way of a dialogue. They are highly flexible and, therefore, are well suited to a wider variety of circumstances and situations in which data are gathered. Depending on the objectives and the level of

structure, interviews may be narrowly focused and formed around a specific subject. Conversely, they may be wide ranging and touch on a variety of topics or themes. Question lists were written in advance but, recalling Burgess (1982: 15) quoted above, these were frequently updated and re-edited as new information was revealed. For instance, focus groups were employed to a greater degree than originally anticipated when it became clear that questionnaire sessions also provided excellent opportunities for unstructured group discussion. These were essentially group interviews with one or two themes suggested by the author and around which several points of view could be solicited at once. These situations allowed the author to go into greater depth on certain subjects and, simultaneously, to step back from the overt role of interviewer and take greater note of what was important or significant for the rubber tappers. It was often more effective and informative to passively join in a debate between neighbours in these instances than it was to engage in a structured question and answer session with a single respondent. The qualitative information obtained in the focus group setting was important for its provision of additional information on topics covered in the survey, such as the seasonal nature of hunting, and in other instances for revealing new avenues of inquiry such as concerning the debate over the benefits and drawbacks of small logging roads penetrating the rubber tappers' forest domain.

At other times, however, a more formal interview situation was appropriate and in these instances an attempt was usually made to record the interview. The advantage of taping is that it effectively reduces the degree of filtering or spontaneous analysis that occurs when the interviewer takes notes or relies solely on memory. The drawback of using the recorder is that it risks disrupting the continuity of the discussion or making respondent(s) feel uncomfortable and thereby influencing the outcome of the interview. Structured interviews were generally directed towards clearly defined topics whether that was a life history or concerning the intricacies of forest plant use or exchange systems. In most cases structured interviews, similar to the questionnaire sessions, took place with a group of people. As a counterpoint to the advantages of a group situation mentioned above, however, there is a commensurate risk (or inevitability) that responses may be different in the presence of peers. Similarly it is the dynamics of the interview that are altered with the introduction of a tape recorder into the setting (Ellen 1984). It is crucial that the researcher be aware of the influence of these factors on the nature and quality of the data that is collected.

When not journeying to distant households, time was spent living with the host families and partaking in the daily stream of activities, such as clearing forest for the coming year's agricultural plot, working in swidden gardens, or carrying out miscellaneous

activities including fishing, chopping firewood, fetching water, and preparing manioc. Time was also spent working in the forest, clearing rubber trails, tapping latex, and going on collecting expeditions for Brazil nuts, wild honey and Açai (a popular forest palm fruit). Participation in a variety of daily and seasonal tasks provided first hand experience of the skill and energy required for certain tasks and gave valuable insight into aspects of everyday existence in the forest. Direct "hands on" experience also provided perspective which guided the inquiry and often pointed to additional information to pursue or verify in, for example, interviews or during questionnaire sessions.

Participant observation is the research tool upon which qualitative fieldwork is founded (Boissevain 1989: 273) yet it often means different things to different people and, as such, it may be applied in a variety ways. Most definitions of participant observation refer to this diversity as a continuum encompassing complete participation at one end and complete observation at the other (Schwartz and Schwartz 1955; Gold 1958). Numerous factors determine to which end of the continuum the researcher will be drawn, some of which are beyond the researcher's direct control such as age, sex and ethnicity as well as the particularities of the research situation itself (Burgess 1982: 47). Not surprisingly, the way in which the researcher participates and observes varies with the circumstances and is, necessarily, in a state of almost constant flux. For some, simply being a member of a particular social setting and partaking in the day-to-day business of survival is the essence of participation (Boissevain 1989: 273), while for others observation can be construed as simply a matter of keeping one's senses open. In this regard the time spent in the field – the totality of the experience – <u>is</u> participant observation.

During the fieldwork a dichotomy emerged between attempts at "active" participation (Schwartz and Schwartz 1955) as described above and the compulsion to constantly observe. Clearly not everything can be observed and so, like the participatory aspect of fieldwork, observation informs and helps to guide the application of other methods. For this researcher observation was especially important and it was to this end of the spectrum of participant observation that the fieldwork was drawn. The author did take part in the "day to day business of survival" and ultimately it was the "totality of the experience" that provided participatory experience.

Traditionally in anthropology participant observation, the centre-piece of field research, involved many months, if not years, in "the field" living in residence with, or at least very close to, the host community. Today, exhaustive ethnographies are less central to

anthropological investigation. This is not to say that all the questions have been answered for clearly they have not. But in the case of the current research, for example, the concern was focused on a specific dimension of rubber tapper culture, namely the composition of their livelihoods and how these related to sustainability. Lengthy fieldwork was not, strictly speaking, necessary.

The only significant methodological problem with the duration of the fieldwork concerns the seasonality of the timing and intensity of different livelihood activities. The twelve weeks encompassed by the fieldwork represented one-quarter of the annual cycle of livelihood activities. The possible limitations imposed on what was learnt about livelihood composition during the fieldwork were mitigated in several ways. First of all, with interviews and the questionnaire, information was sought on the full annual cycle of livelihood activities, not just on what was going on at the moment. Secondly, there are overlaps between events and activities, hence the range of activities that were observed exceeded that which would be expected from the period encompassed by the fieldwork. Finally, it is only some, not all, aspects of livelihood composition that are constrained or determined by the time of year, many activities have an optimal season but may, in certain circumstances, occur at other times of year.

In addition to the limitations imposed by time, it is important to point out the influence of gender on the collection and nature of the data. To begin with, the majority of informants were male, as is this researcher. The most common situation in which questionnaires and interviews took place was around mealtimes, when male members were taking breaks from their work, relaxing in the front "room" of the host's *casa* talking or doing smaller tasks such as making shotgun shells, sharpening tools or effecting small repairs and maintenance around the *barracão*. At these times female members of the household would invariably be occupied with meal preparation, although often they would stop when a formal questionnaire interview was taking place as there was a certain novelty to the whole procedure. Whenever a woman or group of women was interviewed, male members were always present and as Bakx (1986) has noted, the men would often answer questions on the women's behalf.

Extended periods of time spent with the key informant families provided the best opportunities for discourse with women. But gender bias was mitigated primarily by making the household the objective focus of the study of livelihood composition. The household is easily and often construed as a "natural" unit of analysis, however, this should not be confused with homogeneity of household makeup. There are considerable variations in the demographic structure of the household which can have profound effect on the household's ability to provide for itself. Rubber tapper

households are often small and relatively isolated. Both of these facts diminish the importance of gender roles in terms of the household livelihood. Where it was possible to explore gender roles, in household production, for example, these points are discussed in the text.[7]

Finally, as was mentioned earlier, over the course of the research the author was accompanied by one of four "guides" who not only facilitated access to the 50 households encompassed in the survey but who also allowed the author to live with them between these sojourns. These individuals and their families were extraordinarily helpful and generous, providing both material support and their time, not to mention food, shelter and invaluable qualitative data as well. Having four people fulfilling the role of key informant was especially helpful for avoidance of having to rely on a single point of view. There was frequently a difference of opinion between key informants on contentious issues such as road building, encroachment of alternative land uses and so on. This helped to clarify complex issues by exposing multiple arguments. In other areas pertaining to the central concern with household livelihoods there was general agreement on most points concerning household production, the use and management of resources and social and economic relations with wider society. One key informant in particular, was with the author throughout the fieldwork. Having spent the earlier part of his life in Rio Branco he had learned to read and write (a rarity in the forest where levels of illiteracy are high) and hence had a better understanding than most of the peculiarities of outsiders. This individual facilitated the author's "entry" into the rubber tappers' community, provided essential feedback on the implementation of most of the research methods and above all helped to explain and familiarize the author with the nuances of life in the forest.

The multiplicity of methods employed on the field trip encompassed a broad spectrum, ranging from the highly structured survey described above to the almost *laissez faire* approach of participant observation. Interviews were often opportunistic in the sense that detailed information tended to be more forthcoming during unplanned encounters and discussions. By and large those being interviewed were willing and able conversationalists which greatly facilitated the task. One of the most fruitful situations for such discussions proved to be the many hours spent on trails traveling from household to household. Despite a blistering walking pace the rubber tappers generally kept up an almost constant dialogue when traveling through the forest. This provided excellent opportunity for discussions on a wide range of topics and an easy atmosphere in which to reflect on responses and pose evocative questions.

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[7] See Chapter 3 for discussion of the role and nature of the household in peasant economies.

Chapter 3
Seringueiros, Caboclos and Peasant Economy

3.0 Introduction

In the search for sustainable solutions to socio-economic and environmental problems in Amazonia, extractivism represents one of the few historical examples of conservation oriented practices and activities that have the potential to meet some of the basic requirements of sustainable development. For most commentators the two central challenges of sustainable development in Amazonia are the conservation of its delicate and diverse ecosystems and the social and economic use of those ecosystems and resources. Extractivism is an important part of the livelihoods of numerous social groups in Amazonia and plays a vital role in their social reproduction at the same time that it coincides with contemporary conservation objectives. The practitioners of extractivist livelihoods, however, have traditionally occupied the lower stratum of the Amazonian economy. They have been politically marginalized and often exploited or oppressed by a much smaller ruling elite. Most recently their interests have been subjugated by those of large landowners and the externally defined objectives of modern, industrial society.

In the Brazilian Amazon the post-war period has seen a parade of failures in the drive for modernization. Development policy has typically been applied with a broad brush and, in many cases, has been based on poor and inappropriate assumptions and errant stereotypes. In almost every corner of the basin the result has been some degree of ecological crisis and social disruption. Planners and policy makers have disregarded the resident rural population thus a wealth of accumulated knowledge has not been utilized in the planning of settlement and colonization. While it may be difficult to gauge exactly to what degree this has had a negative effect on the outcome of rural development efforts, the disruption of traditional social structures is clear to see and can be measured in the escalation of rural violence in the mid- to late-1980s, the rise in landlessness, and the degree of instability of rural populations (Moran 1993; Schwartzman 1992; Allegretti 1989; Hecht and Cockburn 1989; Bakx 1988 and others).

An initial objective of this research project was to investigate the viability and effectiveness of extractive reserves as a strategy for sustainability in the use of Amazonian forests and the development of the rural economy. Through the course of the preliminary research it emerged that many of the arguments, both for and against extractive reserves, were preoccupied with extractivism or extractivist production in and

of itself, with less attention given to the social parameters of extractivism or the overall composition of livelihoods in which extractivism plays a part. Subsequently, this research project focused on a more comprehensive inquiry into the overall composition of forest-based, rural producer livelihoods and aimed at gaining a better understanding of the real role of extractivism in household livelihoods and its relationship to other livelihood activities.

In Acre, where in many regards the rubber tappers movement was born, a great deal of attention has been focused on the implementation and implications of extractive reserves, especially in the wake of the assassinations of prominent rural union leaders Wilson Pinheiro and Chico Mendes in the 1980s. Much of the subsequent discourse in academia and the media has given the mistaken impression that extractive reserves and extractivism were synonymous with rubber tapping and as such were a special case in Amazonia. The relationship of rubber tappers to a wider social complex in Amazonia has been downplayed if not outright discounted.

This study of the livelihood composition of a community of rubber tappers in Acre, seeks to redress the imbalance and therefore, obtains its broader theoretical and historical relevance by re-emphasizing the connection between rubber tappers (or *seringueiros*) and traditional Amazonian peasantries (i.e. *caboclo* society: see Chapter 4).

3.1 Of peasants and peasantries; types and definitions

In the extensive literature on "the peasantry" it is customary to address the problem of defining the terms "peasant" and "peasant economy". The terms themselves are often criticized for being too vague and too limiting to capture the meaning of what they seek to describe (Mintz 1973; Shanin 1971; Wolf 1955). Quite often 'the peasantry' is offered up as a shorthand for what is then defined as complex social formations about which it is difficult to generalize. However, the lively debate has led to the emergence of a "general type" (Shanin 1971) or more accurately "typologies" of peasant societies (Mintz 1973; Wolf 1955) based on a number of recurring characteristics and criteria.

As an object of anthropological investigation, peasants are frequently juxtaposed to the traditional "primitive other" that is usually associated with the indigenous, tribal peoples upon which modern anthropology has evolved (Nugent 1993; Wolf 1966: 2-4 *passim*). Furthermore, peasants are not strictly speaking part of the wider or dominant society. Peasantries instead exist on the fringes of a larger and more complex society, neither as

a fully integrated member of that society nor completely autonomous from it. Their social position is usually subordinate to more powerful, external socio-political forces (Ellis 1988: 6; Mintz 1973: 94; Shanin 1971: 15; Wolf 1966: 4). It is this betwixt and between nature of peasant societies which led to Alfred Kroeber's early definition of peasants as, "part societies with part cultures" (1948: 248 quoted in Forman 1975: 247; Shanin 1971:14). While this may be seen to be going too far – all societies are to a greater or lesser degree part of larger socio-cultural wholes – the relationship of peasant societies to other social formations is seen as a central and determining aspect of their nature (Mintz 1973; Wolf 1955).

On another level, it is a fundamental assumption that all peasants engage in some form of farming and as such have access to land and its resources, whether by ownership or some other form of tenure, as a central factor in their livelihood (Ellis 1988). "Land husbandry" (Shanin 1971: 15) or "agrarian self-sufficiency" (Mintz 1974: 132) thus forms the basis of a peasant's "material-means-provisioning process" (Halperin and Dow 1977). The essential unit of production in the peasant economy is the farm household which runs almost exclusively on family or household labour, generally in the absence of wages (Ellis 1988; Mintz 1974a; Shanin 1971; Chayanov 1966; Wolf 1966). The composition of rubber tappers' livelihoods, it will be seen, are very much based on the household and family labour.

The preceding attributes, namely the asymmetrical relationship with wider society, various forms of access to and use of the land, and the family-household as the primary unit of social reproduction are relatively uncontentious. At this point, however, writers tend to diverge in their arguments as to what are the most salient features of peasant society. For some it is important to stress that peasant society exists as a process, characterized by change and, therefore, dynamic rather than static (Ellis 1988; Halperin and Dow 1977; Shanin 1971). For others, cultural patterns based on tradition and conformity in small communities are important defining characteristics of peasant society (Mintz 1973, 1974; Shanin 1971; Wolf 1955) as are notions of internal differentiation (Ellis 1988; Mintz 1973, 1974; Halperin and Dow 1977: 280) and the "ambiguity of profit" (Ellis 1988: 9).

One of the most difficult aspects of defining peasants is the seemingly endless variety and diversity of actual peasant societies. Shanin (1971: 15-16) attempts to provide a more inclusive definition of peasantries in the global context by allowing for the existence of "analytically marginal groups" which share some but not all of the attributes of "real" peasants. More satisfactory is Mintz's call for:

> Middle-range definitions of peasantries and of peasant societies: definitions that fall somewhere between real peasant societies, 'on the ground,' so to speak, and the widest-ranging definitional statement...to make a step toward bridging the gap between the realities of the daily life of peasant people on the one hand, and the highest level of definitional abstraction on the other (1973: 92).

And furthermore:

> We do not need a definition of the peasantry, so much as a complex typology, in which no rural groups will remain 'analytically marginal,' since the existence of each may be related significantly to the existence of all (1973:98).

To this end Mintz (1973; 1974) and Wolf (1955; 1966) among others have argued for the construction of typologies of "rural socio-economic groupings" (Mintz 1973: 91) based on some of the features discussed above. So as not to be overwhelmed by the heterogeneity of peasant societies worldwide such typologies are constructed around social structures and relationships rather than from the cultural content of specific societies (Wolf 1955). The aim is to understand the relationship between peasants and other sectors of society, in particular the often interdependent and sometimes antagonistic relationship with other rural sub-groups (Mintz 1973: 103). By constructing typologies based on actual peasantries it is possible to take account of internal differentiation and to recognize the dynamic nature of relationships between individual households and sub-groups within and between specific peasant communities.

One of the most important features of contemporary Amazonian society is the variegated nature of non-urban, Amazonian social formations. Three principal categories or groups occupy distinct yet overlapping social places in rural Amazonian society. They represent different historical experiences and have different relationships with wider Brazilian society. The first group includes indigenous tribal peoples, most of whom persist in remnant groups and communities long compromised by European contact and much altered from their original or former society (Davis 1977; Hemming 1987 for general histories). The second group, which essentially rose from the decimation of aboriginal society, has been described as the "indigenous rural population" (Parker 1985: xx), and are known variously as *caboclos, ribeirinhos, barranqueiros, castanheiros* or *seringueiros* (Wagley 1964).[1] The third group is the so

[1] Parker makes this distinction in comparison to "indigenous tribal populations" (i.e.

called neo-Amazonian or "post-*Transamazônica*" peasant (Nugent 1993). These are the modern colonists; landless peasants, principally from the Centre-South, drawn to the Amazon by the lure of available land, encouraged by state sponsored colonization schemes (largely failed) and the *Transamazônica* road building programs (falling into disrepair) of the 1960s, '70s, and '80s.

It seems that while the small body of Amazonian research that concerns itself with *caboclos* sees fit to mention *seringueiros* as a version of *caboclo* society (Nugent 1993; Parker 1985; Moran 1974; Wagley 1964), research concerned specifically with rubber tappers, in particular *Acreano* rubber tappers, tends to consider them in isolation, almost as if they are some sort of aberration within Amazonia. Throughout this work it is argued that the *seringueiro* is most definitely a form of *caboclo* and that rubber tapper society in Acre is the regional manifestation of a more generalized *caboclo* society. In other words, rubber tappers are one formation of Amazonian peasantry, more specifically one of the historical peasantries that collectively fall under the rubric of Amazonian *caboclo* society (Nugent 1993; Parker 1985; Moran 1974; Wagley 1964).[2]

3.2 Rubber tapper livelihoods and peasant household economy

A particular trait shared by rubber tappers and more general types of peasant society is the centrality of the household to understanding the composition of livelihoods. Notwithstanding the important influence of external forces and internal differentiation on the nature of peasant society, the household unit is a logical social unit for analysis. The foundation of contemporary social science's understanding of the structure of the peasant household economy is based on the work of the Russian agricultural economist Alexander Chayanov.

Chayanov was convinced that while the economic structure of peasant society was linked to the wider economy it could not be explained by mainstream economic theory of the day. His goal to understand the motivation of peasants' economic activity and the organization of the *family labour farm*, therefore, required a special theoretical perspective (Thorner 1966: xv). His point of departure was the peasant family, comprised of the various members of the household, "who eat from the same pot" (Chayanov 1966: 54) and who work collectively to meet their own needs. Chayanov

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Amerindians) deliberately using the term indigenous to underscore the fact that *caboclos* are "directly linked historically, culturally, and biologically to the Amerindian populations that occupied lowland Amazonia at the time of European contact..." (Parker 1985: xx). See Chapter 4 for discussion of the emergence of Amazonian *caboclo* society.

2 See Chapter 4 for elaboration on the definition of *caboclo*.

argued that a real labour market did not exist within peasant society and, therefore, there was no such thing as wages in the peasant economy. It followed then that the family labour farm was formed by an indivisible pool of labour, an analytical whole which, in the absence of wages, could not be broken down into comparative labour units. In contrast to capitalist enterprises the peasant household does not, indeed cannot, calculate the difference between gross income and total production costs as an objective measure of the economic well-being of the family. Economic activity is, instead, motivated by the peasants' own subjective assessment of the household's needs and abilities (Chayanov 1966: 6, 42). By and large such subjective evaluations are underlain by family tradition and experience and, "a desire to maintain a constant level of well-being" (Chayanov 1966: 218). They are determined to a large degree by the composition of the family *production-consumption unit* or what Chayanov termed the *consumer-producer ratio*, in other words, the demographic makeup of the household.

At the end of a given year a peasant household is assumed to have some level of gross output from its labour efforts. From this gross household product a certain amount must be spent on maintaining the means of production, for example, in the form of repairs to equipment, replacement of livestock, replenishment of seed and feed supplies and so on. By deducting these essential expenditures from the gross product Chayanov arrived at the household's net income, or what he called the *labour product*; "the only possible category of income for a peasant or artisan labour family unit" (Chayanov 1966: 5). The labour product category of income for peasant households is indivisible and is not equivalent to profit which, it will be recalled, cannot be calculated in the absence of wage labour. It was readily acknowledged that net household production could be highly variable between households depending upon market conditions, location relative to the market and natural resources, the status of the household's means of production, soil conditions and other ecological factors and, most importantly, the size and composition of the family.

According to Chayanov's theory, household demography was characterized by the ratio of consumers to producers, that is, the number of mouths to feed in the household in relation to the number of able-bodied workers. It is the consumer-producer ratio (also called the *labour-consumer balance*) which plays a central role in determining the degree of self-exploitation to which a household must submit itself in order to approach the theoretical ideal of equilibrium between household demand satisfaction and the drudgery of labour (Chayanov 1966). That is, the greater the number of consumers relative to producers in any given household, the greater is the burden of labour on the latter to satisfy household demand. These concepts are at the heart of Chayanov's

theory. In the absence of wages and the ability to calculate profit, the peasant household is compelled to make a subjective assessment of its needs. Through the application of labour which is deemed to have a marginal disutility (i.e. 'the drudgery of labour'), the household strives to meet these needs. The application of labour is intensified up to a point of equilibrium when the drudgery of the work endured is subjectively evaluated to approximate a sufficient satisfaction of household needs and whereby to increase labour effort further would be more onerous than foregoing the additional output (Chayanov 1966: 6).

A unique (at the time) and provocative conclusion drawn by Chayanov was the competitive power of peasant family farms versus large-scale capitalist farms" (i.e. in Russia) (Thorner 1966: xviii). By insisting on the internal consistency of the household labour unit and thereby establishing that the peasant economy is a distinct system, Chayanov not only argued for an independent economic theory to understand peasant farm organization but also that their structure was inherently, "more resistant to the economic problems of agriculture" (Jones 1984: 153). This resilience was primarily due to the peasant's ability to intensify production through increased labour inputs in response to internal demands of the household rather than being constrained, as in the case of capitalist enterprise, by market conditions and the imperative to generate a profit (Chayanov 1966: 8). Expounding on what he considered the "peculiar nature" of the peasant labour unit, Chayanov ultimately asserted that, "peasants are generally more willing and more able to pay more for land, to accept higher rates of interest, pay higher land rent, accept lower prices for their produce, and so on, than comparative capitalist farm enterprises," and as such, "In conditions where capitalist farms would go bankrupt, peasant families could work longer hours, sell at lower prices, obtain no net surplus, and yet manage to carry on with their farming, year after year" (Thorner 1966: xviii; see also Chayanov 1966: 8-10 *passim*; Kerblay 1971: 158).

Echoing Chayanov, other authors have argued that peasant economies have a comparative advantage, under certain circumstances, over capitalist enterprise in facing the difficulties of agriculture (Jones 1984; Kerblay 1971). This has particular relevance in contemporary, developing countries where large portions of the rural population continue to function within a peasant farm economy. In later chapters the discussion will consider the extent to which Amazonian *caboclo* society obtains this resiliency by examining the adaptability of *seringueiro* livelihoods to both the uncertainties of farming and the rigours of the plentiful yet demanding and delicate Amazonian environment. It will be seen that the greatest threat to the sustainability of rubber tapper

lifestyles and the environments upon which they depend emanates primarily from the often coercive influence exerted by outside interests.

3.3 Modern perspectives on peasant society and economy

The contemporary rediscovery of Chayanov's work, at least for Western social science, has had a profound effect on most areas of peasant studies, both in its articulation of a distinct conceptual framework for the investigation of family farm economies and in the subsequent critiques of his thesis. By his own admission, Chayanov's theory was best suited to regions of low population density where the supply of arable land was not a constraining factor in household production (Chayanov 1966: 111 *passim*). Land extensiveness, therefore, is often suggested as a defining characteristic of his theory, although as Dove (1984) correctly points out, in this situation it is the scarcity of labour which ultimately constrains production. For our purposes the availability of land both is and is not a constraining factor on rubber tapper household production. On the one hand the very nature of rubber tapper livelihoods is very land extensive given the distribution of rubber trees and other forest resources. Thus, there is generally plenty of land within a household's rubber tapping area that can be available for farming. On the other hand, because the area of land required to support a rubber tapper household is large, land shortages can apparently emerge at relatively low overall population densities. Nonetheless, for the traditional peasantry, that is the *seringueiros*, of Acre that labour scarcity is probably more of an impediment to household production than limited land resources.

Chayanov was insistent that the peasant farm economy he was addressing was based on family labour alone. He assumed the absence of hired labour and hence of wages in his conceptualization of the peasant household (Chayanov 1966). For some writers this stipulation limits the usefulness of the theory as they correctly point out that hiring help on the peasant farm and/or going off-farm to work for wages are quite often part and parcel of the peasant household's overall livelihood strategy (Cleary 1993; Mintz 1974). The existence of a labour market implies an external opportunity cost against which livelihood decisions can be measured and thereby renders obsolete the subjective evaluation of work (i.e. the degree of 'drudgery') (Ellis 1988: 122) and dispels the notion that peasant economy cannot be explained using the tools of neoclassical economic theory. Ellis in fact goes so far as to say that:

> What is distinctive about peasant forms of production is not a unique economic rationality common to all of them, but rather their partial integration into

> markets, and the degree of imperfection of those markets. What the Chayanov model describes is nothing more nor less than a singular market imperfection: that of no labour market (1988: 137).

When and where peasants engage the market, however, is usually under circumstances far from the theoretical assumptions of perfect competition and free flowing information. As such, the above quotation appears to contradict Ellis's earlier assertions that, "peasants are defined by varying...commitment to the market and...by the incomplete character of the markets in which they participate" (Ellis 1988: 10 and *passim*). If the market for labour is fraught with imperfections then the cost of labour loses its objective nature which returns us to the Chayanovian position, that peasant societies cannot be analyzed by standard economic criteria. Durrenberger (1984: 8) supports this point of view with the claim that paying or being paid for labour does not automatically imply the existence of a bona fide labour market (see also Long 1984). Similarly, Neale (1971: 25-28 *passim*) suggests a dichotomy between commercialization and monetization whereby the former denotes capitalistic exchange mechanisms and the latter merely an exchange of more subjectively defined values, one of which may happen to be money. As is arguably the case within rubber tapper society, "it is possible for a monetized economy not to be commercialized and thus, not properly analyzed by standard economics" (Durrenberger 1984: 9).

Paradoxically, in spite of his criticism of the overuse of theoretical concepts from capitalist economy, Chayanov's theory is itself partly founded on a particular strand of the neoclassical tradition (Calavan 1984). It is implicitly assumed from the outset that the peasant family is "rational" and has access to perfect information that is readily available and complete (Calavan 1984: 51). For Calavan the problem arises from Chayanov's analysis of peasant economic behaviour from the standpoint of known production results rather than the array of possible outcomes and anticipated results upon which their decisions logically must be based. Calavan argues that it is not enough to form a theory in which the concepts of risk and uncertainty are simply, "defined out of existence" (1984: 51). The complex and at times unpredictable nature of the relationship between labour and production is overly simplified and no account is made in the analysis for variance in the output or returns which peasants receive for their labours which thereby limits deeper understanding of peasant farm organization (Calavan 1984).

To deal with this shortcoming of Chayanov's model, Calavan considers the implications of probability on peasant production and the effects of uncertainty and risk on

household decision making (1984: 57). He argues there is a range of possibilities against which households must determine the allocation of their efforts. Calavan cites the attainment of subsistence production levels as the first priority of the peasant household but concurs with the Chayanovian principal that peasants are usually compelled by tradition and cultural norms to produce at a higher level (Chayanov 1966). In the end peasants respond in the way described by Chayanov's consumption-drudgery curves only when household subsistence is more or less assured (Calavan 1984:62). Calavan, therefore, concludes that the variegated nature of peasant economies can be more fully understood by considering the "probabilistic element in peasant choice" (1984: 68), which is rooted in the risks inherent to peasant livelihoods and the uncertainties which underlie their decisions.

Perhaps the most limiting aspects of the household economy thesis are its lack of attention to external socio-political forces and the internal differentiation within peasant households themselves.

To take the first point, according to the model the peasant household is supposed to be self-sufficient, if not entirely autonomous, from the wider economy in its material-means provisioning process. Building on the Chayanovian principal of peasant orientation towards needs satisfaction rather than maximization, Sahlins (1972) refined a theory of *domestic mode of production* comprised of individuated households and distinct from the capitalist mode. The existence of a specific peasant mode of production, however, is refuted by Marxist and neoclassicist writers alike (although from different perspectives), primarily on the grounds that while peasant production may be quite different from capitalist production it does not occur independently from the market (Ellis 1988; McGough 1984; de Janvry 1982; Harris 1981; Patnaik 1979; Mintz 1973). While the peasant household may be isolated socially and/or physically, "it is anything but independent, since it relies for its reproduction on the circuits of commodity exchange" (Harris 1981: 54; see also Patnaik 1979). In other words it is the wider system which determines the outcome of household productive efforts and thereby defines the limits within which individual decisions are made (Ellis 1988: 116).

Taking the influence of the dominant society to the extreme, de Janvry (1982: 102) upholds the classical Marxist position placing peasants within the capitalist political economy as members of a transitory class or fraction of a class, rather than as part of a distinctive domestic or peasant mode of production. However, this position is problematic insofar as it does not explain the persistence of peasant economies throughout much of Asia, Africa, and Latin America.

In the context of the current investigation whether or not a peasant mode of production exists is in many regards a moot point. The strongest points of our understanding come not from the irreconcilable differences between theories and points of view, rather they come from those areas where there is overlap. For this reason, the congruency of Marx and Chayanov on the lack of a true profit category in peasant economies is ultimately more useful than attempting to resolve the debate on what is and is not a mode of production.[3] Similarly, the influence of external factors are not in the form of predetermined, natural conditions. They are social forces which exist in a dynamic tension with the demands and capabilities of peasant households and as such form part of the "objective reality" which governs peasant decision making (de Janvry 1982). They cannot be ignored.

Finally, it is important to remember that the wider system to which peasant society is invariably connected is not limited to the ubiquitous capitalist market associated with the national economy. Localized exchange at the inter-household level is often crucial to the viability of family livelihoods and usually forms the basis for social cohesion within peasantries (Long 1984: 8; Harris 1981).

The standard defense, emanating from Chayanov himself, to the charge that his model ignores the significant influence of external forces, contends that the theory of peasant household economy was intended only to explain the organization of the family labour farm and was, therefore, not explicitly concerned with wider social or economic structures (Chayanov 1966: 43 *passim*). External forces while acknowledged, were taken as given and considered only in terms of their effect on household production (Tannenbaum 1984: 27, 32). In short, Chayanov and his followers argue that their theory is concerned with the process of peasant farm organization which complements, rather than contradicts, the Marxian analysis of political economy (Tannenbaum 1984: 35). Echoing Chayanov, Tannenbaum claims of the criticism that, "the difficulty is not with Marx but with Marxists" (1984: 33). Nonetheless, by focusing perhaps too exclusively on the household the problem remains of conceiving peasant household economy under idealized and therefore, somewhat unrealistic conditions.

Turning to the second point, the above holds true concerning the internal differentiation of peasant households, something which the household economy model glosses over. Again it is implicitly assumed by Chayanov that the peasant household is a production

[3] The lack of a profit category is regarded as, "a fact derived from objective reality" rather than as a "behavioural presupposition" (de Janvry 1982: 104).

team (Shanin 1966, 1971) and, more significantly, that the return on individual labour within the basic household unit cannot be differentiated (Thorner 1966: xiv). Also implicit in the assumptions of both the Marxist and Chayanovian perspectives is the preeminence of a household patriarch with near total control over the allocation of resources and output (Harris 1981: 56). On the one hand this serves to reinforce the notion of a monolithic household in which decision making is centralized and labour is undifferentiated. On the other hand it relegates the existence of actual divisions of labour to that of given biological or natural facts and subsequently conceals the importance of the social division of labour according to gender (Ellis 1988: 167; Mackintosh 1981: 2) and age (Harris 1981: 56).

Such a stance ignores the possibility of change in the role of women by ascribing to their position a biological determinant rather than confronting the social nature of gender differentiation within the household economy. For our purposes the role of women and the labour they are responsible for is important to comprehending the composition of rubber tapper livelihoods. Similarly, the influence of external socio-political and economic forces cannot be assumed into the background to facilitate the explanation of the organization of peasant society as it is manifest in Amazonia. Nonetheless, in many ways the household is the most logical point of departure in the investigation of peasant livelihoods and their economic organization. The important thing to remember is that the composition of rubber tapper livelihoods is a process undergoing constant change. Household economies are diverse and flexible of necessity as they do not confront static or entirely predictable sets of circumstances. Peasant societies exist within different socio-political contexts which themselves are always changing, both internally and in their relationship with rural societies. In short, "each (peasant society) faces a markedly different future" (Mintz 1973: 102).

3.4 Conclusion

The rubber tappers of Acre fall within a general typology of historical or traditional Amazonian peasantries collectively referred to as *caboclo* society. Until recently the examination of *caboclo* society has been a small strand of Amazonian research. In the English literature the most extensive and oft quoted early account was that of Charles Wagley's work "Amazon Town: A Study of Man in the Tropics" (Wagley 1953). In the contemporary era Eugene Parker's edited volume "The Amazon *Caboclo*: Historical and Contemporary Perspectives" (Parker 1985) helped to launch a renewed and expanded interest in *caboclo* research. Part of the impetus for this resurgence stemmed from growing concern over Amazonia deforestation and the fresh dislocation of traditional

Amazonian cultures in the latter half of the twentieth century. It has been recognized, albeit belatedly, that *caboclo* lifeways in many ways exemplified sustainable and relatively stable rural livelihoods based on a diversified resource base and a highly flexible household labour pool (Nugent 1993; Parker 1985). To this end a growing number of scholars are looking at *caboclos* in a similar way to the more traditional anthropological "other", the indigenous or aboriginal Amazonian.

The concept of an Amazonian *caboclo* society is analogous to the idea of a singular peasant society, an over simplification that masks the true diversity of livelihoods, cultural patterns and social structures under which peasants, or in this case *caboclos*, exist. Often the term *caboclo* is loosely used to refer to rural dwellers or "backwoodsmen" of mixed indigenous, European and, in certain instances, African descent. Parker (1989) and Nugent (1993), among others, strongly refute "the casual lumping together of diverse rural populations" as inconsistent with the historical record and at odds with contemporary reality (Parker 1989:251)(Chapter 4).

The *caboclo* livelihood is variegated to say the least. Not surprisingly, specific examples tend to reflect local resource endowments and environmental circumstances. Forest product extraction for domestic or subsistence purposes is almost universal and takes advantage of the cornucopia of forest fruits, fibres, oils, latexes, woods, wildlife and aquatic resources that are locally available. In many instances *caboclos* engage in marketing forest products as well. The quintessential products are rubber and Brazil nuts but the list also includes, for example, *açai* (*Euterpe precatoria*). *Açai* is widely consumed domestically but is also an important commercial product in estuarine regions close to such major markets as Belém, Manaus, and Santarém (Anderson 1990). *Caboclos* may also engage in sustainable commercial fisheries. These are often characterized by the use of small scale, low technology methods that take advantage of numerous species rather than selectively targeting only the most lucrative (Frechione et al 1989). Another, almost universal factor in *caboclo* livelihoods is farming and agriculture featuring manioc, rice and beans and myriad other crops, fruits and vegetables. Denevan (1984) and Eden (1990) among others have described the complex, horizontal differentiation of *caboclo* agriculture in the Amazonian floodplain or *varzea* regions.

Caboclos, however, are more than forest dwelling jack-of-all-trades whose livelihood patterns reflect the ethnoecological underpinnings of indigenous resource use and land management. Similar to peasants outlined in the discussion above, *caboclos* are also articulated in varying degrees with the wider economy. In addition to extractivists and

small scale farmers they may, in certain circumstances, engage as wage labourers on larger farms and ranches, pursue small scale mining as *garimpeiros* or operate at some level other than that of the primary producer in the *aviamento* chain of debt-credit relationships (Cleary 1993; Nugent 1993). *Caboclos* may be highly mobile and spend time in urban as well as rural settings moving "seamlessly between monetised and non- or partly monetised spheres of the regional economy" (Cleary 1993:335).

Seringueiros are peasants in terms of their orientation towards household subsistence production, their subordinate structural relationship with wider society, the agrarian basis of their livelihoods, and the centrality of the family or household as the main unit of social and economic organization (Mintz 1973; Wolf 1955). The importance of forest product extraction, especially that of rubber, is a distinguishing feature that sets rubber tappers apart from the peasants that are the traditional focus of many theorists and for whom agrarian self-sufficiency is paramount. Notwithstanding the fact that rubber and Brazil nuts are almost exclusively produced for the market and, therefore, do not enter significantly into direct household consumption, rubber tappers are still primarily subsistence producers. They are concerned with meeting the subjectively defined consumption needs of the household. To paraphrase Wolf (1955: 454), peasants, including rubber tappers and other *caboclo* formations, run households not business enterprises. Rubber and other forest products are not sold for the purposes of reinvestment and the pursuit of profit, they are used as currency to obtain those necessities that cannot be produced on the farm or from the forest. Forest product extraction is, therefore, a typological feature that distinguishes, but does not separate, rubber tappers from more generalized or theoretical conceptions of peasant or *caboclo* society.

A central and recurring theme in the discussions to follow pertains to the overall viability of forest based livelihoods in the context of modern socio-economic pressures and the need for sustainable uses of land and resources in Amazonia. The ecological soundness of extractivist-agricultural livelihoods rests on the extraction of resources that is generally achieved without widespread destruction of forest vegetation and the practice of shifting cultivation on a scale that is within the bounds of environmental carrying capacity. The conservationist nature of rubber tapper and other *caboclo* livelihoods is fundamental to their importance as examples of sustainable socio-economic sub-systems. Sustainability, however, is contingent upon these livelihoods being both socially and economically viable in addition to being ecologically benign. It will be argued that such viability exists, based upon the diversity of activities that comprise forest based livelihoods and their adaptability over time to changing and at

times hostile circumstances. Notwithstanding the shortcomings of extractivism as a land use method or development option, the theoretical premise is firstly, that forest product extraction and small scale agriculture, as practiced by many traditional Amazonian peasantries and indigenous people, is significantly oriented toward conservation of the natural environment. Many of these societies pursue lifestyles that are in harmony with both local and global objectives of conservation and sustainability in rural development. Secondly, due to the diversity of livelihood pursuits and the flexibility of livelihood composition, these groups have managed to persist over a substantial period of time. It may be argued that *seringueiro* life is not guaranteed an indefinite existence but it has shown historical persistence under unfavourable conditions.

In the following chapter the discussion will explore the historical formation of Amazonian peasantries and peasant economies as they are manifest in numerous examples of *caboclo* society, including *seringueiros* in Acre. The discussion will focus in particular on the historical resiliency of *caboclo* society that belies contemporary predictions of their imminent demise.

Chapter 4

Amazonia: From Pre-contact to Post-Rubber Boom

4.0 Introduction: pre-contact societies in Amazonia

This chapter explores some of the significant features of Amazonian history which have shaped the formation of rural Amazonian societies. It will look at the processes under which uniquely Amazonian social structures and productive systems have emerged and consider the main political and economic forces by which they have been shaped. We will consider the vitality of traditional Amazonian peasant livelihoods, the importance of extractivism, and how certain rural groupings have managed to persist and adapt through a wide range of social and environmental conditions over an extended period of time. Chapter 5 will focus on recent historical events and the nature of present day Amazonian peasantries, paying particular attention to the case of rubber tappers in Acre.

4.1 Pre-contact societies in Amazonia

Until quite recently our understanding of Amazonian societies prior to the arrival of Europeans in the sixteenth century has been restricted by technical limitations on tropical archaeology and paleo-anthropology and by a written historical record that does not start until the time of European contact (Nugent 1993; Posey and Balée 1989; Roosevelt 1989). As a result, up to the middle of this century Amazonian ethnology relied heavily on the contemporary ethnographic record to explain pre-contact social organization (Roosevelt 1989). The problem, modern authors argue, is that pre-contact, indigenous social formations were assumed to have been largely similar to the small, scattered groups of indigenous peoples that have survived into the modern period (Nugent 1993). The effect of the Europeans' arrival and eventual dominance of the basin was so rapid and far reaching that it was difficult to notice how drastically the structure and nature of aboriginal societies had been altered.

Modern theories on the nature of pre-contact society refute this traditional picture of Amazonia as a sparsely populated, simple and undifferentiated social back-water. Historical records which have recently become available in the form of travelogues and diaries of early European explorers describe large, well established settlements along the main tributaries. These are characterized by high population densities, intensive resource use, and complex socio-political organization (Balée 1989; Roosevelt 1989). Furthermore, modern archaeological techniques have permitted more detailed study of anthropogenic soils, shell mounds, and carbonized artisanal and skeletal remains which similarly suggest larger pre-contact populations and more complex social systems that evolved over long periods of time (Roosevelt 1989).

The archeological record suggests that the transformation of Amazonian social structures in the pre-contact period was driven largely by demographic forces and the changing nature of a growing population's relationship with the Amazonian environment (Roosevelt 1989). This trend was generally characterized by a gradual transition, in some parts of the basin, from early, simpler, small scale social formations consisting of highly mobile, hunter-gatherer communities to much larger sedentary and more complex societies with highly developed productive and distributive systems (Roosevelt 1989).

There are two primary implications of a longer and more complex pre-contact social history in Amazonia. The first is that it challenges the notion of a pristine Amazonia, a virgin rainforest that was unaffected by human activity until European arrival (Nugent 1993; Roosevelt 1989; Balée 1989). Secondly, it raises the possibility that Amazonia can support large, complex social systems, apparently without sustaining extreme or permanent ecological damage. In riverine and floodplain areas (*varzea*) this seems to most certainly have been the case, while there is only limited direct evidence of settlements in *terre firme* areas on the same scale as in the *varzea*. Nevertheless, it is important to remember that this ecological distinction does not limit the social use of forest resources and land. *Varzea* based communities certainly made use of *terre firme* areas and resources. From contemporary evidence it can also be said that the reverse is true. Roosevelt identifies at least five stages of prehistoric resource management, "a substantialoccupation of great time depth and intensity, during which subsistence, population, and social organization changed greatly" (1998:39). For Roosevelt the distinction between *varzea* and *terre firme* areas from a socio-ecological perspective is not fundamentally relevant.

As we go on in later chapters to look at the composition of modern rubber tapper livelihoods in Acre it is important to remember that despite the problems faced by contemporary Amazonia peasantries, certain aspects of their livelihoods have already withstood the test of time.

Contemporary revisions of Amazonian history also emphasize the importance of so-called pre-contact contact. Many indigenous tribes in Amazonia began to feel the effects of the Europeans' arrival in the basin well before actual face to face contact occurred. Indigenous trading networks facilitated the penetration of foreign goods in advance of the Europeans themselves soon after their arrival in coastal areas of Brazil and along the lower reaches of the Rio Amazonas. The arrival of metal implements, for instance, clearly transformed the daily lives of people living in the forest. A much more

profound and tragic effect of pre-contact contact in Amazonia was the introduction and transmission of foreign diseases such as smallpox, influenza, measles, and malaria. With no natural immunities to these diseases indigenous people were extremely vulnerable; in some cases entire communities succumbed to epidemics before ever coming into contact with Europeans themselves (Posey and Balée 1989; Hemming 1978; Davis 1977).

In a very short space of time the repercussions of European contact took effect, fragmenting large riverine communities, disrupting inter- and intra-tribal relationships and, over the course of the colonial period, bringing indigenous Amazonian society to the brink of extinction (See for example: Nugent 1993; Posey and Balée 1989; Hemming 1978; Davis 1977). Modern indigenous Amazonians are only a remnant of their former status, the result of several centuries of cultural devolution and disintegration such as has occurred within numerous aboriginal societies throughout the world (Nugent 1993; Bailey 1989).

4.2 The effect and aftermath of European contact

The arrival of Europeans transformed the socio-political and economic landscape of Amazonia. Early explorations into the basin had revealed a wealth of forest products which, in the eyes of the colonizers, possessed alluring commercial potential. These products came to be known as the *drogas dos sertões* (drugs of the backlands) and their harvest from the forest and sale in the markets of Europe soon formed the basis of the early Amazonian economy (Hemming 1978; Tambs 1966). However, taking full advantage of the Amazon's natural wealth required permanent settlement of the region. Early colonial governments sought to achieve this through an economy built on the profitable exploitation of natural resources and the development of a surplus producing agriculture sector. Ultimately, the successful deployment of either of these strategies was underpinned by a dependence on indigenous labour and knowledge (Hemming 1988: 3).

Ever since Portugal had first opted to establish a permanent presence in the Amazon different interests had been given a mandate to spearhead the colonization process (Hemming 1988: 3). The objectives were to eliminate the threat of violent confrontations with tribal groups, to subjugate and control Amerindians so that they could be drawn upon as a cheap and readily available labour force. Both colonists and colonial officials were highly dependent on indigenous ethnoecological knowledge and labour to propel river craft and to act as guides for the exploitation of the coveted *drogas dos sertões*. Early colonial society in the Amazon was also dependent on native

labour to work the farms of both the church and colonists. Jesuit missionaries were the most influential group in Amazonian politics and economy up to the middle of the eighteenth century. After their expulsion from Amazonia by the Portuguese crown in 1759, they were replaced by a system of colonial managers known as the *Diretorios*. This attempt at secular control of Amazonian labour and resources faired little better than its religious predecessor. Plagued by corruption and ineffectiveness, the Directorate's only real legacy was to presage future attempts by outsiders to subjugate Amazonian people and control the exploitation of its resources (Lang 1979: 162; Hemming 1978).

Throughout Amazonia's early colonial history attempts at coercion, bribery, religious indoctrination and violence succeeded in bringing only a fraction of indigenous society into the fold of the colonial economy. The demands made on the Amerindian population by colonists and Jesuits for farming, river transportation and in the extraction of forest products, however, took a heavy toll on indigenous societies that compounded the effects of disease noted above (Hemming 1978: 5; Davis 1977; Furtado 1963: 141). In addition to perennial problems related to the scarcity of labour, farming in Amazonia was hampered by difficulties in trying to reproduce inappropriate temperate cropping systems in the unfamiliar and unforgiving tropical environment.

Possibly the most lasting legacy of the early colonial period was the emergence of the peculiarly Amazonian trading system known as the *aviamento*. Based almost entirely on river transportation, this system involved chains of credit and debt that linked individual producers living in the forest to a network of rubber estate owners and river traders that eventually led to the large merchant houses of Belém and Manaus and the international market itself (Bakx 1986; Weinstein 1983; Collier 1968). Traders would exchange essential supplies from the cities and towns for a variety of plant and animal products taken from the forest. In general, each player would be in debt to the next person down the chain; inevitably the primary producer – the rubber tapper – would receive the least for his produce and pay the most for his supplies (Tocantins 1958; Reis 1953). In many ways the *aviamento* system was the most viable way in which the European, and later the Brazilian, economies could overcome large distances and poor communications to exploit the resources of Amazonia (Parker 1985). *Aviamento* enabled the penetration of European social structures and institutions and, until comparatively recently, the system had a stake in virtually all aspects of trade and commerce in the basin. Ultimately, the *aviamento* system defined the early Amazonian economy and, in many parts of the basin continues, in various forms, to oil the wheels of trade.

European incursions in Amazonia vanquished indigenous society in a remarkably short period of time. In the wake of contact, new socio-cultural elements emerged through the fusion of Amerindian, European and, to a slightly lesser degree, African cultural patterns (Nugent 1993; Parker 1985; Wagley 1964). The resultant partly new, partly reconstituted peasantry which emerged, altered the social landscape and became the main component of Amazonian rural societies (Mintz 1974; also see Chapter 3).

4.3 The emergence of Amazonian *caboclo* society

The early European experience in Amazonia, as discussed above, was defined primarily by the pursuit and trade of forest products. Attempts to create a surplus producing, agricultural sector were curtailed by environmental limitations imposed on temperate climate farming practices on the one hand, and the socio-economic restrictions of persistently scarce labour on the other.

Out of the melee of socio-cultural forces at play in the Amazon during the 18th and 19th centuries a new rural social formation emerged. Concentrated along the banks of Amazonian rivers and tributaries, *caboclo* society developed through the fusion of disenfranchised indigenous populations, the poorer sectors of European colonizers and, to a lesser extent, former slaves from Africa (Parker 1985, 1989).[1] The emergence of this nascent Amazonian peasantry took place in a new socio-economic order, one dominated by clientelistic power relations enforced through the *aviamento* system and the will of land owning élites. Nevertheless, indigenous cultural features, ethnoecological knowledge, and livelihood practices played a prominent role in the composition and function of *caboclo* livelihoods. The harvest of various forest products and Amerindian agricultural techniques, especially the dependence on manioc cultivation, have persisted as central features of *caboclo* livelihoods to the present day (Nugent 1993; Miller 1985: 171).

The disintegration and deculturation of indigenous tribes occurred haphazardly and at different rates around the basin. The spread of European influence was likewise uneven and so it seems likely that *caboclo* society emerged in fits and starts. In general, however, the rise of *caboclo* society in Amazonia is considered to have paralleled the demise of Amerindian cultures.

The end of the Directorate system was a watershed in the detribalization of the indigenous society. Tribal relations and communal systems which characterize

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[1] Nugent (1993) prefers "fission" as a metaphor for that part of the *caboclos*' socio-cultural roots that are drawn from Amerindian society.

indigenous society had been shattered (Parker 1989). In the early 1800s, the Amazonian economy was in a low period and it was therefore possible for the indigenous survivors of the Directorate and their often mixed-breed descendants to flee the oppression of missions and commercial centres (Ross 1978). They sought to re-form their livelihoods independently, in small groups and hamlets along more remote water courses. These were the first *caboclos* (Parker 1989). While much of their indigenous cultural roots, in the form of complex ritual and spiritual traditions and community organization and leadership, had been lost, their ethnoecological knowledge had not (Parker 1989). Early *caboclos* were able to survive in the forest relying on indigenous farming techniques and their wealth of knowledge of the forest resources at their disposal and how best to exploit them. However, their relationship with wider colonial society was not, and in fact could not be, completely severed. Even with the demise of the Directorate system, commerce and trade in forest products was still an important part of the regional economy and a central component of *caboclo* livelihoods.

Often all that remained of Jesuit or Directorate villages were small hamlets whose focal point was the trading post. The lower echelons of European society, colonists and itinerant traders, who were often little better off than the *caboclos* themselves, took over many of these trading posts and thus provided a tenuous link with the outside world (Parker 1989, Ross 1978). Despite their Amerindian heritage the Amazonian *caboclo* was dependent on a number of features of European society particularly for certain manufactured goods and implements (Ross 1978). According to Parker (1989: 255), "The village *qua* trading post served as a key reference point for emergent *caboclo* society in terms of trade, communication and information exchange, and social intercourse."

Early *caboclo* society is aptly termed the indigenous *rural* population of Amazonia in order to distinguish it from the indigenous *tribal* societies of its Amerindian cultural antecedents (Parker 1989, 1985: xx) and from the much more recent peasantries comprised of post-World War Two migrants to Amazonia (Nugent 1993; Parker 1985; Ross 1978). Since about 1800, *caboclos* have been the most important cultural element in rural Amazonia. The continued importance of extractivist production to the regional economy gave *caboclos* access to manufactured items through trade while other parts of their livelihood repertoire ensured their subsistence and a modicum of independence from external forces (Parker 1989). *Caboclo* livelihoods are highly diverse and specific examples are, to a large extent, determined by local environmental conditions, but in general they are based on a mix of small-scale agriculture and forest product extraction (Chapter 3).

A defining period in the emergence of *caboclo* society in Amazonia was the *Cabanagem* revolt. In the early 1800s the lower classes of Amazonian society, made up of a large mestizo population, semi-acculturated Amerindians and African slaves were embroiled in a corrupt and violent socio-economic system that, according to some authors, bordered on anarchy (Hemming 1987: 227, Anderson 1985). The socio-political groundwork of the *Cabanagem* uprising was laid amid the struggles for power which followed Brazilian independence in 1822 (Anderson 1985). The initial antagonists included the colonial elite which remained predominantly loyal to the Portuguese crown on the one side, versus a Brazilian-born, entrepreneurial elite with strong nationalist leanings on the other. The long prelude to the violent conflagration called the *Cabanagem* lasted from approximately the time of independence until the beginning of 1835. During this period violent interludes were indicative of rising tensions that were not limited to squabbling among ruling classes but reflected a growing dissatisfaction with the status quo among the lower echelons of Amazonian society. The flash point of the rebellion took place in Belém in January 1835, but the violence soon spread into the countryside and other cities upstream, finally encompassing most of the basin. The revolt was fueled by the long-standing inequities of the Amazonian economy and soon pitted *caboclos* and their socio-cultural cousins against traditional regional elites and those who represented the colonial past (Hecht and Cockburn 1989; Anderson 1985). Ultimately the "rebels", that loose alliance of rural and urban underclass, gained little in the way of permanent economic or political power, however, the *Cabanagem* did destabilize traditional structures of economic and political power. Labour relations were similarly transformed as *caboclos* and Amerindians, former slaves and the urban poor could no longer be controlled by old methods of direct coercion and conscription (Hecht and Cockburn 1989, Hemming 1987).

Amazonian *caboclos* were deeply embroiled in the uprising (Anderson 1985). After the suppression of the *Cabanagem* in 1839 they grasped at their hard-won, but incomplete, autonomy to choose and pursue a livelihood. Traditional elites, *patrões* and river traders continued to dominate the regional economy and to control trade through relations of debt-credit and, where necessary, through violence and force, although this was now tempered by the fear that violent uprising could recur. The birth of the rubber economy with the vulcanization of rubber and the invention of the pneumatic tire in the mid-nineteenth century took *caboclo* society in a new direction. In the beginning, indigenous groups and early *caboclos* formed the majority of the rubber tapping work force. But as the price of rubber increased, the more or less stagnant production of the existing population compelled the large commercial interests and middle-men controlling the trade to seek alternative ways of increasing rubber output and profit.

4.4 The Amazonian Rubber Boom

When the *Cabanagem* finally subsided at the end of 1839 some 20,000 to 30,000 people were dead from the violence and the effects of disease associated with the upheaval (Hecht and Cockburn 1989; Hemming 1987; Anderson 1985). A fifth of the population base had been lost, the economy was in dire straits and it was clear that the central government needed to reformulate its policies towards Amazonia. The emergence of rubber as a commodity of global importance provided a convenient solution to the problems of the region and was to dominate the economic and political landscape of the Amazon for the rest of the century.

By 1860 Amazonian rubber production had increased almost a hundred fold from its level in the 1820s (Weinstein 1983: 9). In response to steeply increasing demand on the international market, concerted efforts were made to increase the supply of labour to tap the precious latex. Migration was heavily promoted and subsequently the Amazonian population increased dramatically, more than doubling between 1840 and 1860 (Weinstein 1983: 26). Migration reached a high point in 1877 during one of the worst droughts of the century in the Brazilian North-East, where most of the rubber tapper recruits originated. Exploitation and violence came to characterize the Rubber Boom as the high price of rubber drove the rubber barons and traders to seek higher production through whatever coercive means necessary (Allegretti 1989; Bakx 1986; Weinstein 1983).

It was, however, the new, migrant *seringueiros* who bore the brunt of the peonage often associated with the Rubber Boom. *Caboclo* groups for their part were often able to avoid excessive debt and the pressure to focus all of their labour efforts on rubber production (Weinstein 1985). There is disagreement over the significance of the cultural gulf that *nordestinos* were forced to bridge in making the transition from the *sertões* of the northeast to the humid, tropical environment of the Amazon. Miller (1985: 179) contends *nordestinos* were faced with an alien natural and social environment and were thus more dependent upon and susceptible to exploitation by those above them in the hierarchy of the *aviamento*. Most importantly they lacked the cultural and economic heritage of the *caboclos* which allowed the latter to be relatively self-sufficient and less dependent on the vagaries and exploitation of the rubber trade. Weinstein (1985: 98) on the other hand argues that the *nordestino* was not all that removed from the Amazonian *caboclo*, particularly in terms of their relative socio-economic status. "The nordestino migrant...had a great deal in common with the Amazonian caboclo, both in terms of his position within existing relations of production, and his attitude toward work and production of a surplus" (Weinstein;

1985: 98). Miller's point is probably true of some early Rubber Boom migrants, but ultimately there would have been considerable pressure and incentive to learn and adapt to the proven livelihoods of Amazonian *caboclos*. In effect the Rubber Boom facilitated the expansion and further diversification of Amazonian *caboclo* society as newcomers gravitated to *caboclo* lifestyles and livelihoods, a process which "led to the abandonment of non-Amazonian ways within one generation" (Moran 1974: 137).

The Boom took hold initially in the lower and mid-Amazon, quite naturally because of the proximity of transportation networks and the commercial centres of Manaus and Belém. It was, therefore, not until around 1880 that *seringueiros* started to arrive in the remote watersheds of the Rios Purus and Jurua in the region of the future state of Acre (Rancy 1986; Tocantins 1958; Reis 1953). They were driven by the inflated price of rubber which was buoyed by an accelerating demand seemingly without end, and the exhaustion of key rubber tapping areas in the states of Pará and Amazonas. Acre soon gained a reputation for possessing an abundant resource of trees that yielded a particularly fine grade of latex – so-called *Acre fino* – which produced a high quality rubber and commanded a good price (Rancy 1986; Tocantins 1958; Reis 1953).

4.5 Conclusion

The story of Acre gained notoriety at the turn of the century when the region became embroiled in a protracted struggle over control and jurisdictional rights to the territory and its rich rubber resources. This remote corner of Amazonia suddenly acquired heightened geopolitical and economic importance in Bolivia, Peru and Brazil. After a brief war and an equally brief spell as an independent state, ownership of Acre was finally settled by the Treaty of Petropolis signed between Bolivia and Brazil in 1903 (Dean 1986; Rancy 1986; Weinstein 1983).

In the interim, *Hevea* trees in Southeast Asia were coming to maturity and producing economically important quantities of rubber (Collier 1968). These trees were descended from the survivors of 70,000 seeds that had been clandestinely removed from the Amazon in 1876. Certain diseases endemic to Amazonia, especially the devastating South American Leaf Blight (*Microcylus ulei*), are the most significant environmental factors that have historically, contributed to the failure of rubber tree plantations in the basin (Millikan 1989; Dean 1986). In Southeast Asia, however, *Hevea brasiliensis* thrived, most notably in Malaysia but also in Indonesia. With evenly spaced trees only a few metres rather than tens or hundreds of metres between them and a labour force much easier to control, the costs of production were radically transformed. Subsequently the price of rubber plummeted from $6.00 to $1.00 per kilogram between

1910 and 1919 (Barham and Coomes 1994) while the value of total rubber exports from Amazonia dropped 90% over the same period (Weinstein 1983). In a few short years the Amazonian rubber economy imploded, causing an economic crash on a scale beyond anything the traditionally boom-and-bust economy had ever experienced (Dean 1986; Weinstein 1983; Collier 1968). The international importance of Amazonia as a source of rubber was greatly diminished and yet production and trade in rubber and the social relations responsible for it continued (Barham and Coomes 1994). The legacies of the Rubber Boom; tenure based on the rubber estate or *seringal*, the network of trading relations know as *aviamento*, rural and urban settlement patterns, and the modern role of the state in Amazonia have persisted as major features of the human geography of the basin and have played a major role in the evolution of development throughout this century.

Chapter 5

Amazonia in the Twentieth Century

5.0 Amazonia in the twentieth century

The twentieth century has witnessed some of the deepest transformations in the human and physical landscapes of Amazonia since the arrival of Europeans five centuries ago. Despite the repercussions of the sudden end of the Rubber Boom, Amazonian society did not entirely stagnate nor did the economy come to a complete standstill (Barham and Coomes 1994; Weinstein 1983; Cardoso and Müller 1978). The population declined and many businesses went bankrupt, but it was the land owning elite and urban sectors who were hit the hardest. Many of the region's elite, who had made fortunes during the boom, were ruined and forced to leave the Amazon while others retrenched and tried to continue to make a living from their rubber areas, albeit on a much less opulent scale. For the Amazonian peasantries – traditional *caboclos* and the newer *seringueiro* classes – it was a period of relative calm (Parker 1985). Traditionally situated at the bottom of the rubber economy, the primary producers had less to lose from the crash. While many of the newer *seringueiros* returned to their native states in the northeast, many also remained and solidified their ties with *caboclo* society (Nugent 1993). Patron-client relationships persisted, as did the general features of the *aviamento* system. However, as they had in previous "bust" times, *caboclos* shifted a greater portion of their livelihood efforts to subsistence production and so lessened their dependence on poor markets and financially weakened *patrões* (Miller 1985; Schmink 1985; Moran 1974: 144).

While the Boom brought many changes to the social, political, and economic spheres of life in the Amazon, the traditional class structure and the hierarchy of social relations in the region were not fundamentally transformed (Weinstein 1983: 263). The regional elites, land owners and wealthy merchants who controlled access to Amazonia's natural riches for a time retained much of their traditional power following the collapse of the Boom (Foresta 1991: 57; Weinstein 1983). The national government began to challenge the old order with the rise to power of Getulio Vargas in the 1930s. Vargas presided over the articulation of a new "ideology of development" the goal of which was to transform Brazil into a modern industrial economy (Bourne 1974; Skidmore 1967). In the Amazon, territorial sovereignty was linked to a strong economy that was to be driven by the exploitation of its natural resources which would also help fuel the country's economic growth (Bourne 1974: 207).

Until World War II the work force that supported the extractive economy of Amazonia – that is the many forms of *caboclo* society – remained invisible, if not irrelevant to the national agenda (Nugent 1993). Amazonia was seen primarily as a trove of natural resource wealth and a receptacle for the disenfranchised poor from elsewhere in Brazil. During World War Two the threat and then the reality of Japanese control over the rubber plantations of Southeast Asia effectively cut off the Allied nation's supplies of a key strategic raw material. Suddenly, Amazonian latex was once again of vital interest to western industrial society and an initiative was launched to rekindle large scale production of natural rubber from Amazonia. With large infusions of primarily US. capital a plan was implemented to rekindle the Amazon rubber economy. Potential recruits were once again encouraged to migrate from the drought stricken Northeast. For a brief time during the so-called "Batalha da Borracha" the price of rubber increased. Incidentally *caboclos* living in *Hevea* areas were put under pressure by their *patrões* to leave their subsistence activities aside and increase rubber production. The primary push, however, was to encourage in-migration in the hope that this would simultaneously help to open up the region to civilization and development at the same time that it increased the labour supply, although in the end only a fraction of the numbers originally envisioned for the "rubber army" actually made it to the Amazon to tap rubber (Bourne 1974:108; Hecht and Cockburn 1989: 102; Dean 1986; Parker 1985).

With the end of the war the price of rubber once again subsided and many of the new tappers returned to their home states in the Northeast or joined the ranks of the urban poor in Amazonia's larger towns and cities (Parker 1989: 256). A number of the new *seringueiros* remained and continued to cut rubber, trading it to their respective *patrões* and gradually being absorbed into the melee of Amazonian *caboclo* society. With smaller profits at stake *patrões* became less concerned with maximizing production from their rubber tapping areas. Following a by now familiar pattern, most new *seringueiros* adopted the more diversified and resilient livelihood patterns of the *caboclo* based on a combination of subsistence and commodity production. In general, however, the traditional sectors of the Amazonian peasantries continued to be required to trade exclusively with their *patrões*, often under a yoke of persistent debt (Moran 1974).

Immediately after the war a five-year planning policy was implemented with the objective of encouraging economic development in the "underdeveloped" regions of the country through tax breaks and other investment incentives. This particular plan was short-lived, but the overall objectives of planned, rational, economic development and a

tendency to favour larger business and land owning interests have remained central tenets of development policy in the Amazon (Goodman and Hall; 1990). On the national stage industrial development efforts remained focused on the politically and economically dominant Centre-South. Despite the rhetoric of integration and a desire to reap some of the natural wealth of the Amazon for the national purse, Amazonia's extraction based, pre-capitalist economy remained situated, as it had even through the height of the Rubber Boom, on the periphery of national economic considerations (Weinstein 1983: 231). The position of Amazonia's traditional elites, therefore, remained essentially unchallenged by the central government (Foresta 1991; Weinstein 1983).

The coup of 1964 is widely considered a watershed year in contemporary Brazilian history, particularly in the development of the Amazon basin. Profound changes came with the assumption of power by the armed forces as the developmentalist ideology initiated under Vargas was taken up with new vigour. There was a resurgence of geopolitical dogma and a renewed emphasis on economic modernization and integration of the national economy (Hecht and Cockburn 1989). Once the military had solidified its control of government the balance of power shifted almost immediately between the central government and the old guard of traditional regional elites. Through tax reform the central government usurped much of the states' direct political power and thereby claimed much greater influence over state budgets and capital investment (Foresta 1991: 57; Cardoso and Müller 1978; Dean 1986; Flynn 1978).

Throughout the 1960s and 70s, the military government revamped its policies for the Amazon through the implementation of a series of development programs and an array of government agencies. Under various guises the government sought to promote growth and development in the Amazon through supposedly rational, carefully planned colonization schemes; large capital-intensive development projects; export led growth based on the exploitation of natural resources, notably timber and minerals; and large scale agribusiness focused primarily on raising cattle (Neto 1990: 130; Hecht and Cockburn 1989: 134). The military's policy tools and programs underwent numerous transformations over the course of their two decades in power, but they were consistently underpinned by the armed forces predisposition for geopolitical thinking and their obsession with national security (Hecht and Cockburn 1989: 128).

The most far reaching of the military's programs in Amazonia was the construction of a series of highways that eventually criss-crossed vast sections of the basin. The highways were built to assist the development and integration of Amazonia with the rest

of Brazil by providing essential transportation infrastructure and by attracting more people to Amazonia's remote frontier regions (Moran 1990: 70; Oliveira Filho 1989: 156). They were also built to serve the generals' geopolitical objectives of connecting important urban centres within Amazonia to centres of power in the south (Hecht and Cockburn 1989: 120-21; Goodman and Hall 1990: 4-5). Furthermore, Amazonia had long been seen as a potential outlet for large numbers of landless poor who were being squeezed out by the rapid industrialization taking place in Brazil's central heartland and drought in the poor northeastern states. The penetration of roadways into the basin became a "pull" factor that worked in conjunction with the "push" of socio-economic changes taking place elsewhere in the country. According to Goodman and Hall the building of the *Trans-Amazonica* and its tributary highways initiated unprecedented migration to the frontiers and helped to realize the long held perception of Amazonia as a safety-valve for population pressures elsewhere in Brazil (1990: 8).

The highways brought *caboclo* society into prolonged and direct contact with forces of wider society for the first time and precipitated significant transformations of Amazonia's traditional social structures. The much improved transportation the highways provided proved to be a powerful incentive for potential migrants and colonists. For the most part the roads were built along higher ground away from the river margins where they exert a force that in many cases draws economic activity away from riverine communities.[1] Conversely, established communities that suddenly found themselves connected to the outside world by new roads were often overrun by massive influxes of migrants. The resulting struggles for land between newcomer and longtime inhabitants often turned violent and in certain regions became a familiar feature of the Amazonian frontier (Schmink and Wood 1992; Lisansky 1990).

By and large the military regime's strategy in Amazonia did not manage to achieve its grand objectives. Its policies and programmes failed to establish a process of rational and systematic colonization built on a thriving agricultural sector, nor did they achieve the widespread, modernizing, economic development anticipated from the "trickle down" effect of large scale resource exploitation. The highways that were put in place during the 1960s and 70s changed the physical and social landscape of Amazonia. Any economic improvement that could be claimed by the military's program in Amazonia ultimately was overshadowed by the social problems and environmental degradation that beset the region (Moran 1981).

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[1] When roadways are passable they provide an immeasurably faster form of transportation than the traditional water routes. In many parts of Amazonia, such as the state of Acre, the highway season lasts all of two months. For the rest of the year they are impassable rivers of mud that barely accommodate foot traffic (field interviews).

Legal ownership of land in Amazonia has long been immensely difficult to ascertain due to a history of corrupt and ineffective land titling. One method of gaining legal title, however, has been to deforest a portion of the holding to demonstrate "productive" use of the land. The military's consistent support of large scale rural enterprise, cattle ranching in particular, encouraged the conversion of large tracts of forest into pasture. Indigenous lands were also routinely invaded for any number of reasons ranging from mining and hydroelectric development, to large-scale ranching and unsustainable levels of shifting cultivation (Davis 1977).

Meanwhile, agencies charged with overseeing the distribution of land remained largely ineffectual (Almeida 1990: 230). Most of the military's policies tended to increase the concentration of land ownership in the hands of a minority, rather than confront the thorny issue of agrarian reform. Rural violence and conflict over access to land resources reached dramatic proportions in the 1980s as wave after wave of dispossessed peasants flooded the Amazon from the Northeast and Centre-South. Despite the inability of existing programs to resettle the migrants, government policy continued to pursue the line that the Amazon could provide an outlet for the pressure of increasing population occurring elsewhere in Brazil. At the same time large, capital intensive projects were being implemented. Dams, roadways, and mines provided attractive employment opportunities for migrants, but once on line required far fewer workers to keep them going (Goodman and Hall 1990). Laid-off workers would then be left to their own devices, to compete for land and swell the ranks of the Amazon's burgeoning population of urban poor.

The environmental impact of the highways spread well beyond the 50-metre swath cut through the forest to accommodate the construction of roads. In many areas clusters of spontaneous colonization would follow the advancing front of the road, creating a herring bone pattern of deforestation around the spine of the highway (Millikan 1989). Due to their sheer numbers the new colonists came to form the third major sector of rural Amazonian society: the so called neo-Amazonian or post-*Transamazônica*

peasantry (Nugent 1993). In light of the widespread failure of these new, neo-Amazonians to stay on the land and implant a permanent agricultural economy it became convenient in certain quarters to blame them for their economic failure and to paint them as the primary perpetrators of deforestation and environmental degradation as they became entangled in a cycle of shifting cultivation and squatting (Bakx 1990: 49-51). Subsequent analysis, however, has revealed more telling reasons than the assumed shortcomings of the colonists themselves. Failure among small farmers has

been attributed to the vagaries of the Amazonian environment coupled with poor planning and assessment of the physical constraints on farming, especially the general weakness of Amazonian soils (Goodman and Hall 1990: 8; Furley 1990; Bunker 1985: 104). Institutional inefficiency and excessive bureaucracy denied the colonists essential support in terms of credit, the prompt granting of title, and the provision of infrastructure, and exacerbated the difficulties they faced (Moran 1990; Hecht and Cockburn 1989; Fearnside 1986; Bunker 1985). Finally, as recent research has exposed the logic and resilience of *caboclo* livelihood patterns, the lack of similar knowledge and tradition within the neo-Amazonian peasantry has been identified as a significant hurdle to the success of recent migrants attempting to settle along Amazonian frontiers.

It is misleading to over generalize about the changes that took place in Amazonia both during and after the reign of the armed forces. Many parts of the basin were affected by a complex mix of forces and circumstances that were seldom identical to those taking place in other regions or at other times (Cleary 1993). For instance, in Rondônia, deforestation in the 1980s was quite clearly linked to the influx of thousands of colonists (Moran 1993) while in Acre the loss of forest cover was more directly attributable to the expansion of large ranching interests (Schwartzman 1992). The frontier is not a single advancing front of development. Rather, it is formed by a complex of areas only loosely connected in space, some of which may be contracting while others expand. Nonetheless, certain patterns underlie the transformations and struggles that have taken place in Amazonia since 1964. These have included large increases in regional populations, often characterized by mounting violence in the countryside and high levels of rural-urban and rural-rural migration (Moran 1993). In addition, many parts of Amazonia have been affected by historically unsurpassed rates of deforestation, particularly in areas associated with the highway system and large development projects.

Many of the effects of the policies and programs set in motion during the military's regime only reached an apogee after the generals left office (Foresta 1993; Moran 1993; Schwartzman 1992). From the mid-1980s to early 1990s the rate of deforestation was between one and two million hectares with a somewhat anomalous (nonetheless disturbing) peak in 1988 when a reported 8,000,000 hectares were deforested (Moran 1993:1). Over roughly the same period the incidence of assassinations of rural inhabitants and their leaders in Amazonia rose sharply to almost 200 per annum. In the period between 1964-1988 60% of all rural assassinations in Brazil occurred in Amazonia, a region with just 10% of the country's population (Schwartzman 1992:54). The suspiciously coincidental increases in social and ecological violence in the

Amazonian countryside gave rise to an increased awareness of the social and environmental crises taking place, particularly within the environmental and human rights movements of Brazil and the West, (Nugent 1993). As the struggle for land intensified, so too did political resistance on behalf of rural inhabitants and forest based populations (Moran 1993). Concomitant with the return to civilian rule in the 1980s Brazil's economic crisis deepened (Foresta 1991). Debt restructuring at the insistence of the international community had caused the end of the federal government's generous incentives package for investment in Amazonia. This factor played a prominent part in the relative decline in deforestation and related problems, which had been rising steadily for more than a decade (Moran 1993; Schwartzman 1992).

The rhetoric of successive civilian governments in the post-military period has been heavily laden with pledges to protect the environment and secure the livelihoods of small producers, Indians and rural workers in the basin (cf Melo 1989). There is substantial agreement in the literature, however, that the government's objectives remained very much more concerned with economic development and the interests of regional elites and foreign capital (Nugent 1993; Hecht and Cockburn 1989: 140). Amazonia's traditional peasantries or *caboclo* society had in many respects borne the brunt of the crisis and at the same time had remained invisible and on the periphery of the development debate (Nugent 1993). Only very gradually has Amazonian *caboclo* society been emerging from its marginal position, in large part because of an increase in focused research which has drawn attention to the socio-economic plight of *caboclos* on the one hand and on the other has explored the appropriateness of their livelihood patterns in the search for sustainable development options in the basin (Nugent 1993; Parker 1985). More significant have been the efforts and resistance of certain factions of *caboclo* society to maintain itself in the face of advancing frontiers and external economic and political forces. The rubber tappers or *seringueiros* of Acre have faced off against such interests with varying degrees of success and are a important example of the changing face of rural Amazonia.

5.1 Acre in the contemporary period

The specific circumstances of Acre in the contemporary period, in particular the effects of the development and modernization paradigm followed by the military and successive governments, have played themselves out in the state in a fashion that is both unique to the area and a microcosm of the basin as a whole.

At the turn of the century the Acrean population stood at 75,000 predominantly rural inhabitants. By 1970 the population, which had declined in the period following the end

of the Rubber Boom up until the Second World War, reached 215,000 and by 1990 this had doubled again to 412,000 inhabitants (Anuário Estatístico do Brasil 1989). During the 1960s and 70s rural to urban migration had accelerated substantially. When the military came to power in 1964 over 80 per cent of the population continued to reside in rural areas. Depopulation of the countryside was a direct result of the removal of state support for indebted *patrões* and a reorientation of government development policy and fiscal incentives in favour of southern based agribusiness. Government supported investment from outside the state served to distort the land market and along with high inflation and a speculative investment climate led to increases in the price of rural land between 1,000 and 2,000 per cent during the 1970s (Schwartzman and Allegretti 1987). Some rubber tappers were lured by inflated land prices to sell, if they could, their *colocações* in the hopes of making a windfall gain, others were relocated on government resettlement projects. Between 1970 and 1980 Acre's urban population increased 122 per cent and accounted for roughly half of the state population. In 1990 the urban population had reached 64 per cent of the total placing enormous pressure on urban resources that were frequently unable to meet the needs of newcomers for housing and even the most basic services such as water and sewage. Many disenfranchised rubber tappers ended up in Rio Branco with minimal savings and few skills upon which they could make a living in the city (Schwartzman 1991).

It is important to note that the intensive movement of people in Acre over the last 30 years was not limited to a simple demographic shift from a predominantly rural to a predominantly urban population. As of 1990 the majority (55%) of Brazilian Amazonia's 22 million inhabitants lived in urban settings. Migratory patterns in Acre as elsewhere, however, have been more complex, involving not only the urban-rural shift but also widespread instances of rural to rural migration. Table 5.1 summarizes macro changes in Acre's population in the 1960-1990 period and suggests that while urban population growth has far outstripped rural growth it is only very recently that the countryside has apparently experienced a net reduction in population. Much of the growth in urban population can be attributed in part to the immigration of settlers from elsewhere in Brazil. Caution, however, should be taken with these figures. They are based on official statistics which, in the far flung reaches of Amazonian states such as Acre, are extraordinarily difficult to compile with any degree of real accuracy. In some cases rubber tappers have sought to escape conflict with encroaching ranchers and more recently logging operations, by moving to more remote or otherwise uncontested areas. Others have sought to improve their location vis á vis the market. Some now spend a portion of their time in cities and towns but retain strong ties to their forest based livelihoods for a major part of their household consumption and income needs. During

this same period several thousands of rubber tappers opted to cross the border into Bolivia to escape the mounting land conflicts and rural violence in Acre. However, as essentially illegal aliens in Bolivian territory many of these found themselves in an even more vulnerable position to the Bolivian equivalent of their former *patrões* in Acre (Romanoff 1992; Bakx 1986).

Population	**1960**	**1970**	**1980**	**1990**
Rural	141,600	158,500	172,000	161,600
%	84.1	72.1	56.4	35.2
Urban	26,100	61,400	134,000	267,100
%	15.9	27.9	43.6	64.8
Total	164,000	220,000	307,000	412,000
%	100	100	100	100

Growth	**1960-70**	**1970-80**	**1980-90**
Total	2.95	3.34	2.93
Rural	1.1	0.8	-0.6
Urban	8.6	7.8	6.9

Table 5.1 Acre rural and urban population changes (1960-1990)
Source: Bogne and Butts 1990.

The highway system that spearheaded the military's development programs for Amazonia arrived in Acre at the end of the 1960s, although it was not paved until 1991. Acre, however, did not experience the same levels of extra-regional migration that took place in the neighbouring state of Rondônia over the same period (Moran 1993; Bakx 1987). In fact, the western portion of the state initially retained much of its traditional social and economic structures as the scope of the incursions by the "ranching front" remained limited (Bakx 1986). The existing *patrões* maintained their dominance in the rubber trade, although some of the smaller ones were forced to sell their estates to pay off debts held by larger landowners (Almeida 1992; Hecht and Cockburn 1989).[2] Elsewhere in Acre the story was quite different.

[2] The rubber estate owners who controlled much of the rubber trade through their debt-credit relationship with the actual producers are variously known as *patrões* or *seringalistas*. The former term is more commonly used by the rubber tappers themselves while the latter is considered by some to be a "post-war neologism to [sic] replace the term *patrão* in official jargon only" (Almeida 1992: 95).

The patron-client relationship that characterized the political economy of the rubber trade was built around the tension between the rubber estate (*seringal*) owners and the primary producers of rubber, the *seringueiros*. The *patrão* owned the land, provided credit and supplies, was the sole purchaser of rubber tapper household production and sometimes fulfilled other essentially paternalistic social roles. The *seringueiros* produced rubber and, where available, Brazil nuts which they were obligated to sell to the *patrões*. While in general rubber tappers were almost perpetually in debt and beholden to their respective *patrões* their ultimate control over the means of production (i.e. their own labour) put a definite limit on how far they could be pushed by the *patrões* and at least partially constrained the exploitive nature of their socio-economic relationship (Weinstein 1983). Below, and in later chapters, both the positive and the negative aspects of the demise of the *patrões* control in Acre after 1967 will be discussed.

The Acrean economy has, since the arrival of the rubber trade in the 1870s, been based almost entirely on the extraction of rubber and, in the eastern portion of the state at least, the harvest of Brazil nuts. Even after reorientation of development priorities by the military government in the mid-1960s Acre's contribution to national production in natural rubber and Brazil nuts was 29.3 per cent (7,316 metric tonnes) and 10.3 per cent (4,952 metric tonnes) respectively. At the end of the 1980s these had actually increased to 40.1 per cent (13,400 tonnes) for rubber and 24 percent (8,663 tonnes) for Brazil nuts of the total national output (CNS 1992a). In 1960 one-third of the rural land holdings were rubber producing estates or *seringais* occupying some 97 per cent of the economically active land base (Allegretti 1989:11). This compared with a combined land base under commercial agriculture and/or ranching that amounted to a mere three per cent of the surveyed land. From 1960 to 1975 the total area surveyed in the agricultural census declined from over 9 million to around 3.7 million hectares and then increased once more to 5.6 million hectares by 1980 (Anuário Estatístico do Brasil 1989). Land that is not economically active, even if someone claims title to it, is considered "unproductive" and is not counted in the agricultural census. The decline in the area surveyed, therefore, reflects the deactivation of rubber estates and the exit from the Acrean rubber economy of many of the traditional *patrões*. Throughout most of the 1980s this trend was reversed as outside investors moved into the state to take advantage of both fiscal incentives and increasing land values (Schwartzman and Allegretti 1987; Bakx 1986).

By 1980 slightly more than half of the economically active land base was being used for extractivist production while agriculture and ranching accounted for almost 38 per cent.

Interestingly, during this period the percentage of land holdings engaged in extractivist production exceeded 50 per cent of the total (Allegretti 1989). This latter change was primarily a result of the emergence of the *seringueiro autonomo* in eastern Acre which effectively increased the number of extractivist enterprises after the break-up of the large rubber estates formerly under the control of the *patrões* (Schwartzman and Allegretti 1987).

From the late 1960s to the early 1980s the total area of land occupied by the *seringueiros* declined while the areas occupied for cattle ranching and agriculture both increased substantially. The number of agricultural holdings increased 340 per cent and covered 57 per cent more territory while the number of ranching enterprises expanded 363 per cent with a concomitant increase of 413 per cent in the area of land they occupied (GT Planacre 1985 quoted in Schwartzman and Allegretti 1987). Paradoxically, at the same time the financial contribution of rubber as a percentage of Acre's total exports increased as did the per hectare value of extraction of both rubber and Brazil nuts both in absolute terms and relative to the per hectare value of both agriculture and cattle ranching. Schwartzman and Allegretti (1987) suggest that this may indicate an increase in the productivity of rubber tappers once they had broken free from their former bosses. In terms of volume, from 1970 through 1982 rubber was Acre's largest export, followed by Brazil nuts. By comparison, over this period the peak year (1975) for cattle and other agricultural products accounted for only 4.2 per cent of the total value of state exports (Anuário Estatístico do Acre 1975, 1980 quoted in Schwartzman and Allegretti 1987).

The 1980 employment structure of the rural population in Acre according to official census figures is summarised in Table 5.2. These data are meant to represent the economically active population and are therefore in many cases referring to the head(s) of nuclear families or households or otherwise independent, working adults. However, this would mean that in 1980 over 50 per cent of the population was, in government census terms, economically active. As this is unlikely a more plausible explanation, and one that also reveals the shortcomings of such "official" data, is that many rural inhabitants in fact are engaged in more than one of these categories. For rubber tappers this would be almost universally the case as will be amply discussed in the chapters to come.

Three years after the military's takeover in 1964 the new Amazonian bank (BASA) began to call in its outstanding debts with many Acrean *patrões*.[3] In the central and

[3] BASA (the Banco da Amazônia) was the financial arm of SUDAM (the Superintendência de

eastern portions of the state both large and small estate owners found themselves unable to meet the debt repayment requirements set out by the new bank and subsequently had to sell out to investors – primarily ranching interests and land speculators – that came most frequently from the Centre-South of Brazil (Schwartzman 1992; Hecht and Cockburn 1989; Bakx 1988, 1987). The new land owning class was, for various reasons, less interested in the waning profits to be made from rubber. Instead, investors focused on taking advantage of generous incentives, in the form of subsidized rural credit and negative real interest rates, offered under the aegis of the developmentalist strategies of the military regime (Schwartzman 1992; Bakx 1990).

Agriculture	Cattle raising	Extractivism	Other	Total
41,613	12,467	38,366	3,308	95,754
43.4%	13%	40.1%	3.5%	100%

Table 5.2 Distribution of rural population (of working age) by occupation.
Source: IBGE, Censos Agropecuários do Acre 1980.

Later, when most of the subsidies were curtailed, the productive or "social use" of the land remained a low priority. The relatively low capital cost of land and persistently high rates of inflation continued to encourage investment in land primarily as an object of speculation (Bakx 1988). Through the 1970s and 1980s a crisis ensued wherein the structure of land ownership was altered dramatically (Schwartzman 1992). In Central Acre large, corporate, ranching interests took control of vast tracts of land while in the east smaller, self-capitalized ranchers predominated (Hecht and Cockburn 1989). The spread of ranching as the land use choice of new investors brought successive groups of *seringueiros* into a protracted struggle for land characterized by rising incidents of rural violence and rapid deforestation (Moran 1990; Martine 1990).

The advance of the "ranching front" was not uniform but as was common throughout Amazonia, followed the penetration of new roads. In more remote areas the exodus of the original rubber estate owners had the peculiar effect of deconcentrating land holdings as many of the *seringueiros* elected to remain in the forest collecting rubber on what was *de facto* their own land (Schwartzman 1992). It was not new that as the *patrões*' interest and commitment to rubber production waned, so did their ability to provide staple goods necessary to maintain the rubber tappers in the forest. It has

Desenvolvimento da Amazônia) a new agency instituted by the government in 1966 to coordinate federal intervention in Amazonia (Bakx 1987).

already been mentioned that in these instances a common response by *caboclos* engaged in the rubber trade was to retrench their livelihood composition, that is, to diversify (or re-diversify) their activities primarily by devoting more time and labour to the self-provision of food. But the *patrões* were wont to give up their control easily. It was, in fact, the rubber tappers themselves who gradually started to assert their independence from the *patrões* by selling their produce to itinerant traders and others who might offer a better price than their *patrão*. This form of resistance marked the early signs of an emerging social movement within rubber tapper society that aimed to take greater control over their livelihoods. As a measure of the rubber tappers' initial success, in the 1970s *patrões* in eastern Acre gradually ceased to insist that all rubber produced on their estates had to be traded through the estate owner himself or his representative (Allegretti 1989; Schwartzman 1987; Bakx 1986).

In the wake of the *patrões'* exit there emerged a dichotomy within the rubber tapping population that was essentially based on the degree of liberty households have in choosing where and to whom to sell their produce and whether or not they own or rent their *colocação*. In their own parlance, rubber tappers fall into – or in some instances between – one of two categories. So called *seringueiros cativos* or captive rubber tappers represent the traditional extractivists associated with the Amazonian rubber trade. They are usually tied to a *patrão* by debt and/or a duty of rent for tapping rights to specific *estradas* "owned" by the *patrão*. Patron-client relationships in various forms continue to dominate in western Acre, in the valley of the Alto Jurua and to a slightly lesser extent, in central Acre. In contrast, *seringueiros autonomos* (or *liberado*), are characterized as autonomous or free *seringueiros* who operate as independent small scale rural producers in the forest.[4] Their livelihoods are diverse and flexible, and the patron-client relationships that do remain are substantially less restrictive than those generally associated with the rubber economy and the *aviamento*. Their trading relationships are similarly diverse, often spread amongst several river traders. These small, generally itinerant, merchant operators, know as *regatões* or *marreteiros*, became more prevalent on the rivers of eastern Acre with the emergence of autonomous rubber tappers and today play a vital role linking the remote rubber tapper with the market. If it is assumed that *seringueiros* in eastern Acre are mainly autonomous while their western counterparts are by and large still within the old patron-client system then as of 1980 there were approximately 82,000 *seringueiros cativos* and 94,000 *seringueiros autonomos* in the state (IMAC 1991). Although once again these figures are suspect.

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[4] For a detailed discussions of autonomous and "captive" *seringueiros* see, among others; Almeida (1992), Allegretti (1989:8-14 *passim*), Schwartzman and Allegretti (1987:6), and Bakx (1986). Whitesell (1988) draws attention to the existence of partially autonomous *seringueiros* along the middle Jurua in the state of Amazonas.

The penetration of roads into the Acrean countryside and with them the advancement of the "ranching front" brought a quick end to any sense of liberation rubber tappers may have felt with the end of the *patrões'* dominance (Schwartzman 1992; Hecht and Cockburn 1989). Nonetheless, their autonomy allowed for a new level of political awareness, organization and resistance which has played an important part in the changes taking place in the Acrean countryside. In the 1980s rural workers' unions became increasingly active in the state as did certain sections of the Catholic Church (Bakx 1986). With their increased organization, rubber tappers in Acre started to reach out to other communities in similar circumstances, those dependent on diverse forest resources for their livelihoods and often embroiled in some form of conflict over access

to those resources (Bakx 1987). In 1985, at a national meeting of rubber tappers held in Brasilia, the National Rubber Tappers' Council was created to help further the needs of rubber tappers throughout Amazonia (Allegretti 1989). Acrean rubber tappers were central in the formulation of the concept of establishing specific areas where rubber tapping communities could have exclusive usufruct rights to the forest land and its resources.[5] The idea of extractive reserves was not entirely original or unique, however, the central role played by the *seringueiro* communities themselves in the development of the idea was a rare occurrence in Amazonian development.

The establishment of a limited number of extractive reserves was a modest gain for rubber tappers in Acre and Amapá in the 1980s. But they were bittersweet victories that came at considerable cost to the communities, perhaps most tragically in the assassinations of important community and union leaders. Co-operative efforts at community organization have gone the farthest in the south-east corner of Acre, around Xapuri and the towns of Brasiléia and Assis Brasil along the Bolivian border. More often than not, however, *seringueiro* communities were overwhelmed in their efforts to stay on the land. To begin with, the opening of the agricultural frontier entailed the felling of large tracts of forest with little or no regard for whether or not the area was occupied. Resistance on behalf of the rubber tappers was frequently met with harsh, often violent, retaliation by the ranchers and their employees.

Between 1975 and 1987 the area of land deforested in the state increased tenfold, most of it converted to low productivity pasture that provides little long-term employment (Schwartzman 1992). At the same time, land ownership was becoming increasingly polarized between a small number of large, under productive *latifundios* on the one hand

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5 Usufruct is defined in Webster's dictionary as, "the right of using and enjoying all the advantages and profits of the property of another without altering or damaging the substance."

and an over abundance of small, economically unsustainable *minifundios* on the other. By 1986 10% of the state's land holdings maintained control of some 82% of the countryside while the vast majority of the rural population, 88% of all rural land holdings, controlled only 7% of the state's land area (Schwartzman 1991, 1992; Bakx 1987). For many households in these circumstances a forest based livelihood was untenable and they were forced to abandon their *colocações* and migrate either to the nearest town, to the city of Rio Branco or across the border into Bolivia. Acre experienced a period of intense migration during the 1970s characterized by urbanization on a massive scale, usually far in excess of the capacity of state institutions to manage the movement of people. Rural migrants in their thousands converged on the shantytowns of Rio Branco despite chronically inadequate infrastructure and high levels of unemployment and underemployment. By 1990 Rio Branco's population stood at around 120,000 people, a five-fold increase over its level when the military came to power (Schwartzman 1992).

The destabilization of the rural population and ensuing urban migration did not go unrecognized by government officials as a potential social and economic disaster. Not surprisingly successive administrations made a concerted, if ineffectual effort to manage the crisis through the 1970s and 80s, deploying numerous colonization schemes in an effort to take the pressure off urban areas and develop a viable agricultural sector. For the most part, however, these schemes were ineffective and failed to attain most of their objectives (Bakx 1987, 1990). At the end of the 1980s Acre remained a net importer of staple foods as successive colonization projects failed to establish a viable, surplus generating agricultural sector. Most colonists suffered unacceptably high failure rates whether they were former rubber tappers or migrants from outside of the state (Schwartzman 1992; Bakx 1990). In the end the various rural development models implemented by INCRA, the federal agency responsible for colonization and agrarian reform, exacerbated the problems they were created to solve (Schwartzman 1992; Goodman and Hall 1990; Bakx 1987). Several authors have described the failure of state and private colonization schemes in Amazonia that have foundered on everything from misspent resources, erroneous assumptions about ecological and social realities to corruption, rural violence and malaria (for example Goodman and Redclift 1991; Goodman and Hall 1990; Bakx 1987). For many of the disenfranchised rubber tappers forced off their land by more powerful interests, the colonization projects were little more than a stepping stone from their former, forest based livelihood to an increasingly impoverished and marginalized existence either as an itinerant farming family caught in a cycle of barely adequate shifting cultivation or as part of the burgeoning urban underclass.

By the end of the 1980s rates of deforestation had stabilized at a level somewhat below the peak rate recorded in 1987 (Moran 1993; de Onis 1992). Rural-urban migration also slowed down but continued to strain the resources of the state's urban centres, especially the capital, Rio Branco. The Rubber Tapper's Movement had achieved some moderate success in slowing the penetration of the agricultural frontier into some active rubber tapping areas. In 1991 no less than nine extractive reserves, representing 1.75 million hectares or 11.5% of the state, appeared on a map of protected areas in Acre (IMAC 1991). In reality, however, some of the reserves remained entrenched in the bureaucratic and political process of assessment, expropriation and demarcation and were not firmly established or legally protected in any meaningful way. In 1993 two ranchers successfully challenged the legality of the expropriation of their *fazendas* within the Chico Mendes Extractive Reserve (Veja 1993). The Figueirda Extractive Reserve, located just to the north of the Riozinho do Rola, is bisected by the AC90 highway and is reputedly no longer an active rubber tapping area. Most of the rubber tappers in the proposed reserve have been dislodged as a result of deforestation and spontaneous colonization along the road and the subsequent erosion of their forest based livelihoods (field interviews).[6]

In recent years the *seringueiros'* access to forest resources, specifically along the tributaries of the Rio Purus in the eastern portion of Acre, has been threatened by commercial logging as much, if not more, than pasture clearances which characterized the struggle for land during the 1970s and 1980s (de Onis 1992; Moran 1993; Nugent 1993; Field interviews). The penetration of logging operations, both legal and illegal, was a major preoccupation of the majority of households visited along the Riozinho do Rola and the Igarapé Espalha during the fieldwork. In addition, feeder roads punched through the forest are widely acknowledged to be an impetus for so called *invasão*, the process of spontaneous colonization by small, often landless farmers which typically advances along new roadways in the Amazon and thus precipitates further deforestation and puts additional pressure on forest resources such as wild game and fish (Chapter 11).

On another level, *seringueiro* livelihoods have been severely hit by the removal of federal subsidies which have in one form or another maintained the price of rubber at up to three times the price on the international market (Torres and Martine 1991). Since the end of the Rubber Boom, and subsequently the end of Amazonia's monopoly control

6 An official of SINPASA who visited the research area, key informants, and other respondents frequently remarked on this pattern of frontier expansion that has repeated itself throughout so much of Amazonia. Portions of the Figueirda extractive reserve are a prime example of this process taking place in Acre.

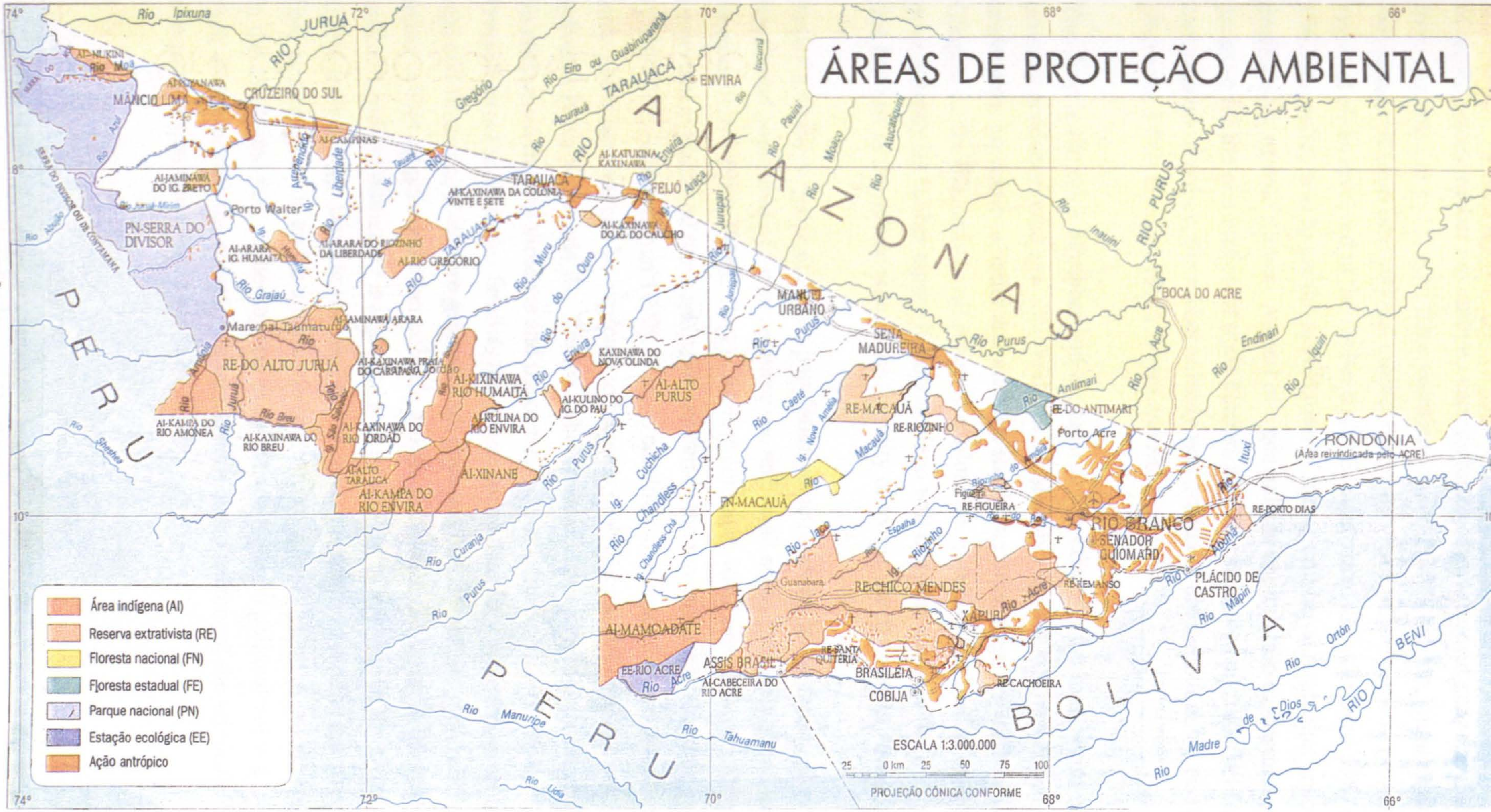

Figure 5.1 Acre protected areas

Source: Instituto de Meio Ambiente do Acre (IMAC) 1991.

of world prices, rubber has enjoyed various forms of government support. In Brazil, from the crash in 1911, until three years into the Military's regime, Amazonian rubber was insulated from international market forces by virtue of the political power of regional elites involved in the rubber trade (Schwartzman and Allegretti 1987). After 1967 the policy was to tax the importation of foreign rubber at a rate that ensured the profitability of wild rubber. As part of a generalized capitulation to international pressure for the elimination of trade barriers and the preeminence of market forces in the formulation of policy, the rubber subsidy was gradually phased out in the early 1990s (Browder 1992; Homma 1992; Torres and Martine 1991).

The drop in the price of rubber had the most severe effect on the livelihoods of the primary producers who saw their real income sharply reduced.[7] But river traders and merchants, especially smaller and medium sized operators, were also affected. In Chapter 12 the discussion will return to explore the impact of the loss of the rubber price subsidy on rubber tapper livelihoods and will consider some of the implications this has had in the debate around the viability of extractive reserves in Amazonia.

Today a slight majority of Acre's population remains living in the forest off of a mixed livelihood composed of forest resource use and small scale, primarily subsistence farming (CNS 1992; IMAC 1991). Rubber continues to be one of the state's most important exports and plays an important part in the functioning of the state's economy (CNS 1992; Schwartzman 1992). People continue to migrate to Acre from outside the state and migration can be expected to increase now that the BR364 has been paved between Porto Velho and Rio Branco. The external view of Acre is that there has been an abatement in rural violence and the overall rate of deforestation (De Onis 1992). Overall, most *seringueiro* families are poorer today than they were ten, even five years ago and future prospects are generally not encouraging. It is a common refrain among many rubber tappers and other *caboclo* groups that life in the forest is increasingly difficult and yet ultimately is regarded as a better way of life than in the cities and towns (Field interviews). Despite waning interest from international media, the struggle for land in Acre goes on and is unlikely to be resolved quickly. Due to union organization in the 1970s and 80s, rubber tappers in Acre have gained a political voice and through their alliances with the environmental movement and sectors of the scientific community that voice has come to be heard.

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[7] Inflation in Brazil has also had a persistently negative effect on rubber prices and subsequently on the level and composition of seringueiro livelihoods.

5.2 Conclusion

The clash of European culture and later Brazilian national society with the indigenous peoples of Amazonia is a well documented and tragic story (See for example, Hemming 1987, 1978; Davis 1977). In the aftermath of the decimation of indigenous society, *caboclo* culture emerged as the dominant rural social formation in Amazonia. *Caboclo* livelihoods and culture were fused from the Amazonian cultural melee that included Amerindian, European and, to a lesser extent, African social influences (Wagley 1964; Miller 1985; Parker 1985). As a nascent peasantry, *caboclos* typically occupied the lower echelons of the Amazonian economy and commonly endured exploitive if not oppressive relations with ruling elites (Nugent 1993; Bakx 1986). The early political economy of the Amazon was shaped by the dynamic tension that existed between powerful landowners and regional elites within Amazonia itself and the external forces represented by colonial and, later independent Brazilian governments.

During the colonial period policy and practice in the Amazon focused on the exploitation of the region's natural resources and the need to establish an agricultural sector to support a permanent population. Development in Amazonia, especially agriculture, was frustrated from the outset by labour shortages, technical difficulties, and the almost anarchistic nature of the Amazonian frontier. As Brazil gained independence in the early 19th century, Amazonia was immersed in a socio-economic system over which the central government had little direct control, although it did reap a substantial benefit from the exploitation of its many natural resources (Barham and Coomes 1994). Social relations were characterized by exploitive systems of exchange and political power based on patronage and underwritten by the force of violence.

The *Cabanagem* revolt was symptomatic of the social and political tensions that had been building in the Amazon since the demise of the *Diretorio*. Some historians argue that the revolt was a defining moment in the emergence of Amazonian *caboclo* society (Anderson 1985) although it did not lead to any fundamental change in the social hierarchies or political economy of the Amazon. The onset of the Rubber Boom arguably had a much more profound effect on Amazonian society.

Throughout the latter half of the 19th century, *caboclo* and indigenous groups came under increasing pressure to focus their productive efforts on rubber. Simultaneously new immigrants were brought to Amazonia to bolster the overall rubber tapping workforce. In addition to addressing the perennial problem of labour in the Amazon, the policies of the central government and ruling elite were focused on financing the commercialisation of the rubber trade (Weinstein 1983: 101). State subsidies provided

incentives and financing for the production, distribution and storage of rubber as well as for improvements to infrastructure such as at the ports of Belém and Manaus (Hecht and Cockburn 1989: 73; Reis 1974: 40).

The Rubber Boom was a period of extremes which brought to some immense wealth and to many extreme hardship. Despite the wealth that was generated by the rubber economy, trade in the Amazon remained based on a pre capitalist system of exchange relations and a hierarchy of indebtedness (Weinstein 1983: 263). For a time the Boom made Amazonia one of the most important economic regions of Brazil. However, the single-commodity, export based economy and small internal market of Amazonia was of only peripheral importance to the Brazilian economy as a whole and its decline posed a relatively insignificant threat to the overall prosperity of the nation (Weinstein 1983: 231).

With the end of the Rubber Boom the Amazonian economy contracted and the regional population declined drastically. According to most commentators Amazonia slipped into a period of relative obscurity for the next several decades. But the two most important legacies of the colonial and Rubber Boom periods in Amazonia – *caboclo* society and the *aviamento* system – did not disappear. If anything, most *caboclo* groups were able to revert to more traditional livelihood patterns that were less heavily focused on rubber extraction than they had been during the Boom. The *aviamento* also persisted, primarily because of its "impeccable logic" as an exchange system that made trade possible in a region characterized by vast distances and a sparse population (Parker 1985: xxxv; Barham and Coomes 1994). With the introduction of roads into Amazonia the importance of *aviamento* has diminished but not disappeared and the relationship of social groups to the modern *aviamento* system remains a significant factor in the formation and reproduction of their livelihoods.

The geopolitical importance of Amazonia to greater Brazil was rekindled during the two administrations of Getulio Vargas. Over the course of this period, during the Second World War, a second mini-boom occurred in the Amazonian rubber economy and a second wave of migrants moved in. When the ill-fated "Batalha da Borracha" concluded many of the migrant rubber tappers migrated to urban areas to make a living or returned to their home states in the North-East. Nonetheless, a significant number also stayed on in the forest, gradually being soaked up by the fabric of *caboclo* society.

In the post-war period development of Amazonia was central to initiatives to modernize the Brazilian economy and to integrate its more isolated regions with the country's

economic and political heartland. The successive administrations of the military regime that followed the coup of 1964 were preoccupied with Amazonia for both its geopolitical and economic importance. The *Transamazônica* highway network, in particular, transformed the social and physical landscapes of Amazonia as the roadways penetrated areas heretofore inaccessible to most of the outside world. In general, the development programs initiated in Amazonia during the military's regime were lopsided in favour of large commercial interests and were driven by a national agenda focused on economic modernization rather than sustainability or the needs or interests of Amazonians (Bourne 1974; Hecht and Cockburn 1989).

The flurry of development projects in the 1960s, 70s and 80s unleashed forces in the Amazon that rational planning could not contain. Policy makers were forced to confront complex environmental and indigenous peoples issues that challenged the narrow focus of government policies. These were typically based on the knowledge and assumptions of a central, ruling oligarchy and implemented primarily with the Centre's interests in mind. In the less developed periphery of Amazonia these policies proved to be inappropriate and ambiguous. They contributed to the concentration of wealth and power, created uncertainty in the frontier's social and political economy, and introduced widespread conflict and rural violence. Closely linked to social tensions and upheaval was a drastic escalation in ecological degradation resulting from the extension of roads into the basin and the subsequent influx of people and development .

The *caboclo* population of Acre, made up principally of rubber tappers, was at the forefront of the general malaise in the Amazonian countryside during the 1970s and 80s. The independent or free *seringueiros autonomos*, concentrated in the eastern portion of the state, have faced the most pressure from competing land uses such as large scale cattle ranching and, more recently, commercial logging. They began organizing in the early 1970s and have subsequently found their political voice. While some rubber tapper communities have had some successes in protecting their forest based livelihoods against more destructive incursions this success has come at considerable cost.

In Acre, as elsewhere in Amazonia, conflict between competing land uses and different social groups remain intractable problems despite the drop in levels of deforestation and rural violence from the late 1980s. The role of forest product extraction continues to be both central and contentious in the debate over how ecologically sustainable development might occur in the Amazon. There are valid arguments that extractivist production may be

seriously limited in what it can achieve economically for the region and its inhabitants. Nonetheless, rubber tappers have successfully lobbied for the establishment of extractive reserves and in so doing have drawn wider attention to the conservationist nature of their livelihoods.

Chapter 6
The Riozinho do Rola

6.0 Location

The 7,800 square kilometre catchment basin of the Riozinho do Rola is located at the eastern end of Acre at about 10° south of the equator and to the west of Rio Branco (Figure 2.1). The author's field research was conducted on three *seringais* (rubber tapping areas) falling within an area of just under 500 square kilometres located along the Riozinho do Rola and one of its main tributaries, the Igarapé Espalha. About 30 kilometres to the north of the main channel, the Riozinho do Rola is paralleled by a seasonal dirt highway, the AC90 (Figure 5.1). This road is passable by vehicle for only three to four months of the year, but nonetheless provides a significant link between the forest and city. Access to the Riozinho do Rola, however, is primarily by boat and the rivers remain a defining feature of the forest economy and life on the *seringal.*

It is reasonable to assume that people living in more remote areas (not just remote from Rio Branco, but from any one of the dozen or so small urban centres around the state) face different circumstances and difficulties in making a livelihood. Increased distance from urban services, markets and influence may have both positive and negative effects. On the one hand, as with economic activity in Amazonia in general, transportation cost between the point of production and the market is highly sensitive to distance. On the other hand, certain forest resources, such as game animals and aquatic resources may be more abundant farther from the density of population associated with the city. This study's concern with a community and area that is relatively less isolated draws attention to the relationship between forest based livelihoods and the growing urban sector of Amazonian society.

The Riozinho do Rola basin is one of the oldest, still-active rubber tapping regions in the state (Rancy 1986). Notwithstanding the rapid changes undergoing the area recently, longevity is an important indicator of sustainability. The proximity of Rio Branco implies a dynamic environment where the influence and effect of development is close at hand and where the viability and vulnerability of forest based livelihoods is most visible in comparison to potentially competing landuses.[1] For their part rubber tapper livelihoods on the middle and upper Riozinho do Rola are at an important historical moment. Another spurt of development and deforestation as witnessed during

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[1] So as not to overstate Rio Branco's relative proximity, it is of interest to note that a visit to the region of the Riozinho do Rola\Igarapé Espalha juncture made by the then mayor of Rio Branco Municipality in July 1993 was the first by a political leader according to residents of the area.

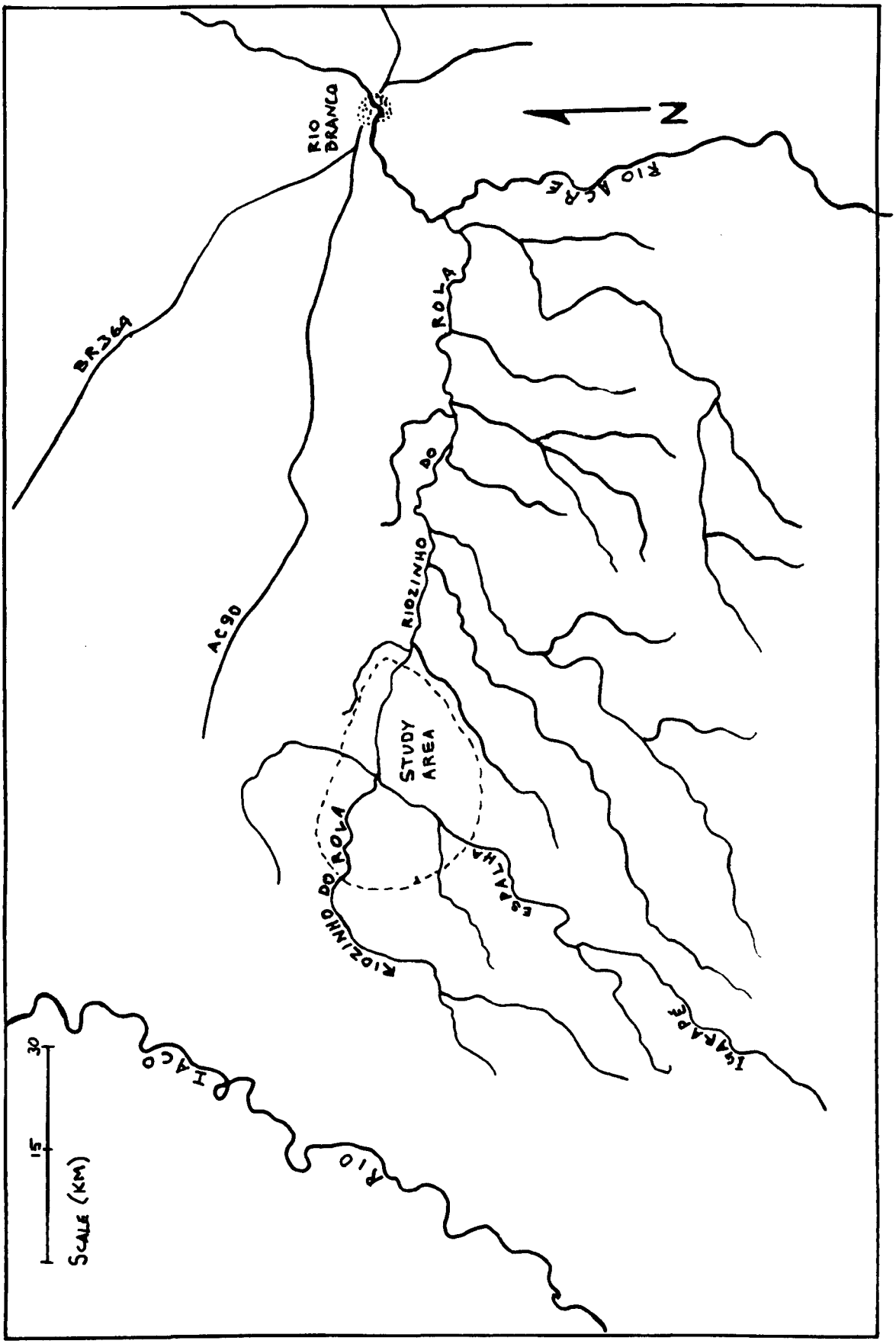

Figure 6.1 Map of the Riozinho do Rola
Source: Field maps and research; Landsat Thematic Mapper, Image ID: TM5-39026-S004, July 1991

the 1980s could conceivably overwhelm the social and environmental bases of their existence. Conversely, it is possible that these forest communities can successfully coexist and compete with the dynamic environment and influence of Rio Branco. In this case the rubber tappers along the Riozinho do Rola provide a useful picture of forest based livelihoods in a setting where transportation costs are minimized, where health services and education are relatively accessible and where they can occupy a stronger position vis á vis their interaction with the market.

6.1 Physical environment

The region containing the Riozinho do Rola is part of the greater Amazonian flood plain and lies at an elevation of around 250 metres. At the local level the topography is highly irregular; flat in some areas, steep and undulating in others (IMAC 1991). Soils are weathered, nutrient poor, especially in phosphorous, and often contain high levels of aluminum (IMAC 1993). The climate is that of the humid tropics. Annual rainfall is over 2,000 millimetres and relative humidity is rarely below 80%. The region has a pronounced dry season (June - August inclusive) during which precipitation reaches only 100-150 millimetres in total. Average annual temperature is around 23°C, rising into the high 30s between September and November. By cruel coincidence this is also when the air is choked with the smoke of annual burning to clear new agriculture plots. The cool, dry "summer" months average around 18°C except during the periodic "cold snaps" when nighttime temperatures plunge to less than 10°C.[2] These so called *friagems* occur mostly in August and are associated with cold air masses originating over the Southern Cone that migrate northwards into the southwestern reaches of the Amazon basin. Daytime temperatures during a *friagem* are pleasant and provide a welcome break from the oppressive tropical heat. At night, however, temperatures are uncomfortably cold.

The annual flooding of large areas of forest, the *varzea*, transforms the rubber tappers' environment and their livelihood patterns from one season to the next. *Varzea* forest comprises a mere three per cent of Amazonian territory. The remainder is lumped under the category of *terra firme* forest that does not experience annual flooding. Similar proportions of *varzea* and *terra firme* exist in the basin of the Riozinho do Rola. The unique ecology of the *varzea*, which in part derives from the annual deposition of fresh, nutrient rich sediment, magnifies its importance as a resource niche in the composition of forest livelihoods. *Varzea* forest and adjacent areas are associated with highly productive rubber trees that yield latex superior to the *Hevea* found in the interior. A similar relationship exists for Brazil nut trees which occur at progressively lower

[2] By local convention the summer months in Acre coincide with those of the Northern Hemisphere.

densities in relation to their distance from river channels and *varzea* (Field interviews; cf Pereira 1992). Even households located in the interior, well away from areas of annual inundation, were closely attuned to the different environments they were faced with from one season to the next (IMAC 1993).

The Environment Institute of Acre classifies diverse forest vegetation in the Riozinho do Rola basin as "open tropical forest".[3] "Open" in this case refers to the canopy of the forest as viewed from the air. The rubber tappers, on the other hand, identify their complex environments, not by the scientist's criteria concerning the nature of the canopy, but according to, among other things, the density of the vegetation at ground level and the ease with which one can move through the forest on foot. In general, the more open the canopy the more dense the understorey and vice versa. For the *seringueiro*, therefore, "open tropical forest" is *fechado* (closed) while "closed" or "dense tropical forest", with its contiguous canopy and relatively open forest floor, is *aberta* (open). The rubber tappers' understanding of the forest comes from a unique perspective, one based on physical contact, use and accumulated historical knowledge.

6.2 Human geography

Within the Riozinho do Rola basin there are about 1300 households (IMAC 1993). The author's survey produced a census of 50 households with a total population of 332 and an average of seven people per household. Extrapolating the average household size to the entire basin gives a population density of slightly more than one person per square kilometre. To put it another way, within the Riozinho do Rola basin there are about 600 hectares of land available per household, seemingly well above the 300-400 hectares typically stated as necessary to support a single rubber tapper household (CNS 1992; Fearnside 1991).

The demography of the 50 households that were covered by the survey is illustrated in figure 6.2. The graph shows three related phenomena in the local population that are characteristic of poor, rural populations. First, there is a proportionately large number of children which in many rural settings is prerequisite for ensuring a sufficient labour supply to meet household requirements into the future. Secondly, the graph shows a relatively high mortality rate among children and adolescents which is also a major incentive for raising many offspring. Thirdly, with a quarter of the population under the age of five, it is evident that the birthrate is high and that the population is expanding.

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[3] The IMAC survey collected data from nine locations within the basin from which it identified 429 species of plants with a dbh greater than 10 centimetres (IMAC 1993).

This is significant in terms of the future sustainability of livelihoods in the basin. There was widespread recognition among respondents that the growing population was putting increasing pressure on their forest resource base and that this would inevitably jeopardize the long-term sustainability of their forest based livelihoods. Most of the older respondents to the survey recalled that hunting and fishing resources in particular, were substantially more abundant in the past.

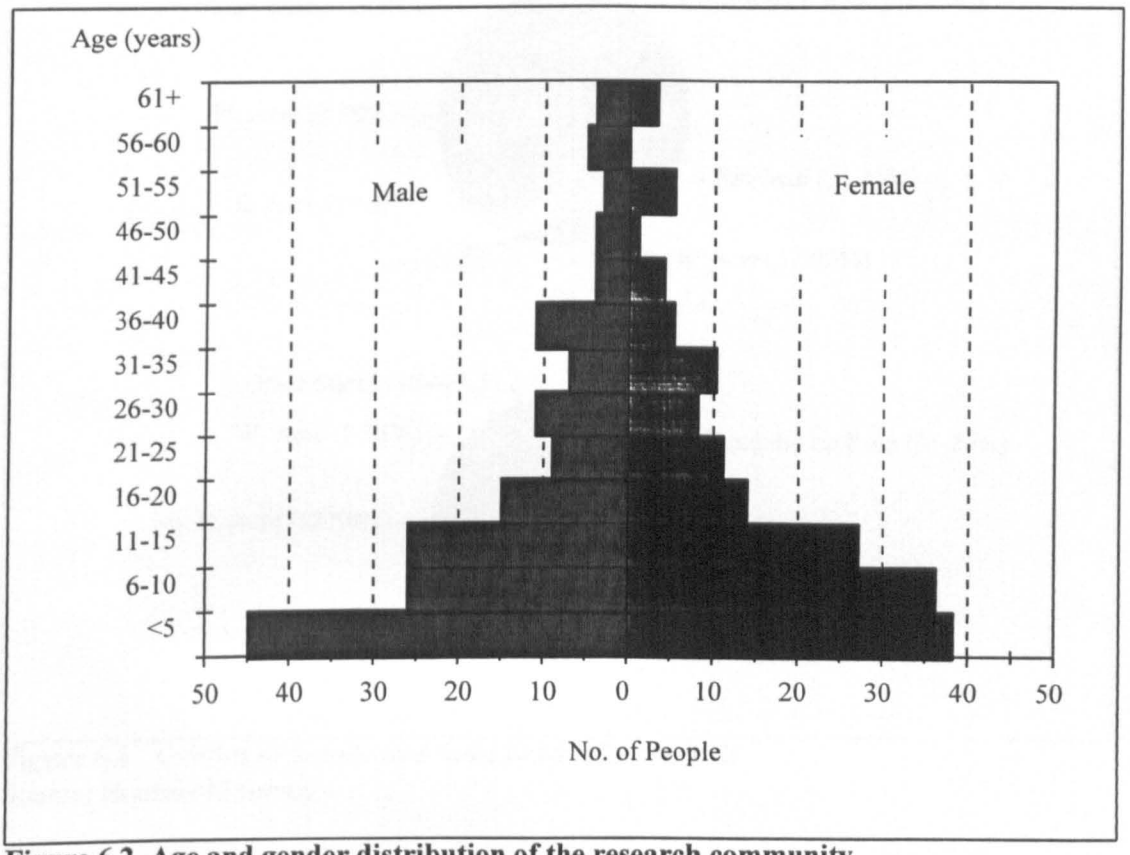

Figure 6.2 Age and gender distribution of the research community
Source: Household survey.

Approximately two-thirds of the male and female heads of households in the survey population were either, (a) born on a *seringal* within the Riozinho do Rola itself, (b) originated from the Rio Iaco immediately to the west or, (c) came from other rubber tapping areas in eastern Acre (Figure 6.3). A smaller proportion of respondents originated from cities and towns in Acre, primarily Rio Branco, or immigrated from other states of the Northeast, such as Ceará, Piauí and Rio Grande do Norte.

Migration

Data on the frequency with which individual households move their residence indicates that the population is highly mobile. In over half of the cases households shifted from their current location to another *colocação* within five years of arriving. One-third of all

moves occurred within two years. By the same token, while the majority of households seem to have moved about frequently, another third have spent 10 or more years in one location and one-sixth of the households have stayed put for over twenty years (Figure 6.4).

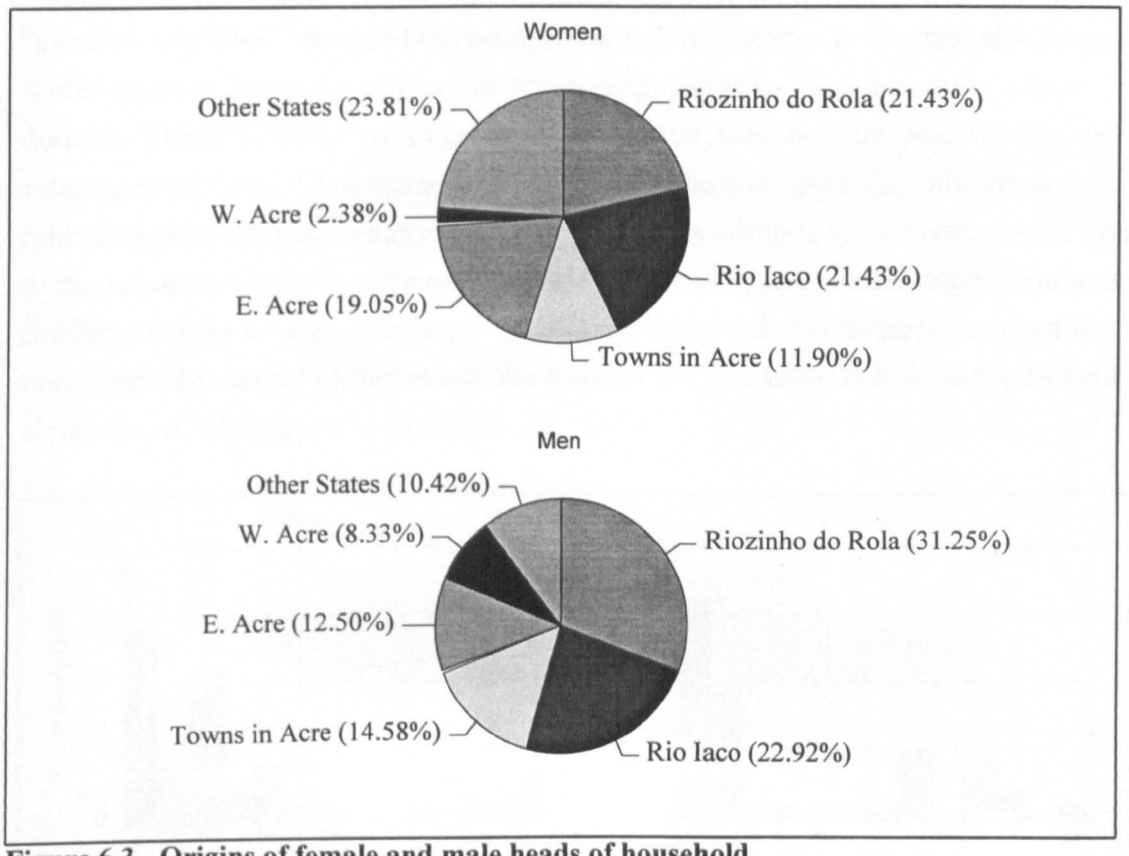

Figure 6.3 Origins of female and male heads of household
Source: Household survey.

A significant and poorly understood characteristic of Amazonian rural society is the prevalence of so called rural-rural migration. The impact on the household livelihood of moving from one rural location to another is arguably less disruptive than leaving the countryside for an unfamiliar urban environment. While the location of a household's livelihood may change, the nature of livelihood patterns and activities remain basically the same. This is especially the case with relatively localized moves in which social networks and relationships remain more or less intact.

There were two basic patterns to the movement of people within the Riozinho do Rola. Firstly, a large number of households were engaged in a circular pattern of rural-rural migration. These were usually respondents who had been born within the Riozinho do Rola, or who had lived most of their lives there. These households moved within and between the general area of the three *seringais* encompassed by the survey and surrounding areas of the central and upper Riozinho do Rola. Migration among this

group was primarily motivated by the quest for a *colocação* with a better location, to improve the household's situation vis á vis access to transportation and trading opportunities along the river. In other cases the household was seeking a *colocação* that was larger, to accommodate family growth, or one that was simply more productive. Young couples starting out on their own were a large component of this group of "circular migrators". Some of the households had, at one time or another, also been forced to move due to the infiltration of ranching and/or colonist farmers into their domain. These incidence have been increasingly prevalent over the past two decades in many parts of Acre. Until recently, within the middle and upper Riozinho basin the rubber tappers, remained relatively unencumbered by competing interests. At the time of the research, however, commercial logging operations were increasingly coming into conflict with the *seringueiros*' interests. Ranchers and colonist farmers, meanwhile, have gradually moved upstream into the basin of the Riozinho do Rola and westward along the AC90 highway to the north.

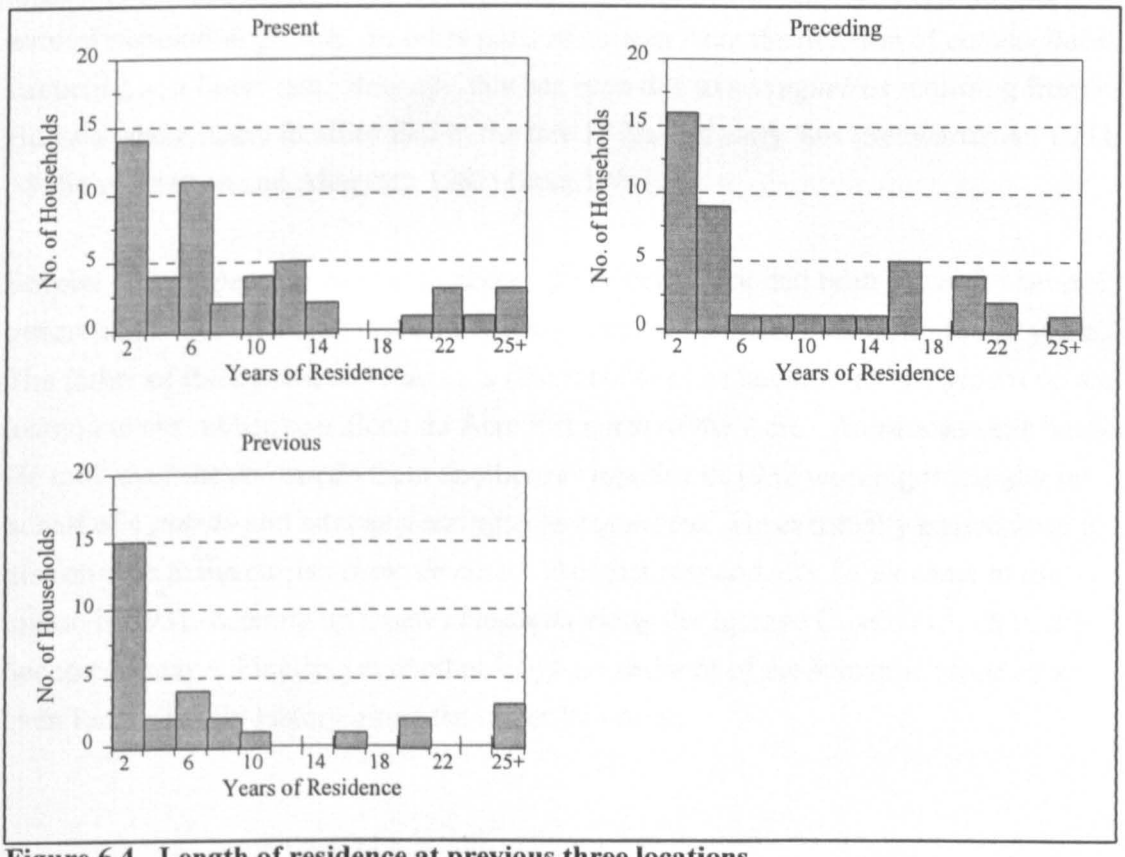

Figure 6.4 Length of residence at previous three locations
Source: Field survey

The second pattern of rural-rural migration included households that had migrated in a more or less linear fashion from the upper reaches of the Riozinho and Espalha or from the neighbouring Rio Iaco, gradually moving eastward into the middle region of the Riozinho. The primary objective of these households had been to move closer to Rio

Branco in order to obtain better access to markets, health care and education opportunities. Improved access to urban services, however, is counter-balanced by the threat of expanding alternative landuses that emanate from the city and that are usually in conflict with rubber tapper interests. The proximity of the Rio Branco is both a benefit and a threat to the livelihoods of the resident *seringueiros* along the Riozinho do Rola.

The *Colocação*

The rubber tapper's household livelihood is derived from the *colocação*. This includes the family house, surrounding areas of cleared land for garden plots and livestock and several hundred hectares of forest with special trails to access rubber, Brazil nut trees and other forest resources. The *colocação* is the essential land use and resource management unit for the household livelihood. By far the majority of *colocações* were associated with a single family. However, in a few cases two or more households shared or divided what was formerly a single *colocação*, usually to accommodate natural population growth. In other parts of eastern Acre the division of *colocações* is occurring at a faster rate. Recently this has been due to *seringueiros* returning from Bolivia where many families fled in the late 1970s and early '80s (Schwartzman 1992: 58; Schwartzman and Allegretti 1987; Bakx 1986).[4]

Several *colocações* that were visited during the field work had been active for several generations. For example, one family had occupied the same *colocação* for 50 years. The father of the current *dono de casa* (the male head of household) had grown up and learned to cut rubber near Boca do Acre just north of the Acre - Amazonas state border. He took over the *colocação* from another *seringueiro* in 1932 working it initially on behalf of a *patrão* and later as a *seringueiro autonomo*. He eventually passed it on to his son who is the current *dono de casa*.[5] Another respondent's father came to the region in 1931, opening up a new *colocação* along the Igarapé Espalha which is still occupied today.[6] Finally, yet another longtime resident of the Riozinho reported an even longer family history along the upper Rio Acre:

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4 Rural conflict and violence between rubber tappers and ranchers was severe at this time and caused many Acreano rubber tappers to migrate. For many communities in the south east of the state Bolivia was the closest and most secure place to move. However, rubber tapping was no more lucrative and by some accounts exploitation and cheating was far worse in the Bolivian rubber trade (See Bakx 1986 for a discussion). In recent years some of these *seringueiros* have been returning to their former rubber tapping areas in Acre. The additional growth in population may have a negative impact on the sustainability of forest livelihoods in the region (Jon Dain pers. com.)

5 Field interview.

6 Field interview.

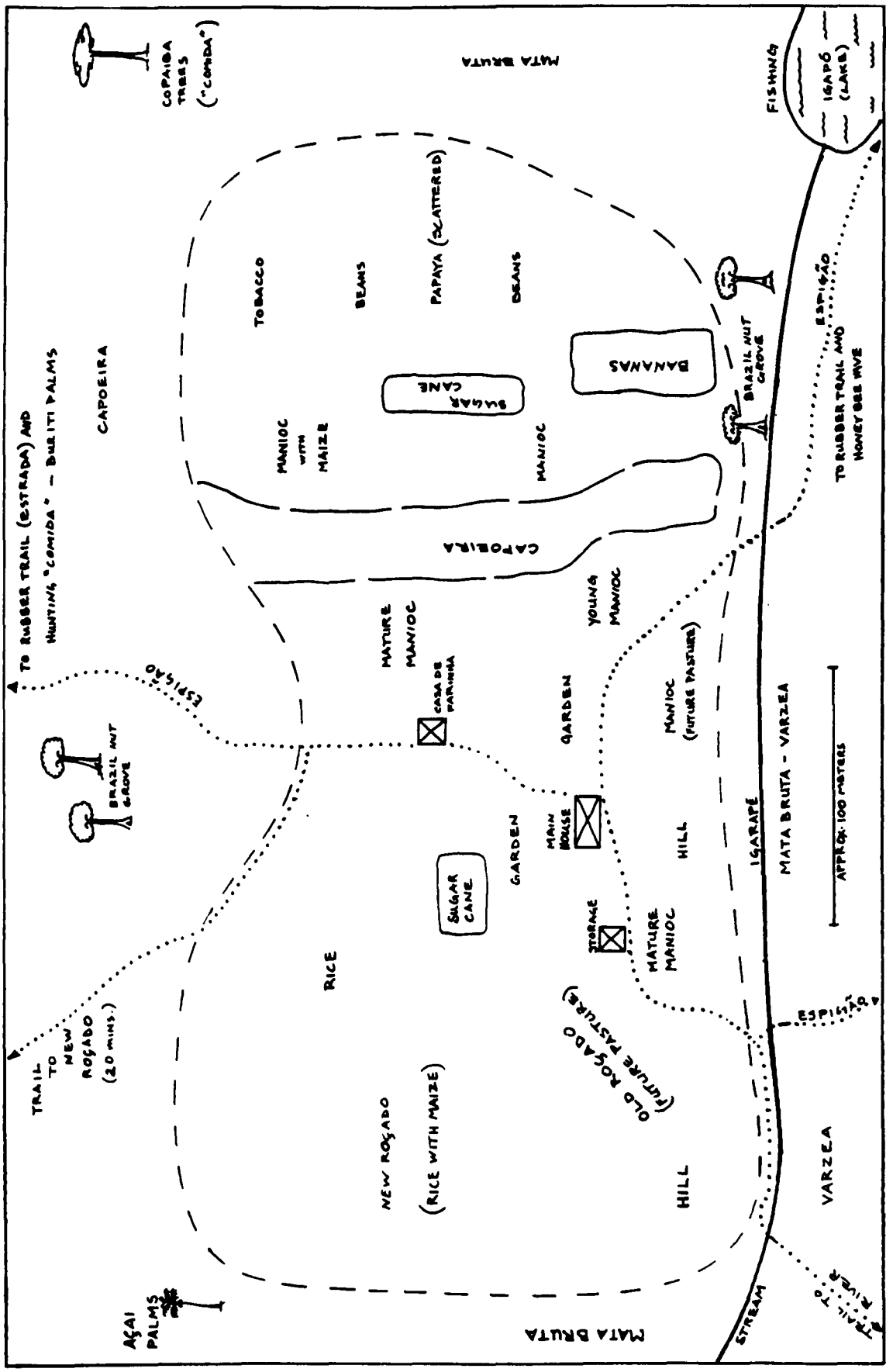

Figure 6.5 Schematic of a *barração* and associated landuse

Source: Field research

> My father arrived in Acre in 1907... a long time ago eh? It was like this, he came to Acre when he was fifteen...he cut rubber for thirty-six years, he cut in Corredeira when he first arrived and in another *colocação* down from Rio

Branco...then he cut on *seringal* Boa Vista, near to Xapuri...it was there at Boa Vista that I was born...I learned to cut rubber there myself and when I was fourteen we came here to the Espalha (i.e. in 1954)...I cut rubber for a *patrão* for ten years before I became independent...but I've always cut rubber.[7]

Most rubber tapper households in eastern Acre today are autonomous and independent producers.[8] Along the Riozinho do Rola all but two of the 50 households in the survey were autonomous. These two households maintained traditional relationships of exchanging their rubber and Brazil nut production for *mercadorias* with the *patrão*, although this was claimed to be a matter of choice not coercion.[9] Three other partial exceptions were essentially autonomous households except that instead of owning their *colocações* they paid a nominal rent. In all three cases the landlord was a fellow *seringueiro* and a relative of the tenant.[10]

Official land tenure in Acre is extremely convoluted. In the past no fewer than four jurisdictions have presided over the allocation of title, often with little or no regard for prior claims. To say the least, there has been a long line of false claims, double titling and general confusion around the whole issue of land ownership in the state (Schwartzman 1992; Schwartzman and Allegretti 1987). On the *seringais* today, especially among the autonomous rubber tappers in eastern Acre, there are only a small minority of households that retain any kind of documentation supporting their right or claim to a particular piece of land. Nonetheless, within the forest community there is a *de facto* recognition of land, or more precisely, *colocação* ownership. *Colocações* are regularly traded or exchanged between families for rubber, Brazil nuts or other considerations (Figure 6.6). Depending on the number of rubber and Brazil nut trees and its location in relation to the nearest navigable river the exchange value of a *colocação* ranged from 300-600 kilograms of rubber.

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7 Field interview.

8 INCRA official, personal communication. Cf Almeida, 1992; Whitesell, 1988. See Chapter 4.

9 Field interview.

10 Field research - household survey. *Dona de casa* is the female head of the household, *dono de casa* is the male head of the household.

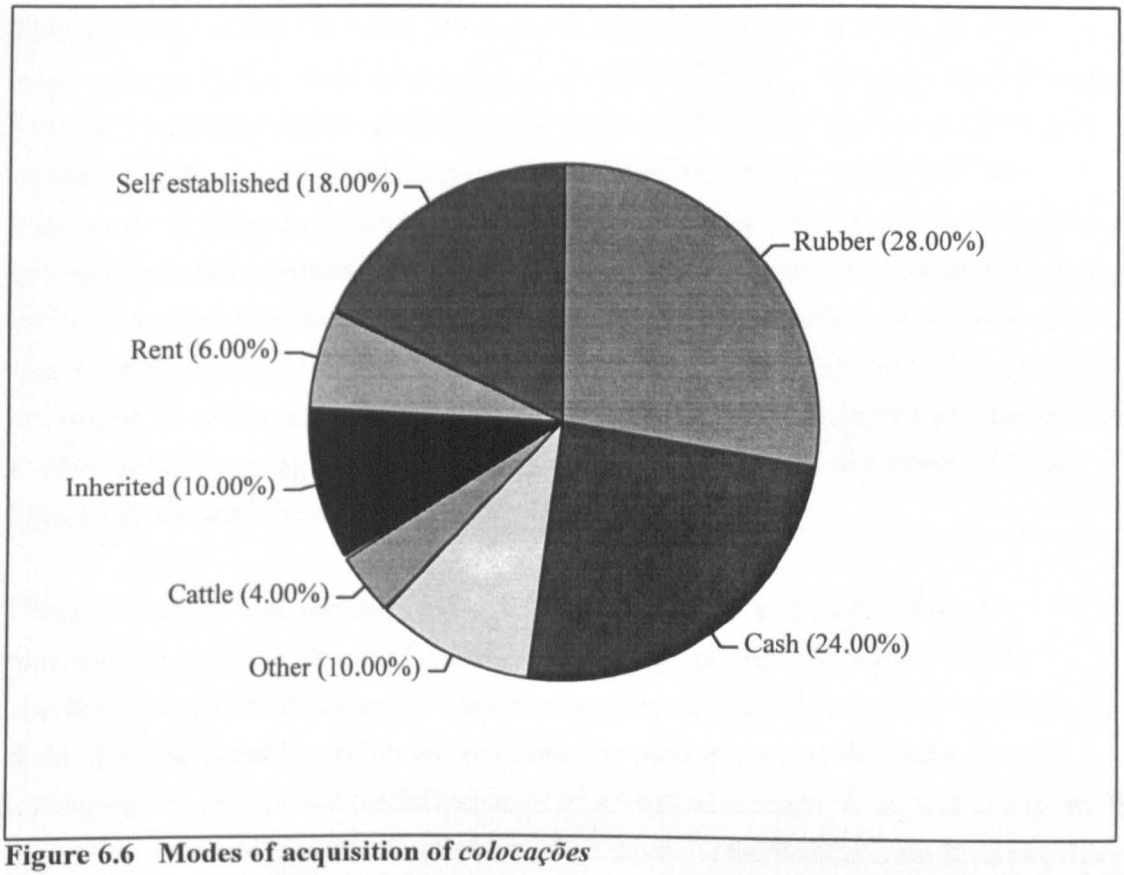

Figure 6.6 Modes of acquisition of *colocações*
Source: Household survey

Although rubber tappers buy, sell and trade their *colocações* on a regular basis, overall the forest is regarded as a communal resource. By convention households own the right to tap rubber and collect Brazil nuts from the trees within their *colocações*. They also have jurisdiction over the clearing of forest for agriculture within their domain and, should the household choose to do so, the selling of trees to commercial loggers. By comparison, hunting, fishing, and the collection of other non-timber forest products, such as wild honey, are more or less unrestricted.

6.3 Conclusion

Rubber production began in earnest in what is now Acre when the first *seringais* were opened up along the upper regions of the Rios Purus and Jurua during the nascent stages of the Rubber Boom (CNS 1992; Dean 1987:40; Rancy 1986; Tambs 1966:258-267 *passim*). The Riozinho do Rola basin itself received some of the earliest arrivals to Acre and continues to be a significant rubber tapping area that provides an excellent cross-section of the conditions and circumstances faced by contemporary rubber tappers in eastern Acre.

The proximity of Rio Branco to the research area presents both advantages and disadvantages for the resident population and for researchers. Although the state capital is far and away the largest urban centre in Acre and, therefore, represents the largest market, its influence on conditions in neighbouring forest areas should not be overstated. In other areas, demographically much smaller urban nuclei provide the same essential linkages between the seringal and the wider economy. Rio Branco's influence on the Riozinho do Rola is most notable in terms of the pressure its population exerts on resources and land by the gradual creep of "development" up the basin. The city does not impart excessive advantages to the residents of the Riozinho do Rola in comparison to other rubber tapping areas that are articulated with much smaller towns such as Plácido do Castro, Xapuri or Feijó (World Bank 1991: 7)

There was substantial variation in the relative wealth and well being of the 50 households studied during the fieldwork. The chapters that follow examine the composition of rubber tapper livelihoods along the middle portion of the Riozinho do Rola. Diversity and flexibility are key concepts used to explore the make-up of livelihoods, to understand the influence of a variegated resource base, and to explain the roles of a variety of livelihood activities. This study of the Riozinho do Rola provides a glimpse of an active, established rubber tapper population that is still distant, but is no longer isolated, from population and development pressure and the general influence of wider Amazonian society.

Chapter 7

The Forest Harvest: Tapping and Producing Wild Rubber

7.0 Introduction

One of the clearest physical determinants of productivity in the *seringueiros* resource base is the geographic distribution of rubber trees. The density and location of trees and their accessibility to the household are reflected in the size and layout of trails which in turn bear directly on production levels. Substantial work is required to clear and maintain rubber trails, work that is partially determined by the nature and structure of forest micro-zones. During the rubber tapping season only the availability of labour restricts its application to the production of rubber. During the trail clearing phase labour can be increased at will through sharing and exchange of workdays between households. The quantity of rubber produced is most directly affected by the number of days that household labour is applied to rubber production over the course of the tapping season which lasts for about six or seven months of the year. In this regard rubber tapping is a highly flexible activity and can be easily coordinated so as not to conflict with other aspects of livelihood which may be more restricted by seasonality or other factors. Ultimately, the amount of time that is devoted to the production of rubber is a subjective decision based on the individual household's assessment of its needs and its ability to meet those needs through the application of household labour.

The productivity of individual trees has both an ecological and a social element. Some trees are simply more productive than others, but the care and skill with which individual rubber tappers harvest their latex also has crucial bearing on the long-term yield of each tree. Through the careful cutting and maintenance of their rubber trees the tappers are able to extract value from the forest with little or no substantial alteration or disturbance of the ecosystem. It is this last point that strikes to the core of the debates on sustainability in the use of tropical forests and represents one of the intrinsically conservationist aspects of *seringueiro* livelihoods.

There are a variety of processes used in the forest to convert latex into crude rubber for sale. These techniques are based on a cornucopia of ethnoecological knowledge and experience and are well adapted to the conditions of forest life. Of the two principal methods of rubber production – smoking and coagulation – the former is substantially more labour intensive. Smoking rubber is also the more traditional method and, according to interviews in the field, is considered to produce a more valuable product. Interestingly, this assumption is not born out by the household survey, which shows

little difference in the actual prices of smoked and coagulated rubber. In terms of livelihood composition, however, access to different processing techniques once again adds to the flexibility of *seringueiro* livelihoods and enhances the household's ability to respond to changing circumstances.

The following discussion will emphasize the variability of the rubber tappers' main forest resource, *Hevea brasiliensis* and explore, from the standpoint of rubber production, the ways in which *seringueiro* livelihoods are well suited to dealing with the vagaries of the physical and social environments in which they operate. While some of the data presented here may represent unique features of the Riozinho do Rola region itself, overall the discussion is aimed at bolstering the current understanding of the *seringueiros'* extractivist methods and why they work. With a firmer understanding of rubber production it will become clearer how rubber tapping fits into the realm of forest product extraction, and how in turn forest product extraction fits in with the overall mosaic of *seringueiro* livelihoods and *caboclo* society in general.

7.1 *Estrada de seringa* - the rubber trail

The *estrada de seringa* or rubber trail, is the basic spatial unit which governs the collection of latex from the forest. Between the fifty odd households within the research area there were 283 rubber trails of which 185 (65%) were being actively cut in 1993.[1] This represents about 24,000 to 25,000 *Hevea* trees in active production during the season of the field work. An *estrada* is typically described as a circular or teardrop shaped trail that loops through the forest from tree to tree, starting and finishing at or near the *barracão* (Weinstein 1983:16-17; Bakx 1986; Schwartzman and Allegretti 1987:8).[2] However, the degree of circularity of rubber trails that is implied is somewhat misleading. After walking over four hundred kilometres through the forest, mostly along rubber trails, it was evident that the layout of *estradas* is as complex and varied as the distribution of the rubber trees themselves (See Figure 7.1). More often than not, a trail tends to wind and zig-zag through the forest, doubling back on itself time and again as it leads from tree to tree. There are numerous dead end trails called *mangas* (literally; to go and return) which branch off from the main *estrada* and lead to one or more otherwise isolated rubber trees. Often the rubber trails do not begin and/or end conveniently at the *barracão* and are instead connected to the *seringueiro* family's

[1] Field research household survey.

[2] The *seringueiros* of the Riozinho do Rola referred to the main dwelling of the *colocação* and its immediate environs as the *barracão*. Historically the term referred to the trading headquarters and supplies store of the *seringal* where the rubber tappers would bring their rubber and Brazil nut harvests to exchange for *mercadorias* with the *Patrão* or his representative (cf. Almeida 1992; Weinstein 1983).

residence by another trail known as the *espigão*. The *espigão* itself can be quite long and is often routed past active rubber trees enhancing the use of time spent in walking between the *barracão* and the *estrada*. In some instances rubber trails are situated deep in the forest at the back of another *estrada* and up to an hour or more on foot from the *barracão* (Field observation; Almeida 1992).

The size of individual *estradas* varies substantially in both overall length and in the number of trees they access, although for the *seringueiro* it is the latter that is the measurement of consequence. During the household survey many respondents reported precise numbers of rubber trees for each of their *estradas*. These ranged from particularly small *estradas* of 40 to 50 trees each to a maximum in excess of two hundred trees.[3] On average, however, and in keeping with data from elsewhere in Acre, rubber trails tend to encompass 120-140 rubber trees reflecting a natural balance between rubber tree distribution and the availability of household labour (Field observation; Almeida 1992; CNS 1992:52; Rodrigues 1991:22-24; INCRA 1990,1989,1988).

Various estimates put the average area of a *colocação* at anywhere between 200 and 600 hectares. The Conselho Nacional dos *Seringueiros* (CNS) has calculated that the average *estrada* occupies about 100 hectares and, therefore, the average *colocação* covers about 300-400 hectares (CNS, 1992). Santos (1980 in Allegretti 1989) reports an average size of 540 hectares while in the region of the Upper Jurua in western Acre, Almeida (1992) has come up with an estimate of 850 hectares for the average *colocação*. In contrast to the single household *colocações* that are the norm along the Riozinho and elsewhere in the Purus Valley, in Almeida's research area *colocações* are comprised of groups of households which he calls "settlements". With the average settlement having 2.79 "houses", the area of forest exploited by a single household amounts to 338 hectares (Almeida 1992:178). For the research area along the Riozinho do Rola the average potential area of land per *colocação* was about 600 hectares although it is important to recall that this includes territory that lies between *colocações*, land that is not necessarily part of individual holdings (Field interview; Chapter 6). As Schwartzman and Allegretti (1987: 8) have pointed out, the actual area of a *colocação* is less relevant to understanding rubber tapper livelihoods and resource use than is the distribution of forest resources.

[3] In one exceptional case the household reported a single *estrada* with 298 rubber trees.

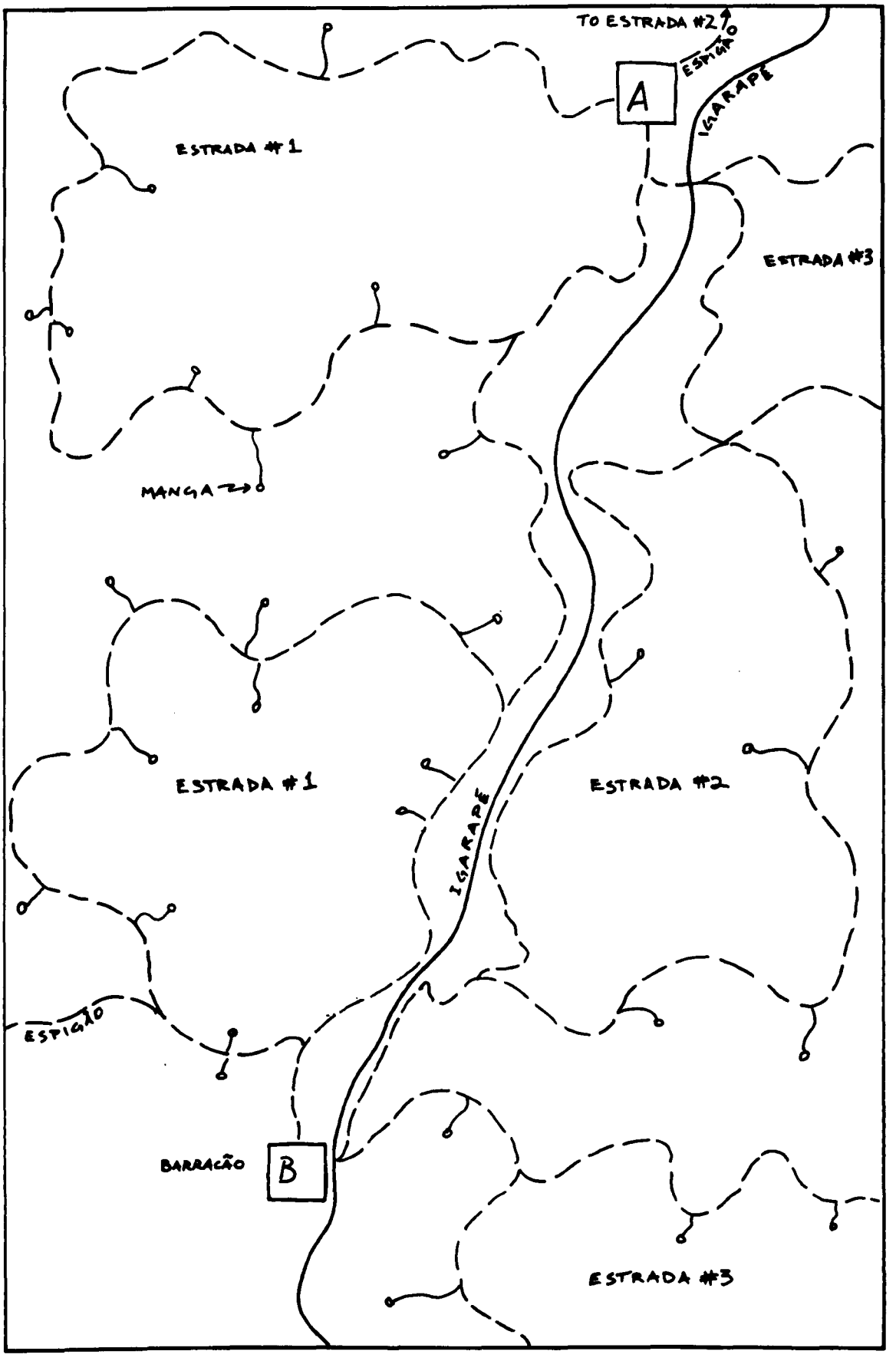

Figure 7.1 Representation of the layout of *estradas* or rubber trails.
Source: Field research.

The extensive nature of extractivist rubber production is reflective of the natural occurrence of *Hevea* species in the forest.[4] Distribution is highly variable and rarely are rubber trees encountered in groves of more than a few individuals, if at all (Field interview; Dean 1987:36). The spatial organization of *estradas* is done in such a way so as to maximize the efficiency of moving through the forest from tree to tree but even so, rubber trails are necessarily long and cover large areas of forest .[5] For rubber to provide a meaningful portion of household income, comparatively large areas of land must be available to support a single family.

Critics of extractive reserves argue that the inherent extensiveness of forest based livelihoods, rubber tapping in particular, is a major limitation to the usefulness of extractivism as a viable strategy for sustainable development . It is argued that because extractivist livelihoods can only support relatively low population densities in the long-term, they have limited utility. However, this ignores the fact that alternative forms of rural development and land use, such as large scale ranching or full-time agricultural livelihoods for the most part employ fewer people per hectare, have graver environmental impacts, or are socially and economically unsustainable (Nepstad et al 1992; Hecht and Schwartzman 1989). Recent developments in many frontier areas of Amazonia illustrate the comparative strength of traditional peasant livelihoods associated with the many types of *caboclo* society. Capitalist forms of development in Amazonia are governed to a large extent by the fluctuation of state involvement in the regional economy and pressures of the international market. A dramatic example of this phenomenon is the sharp decline in rates of deforestation along some Amazonian frontiers that occurred when state subsidies for ranching were removed in the late 1980s (Moran 1993). By comparison, sectors of *caboclo* society have persisted, not in a static fashion but through adaptation and resilience that stems to a very large degree from the flexibility and diversity of their livelihood composition.

7.2 Rubber trail preparation and maintenance

The area of forest that is actively exploited by a *seringueiro* household is not solely determined by ecological factors; it is also a function of household needs and labour resources.

Two-thirds of the *colocações* surveyed worked or had access to between two and six *estradas*. A dozen older, well established *colocações* controlled nine or more *estradas*, to a maximum of 13. Often these latter cases were home to more than one family

[4] The low density and dispersed distribution of rubber and other tree species is a corollary of the high biodiversity that is characteristic of Amazonian forests.

[5] See Bakx 1986 and Almeida 1992 for full descriptions of the process involved in laying out a rubber trail.

although in all cases these multiple family *colocações* were between close kin. The number of *estradas* being cut in a given season was dependent primarily on household labour resources. During the fieldwork two-thirds of the households had between two and four *estradas* in production, although households with two or more full-time rubber cutters would often have more trails in production. In general the number of trails being actively cut per *seringueiro* rarely exceeded three (Field research; Almeida 1993; CNS 1992; Rodrigues 1991).

The preparation of an *estrada* and its trees for a season of tapping consists of two distinct tasks which may or may not be carried out concurrently. The first task comprises the clearing of encroaching vegetation from the trail itself and the area around each tree. This is done to facilitate movement along the trail and to reduce the risk of snakes. The second task involves scraping the bark of the tree around where it is to be cut (*raspar seringueira*). Scraping is carried out to clean the area where successive cuts in the bark will be made over the course of the tapping season, to both facilitate good cutting technique and to reduce the risk of impurities such as small bits of bark and lichen falling into the cup of latex. Much of the literature provides little description or analysis of this aspect of rubber production, somewhat surprising in view of the fact that it can be a fairly involved and time consuming task, making extensive demands on household labour. A thorough accounting of the costs of rubber production, particularly labour costs, must therefore pay close attention to trail and tree preparation. Although detailed and comprehensive analysis of the allocation of labour was beyond the scope of this research, field data points to the significance of the work required of a household each year before actual cutting and collecting of latex can even begin.

On average, households claimed to have spent slightly more than 30 human-days in the process of rubber trail and tree preparation in the last two seasons. It is important to point out, however, that this average falls within a considerable range of effort that may be required to bring a trail on line in any given year. Some households reported spending as few as three human-days on preparation before commencing tapping. Other households reported four or five-person work teams being occupied for a full month, consuming up to 126 human-days of labour in the process. One *colocação* surveyed, for example, had four active *seringueiros* (father and three sons) who between them cut all nine of their *estradas* in most years. They stated that on average 80 to 100 human-days – 6% of their aggregate potential work days for the year – were required to open the trails before cutting each year. In these extreme cases the respondent would often add that the trail in question had not been cut for perhaps five or ten years. In such cases a substantial amount of reclamation work would need to be done. In a

comparative study of the Extractive Reserves Cachoeira and São Luis do Remanso, preparation of rubber trees and trails was reported to involve an average of 24 and 43 human days of labour respectively (Rodrigues, 1991).

The data illustrate that the demand of trail clearance on household labour resources ultimately implies a greater per unit cost in the production of rubber than simple calculations based on the number of days spent cutting. On the other hand, tree and trail maintenance is not only a cost. It is also an investment in the productivity of household labour.

Most of the *colocações* had several more trails than would ordinarily be cut in a given year. Households, therefore, often manage their rubber tree resources by leaving trails dormant after one or more seasons of cutting, an approach analogous to leaving a crop field to fallow. In such instances, when it comes time to cut the trail again, substantial work may be involved to reclaim the *estrada* from the encroaching vegetation. The longer a trail lies dormant, the more effort required to bring it on line again. Conversely, *colocações* less well endowed with *estradas* are forced to cut all their trails more frequently and subsequently they tend to require only minimal preparation each year.[6] More frequent cutting of particular trails, however, may lead to declining productivity from over-tapped trees.

The timing of the demand on household labour for the clearing and preparation of rubber trails at the beginning of a new season is varied. The work is not as sensitive to seasonal environmental constraints as tasks such as planting or forest clearing are. Trail preparation does not conflict with the collection of Brazil nuts, although it can quite easily coincide with the rice harvest and the planting of beans. Even so, as it is a prerequisite to the collection of rubber it is ideally carried out as early in the season as possible. Having said that, this researcher participated in trail clearance in mid-August with a family that was endeavouring to open up and tap two trails for the remaining weeks of the tapping season before the rains arrived. Previously this family had planned to forgo rubber production entirely, in order to concentrate on agriculture with a view to generating a marketable surplus for the following year. At the beginning of August they envisaged a short-fall in basic supplies needed to get them through the intervening months before the next harvest. Faced with the prospect of running up a large debt they decided to generate some immediate income from rubber. It was a situation which exemplified the flexibility of *seringueiro* livelihoods and how the ability to move

[6] Field research household survey and interviews.

quickly between diverse livelihood strategies is an often crucial factor in ensuring family subsistence levels.[7]

A particularly interesting aspect of this preparatory phase in rubber production is its communal nature. Most *seringueiros* reported receiving some kind of assistance from neighbours and relatives for trail clearance and tree preparation prior to tapping their trees. The exchange of labour between households seemed more prevalent than with other occupations such as rubber tapping or the Brazil nut harvest. Work parties were typically set up to take care of the task at hand as quickly as possible, especially in the case of severely overgrown *estradas*. The participants did not appear preoccupied that the exchanges should be completely or consistently equal. One *seringueiro*, for example, received a day's labour from five members of his wife's family which was spent preparing a rubber trail. In return he spent only one day of his own time helping to clear one of their trails.[8] The disparity of the exchange itself was not important and illustrates the cooperative nature of inter-household relations and the flexibility of labour in the forest. Labour exchange is one facet of a dynamic internal economy that involves the trade of goods and services between households on the *seringal*.

7.3 Cutting rubber

Tapping rubber, or cutting as the *seringueiros* refer to it, has not changed in any significant way since the peak of the Rubber Boom in the first decade of this century. The skills and ethnoecological knowledge upon which the process is based most likely originated from Amerindian cultures and are perhaps centuries old. The pressure to increase production during the Rubber Boom led to certain innovations such as the rubber tapper's knife or *cabrita* and the herring bone cutting pattern which replaced the use of an axe and haphazard incisions respectively (Bakx, 1986; Barlow 1978; Reis 1953:100). The process of tapping is not overly complex, although care and skill are required to maximize production and still ensure the long term productivity of the trees. To the modern observer cutting techniques and the overall management of the rubber trees and trails are an excellent example of conservation and sustainability in action. Numerous forest and domestic plant resources are conserved or "managed" by households usually on the basis that they have some utility. Estimates run as high as 50 as to the number of plant species a household may actively manipulate or otherwise manage at variable levels of intensity (Kainer and Druyea 1992; Schwartzman 1989).

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[7] Field interview.

[8] Field research

Rubber trees are not cut on a daily basis, as this is widely acknowledged to impinge on the production of latex (Field observation; Almeida 1992:233-257 *passim*; Allegretti 1989; Drabble 1973). The *seringueiros* regard as ideal a rubber tapping regimen which maximizes production and ostensibly does not overwork the tree, it is comprised of a six-day rotation of three trails as illustrated in Table 7.1. In reality this ideal pattern is likely to be deviated from as often as it is adhered to by individual households striving to balance limited resources. For instance, it was quite common for households to operate only two active rubber trails which would be tapped alternately, two to six days a week. Key informants insisted that trails were never cut on a daily basis by other than the "short sighted" or "foolish", despite the potential for higher short term production (Field research; Almeida 1992). Ultimately, it is this natural limit on productivity of the *Hevea* that encourages a conservationist tapping regimen. Rubber tappers generally know to what intensity they can tap their trees and that over-cutting can lead to a rapid decline in latex production.

On a typical rubber tapping day the *seringueiro* arises in the early pre-dawn hours known as *madrugada* in order to complete the cutting before the heat of the day sets in. When the temperature is cool the latex runs freely. Once the trees have warmed up latex yield is significantly lower and it is thus not advantageous to tap rubber later in the day. Curiously, rubber tapping is not done during the summer *friagems* when temperatures can drop to overnight lows of twelve degrees Celsius or less. It was explained that while latex does flow abundantly during these cold snaps, it becomes counter productive to tap during the *friagems* because of the risk of exhausting the trees' short-term supply of latex and possibly jeopardizing future productivity of the tree (Field interview; Almeida 1992:236; Drabble 1973).

Trail No.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Trail 1	Cut	Rest	Rest	Cut	Rest	Rest	Rest
Trail 2	Rest	Cut	Rest	Rest	Cut	Rest	Rest
Trail 3	Rest	Rest	Cut	Rest	Rest	Cut	Rest

Table 7.1 Idealized weekly tapping regime for three *estradas*
Source: Field research

On his first round of the rubber trail the *seringueiro* makes the cuts in the bark of each tree from which flows the white, milky latex. Each cut is made about seven millimetres deep, in an area of the trunk that has been scraped clean at the beginning of the rubber tapping season. The first incision is made at an inclination of roughly twenty degrees to horizontal, parallel, and usually below, the previous cut or *corte*. At their lower end each cut terminates against a long vertical cut know as the *risco*. Together each risco

and its associated *cortes* is referred to as a *pano* (Appendix A). In certain instances, such as in the case of a particularly productive tree, a cut is made at the top and bottom of the pano. At the junction of the vertical and the inclined cut, a small inverted crescent cut is made under which the edge of a small, metal cup (known as the *tigela*), is tucked to accept the latex as it runs from the fresh incision. If the *seringueiro* is not equipped with metal *tigelas* there are numerous means of improvisation. A method commonly observed employed a small rectangular piece of metal, bent slightly to form a trough which is then stuck into the bark at the junction of the risco and the *corte*. The latex thus flows down the makeshift spigot into a suitable receptacle, such as a Brazil nut husk, held in the crotch of a forked stick and propped up against the tree.[9]

New *panos* are generally started at the beginning of the tapping season, depending on how many times the tree was cut the previous year. Once a *pano* extends vertically to cover approximately a metre of trunk it is abandoned and a new pano is commenced farther up the tree. The most active *panos* observed on a single tree was six, on a tree with a diameter at breast height (dbh) of about 1.5 metres. The spacing of *panos* is determined by measuring off approximately three spans of the hand (+/- 50 to 80 centimetres) between one *risco* and the next. In this way it is guaranteed that there are always spaces of bark left intact between adjacent *panos*. The rationale behind this practice, like the rotating cutting regimen, is aimed at preserving the health and productivity of the tree. Several *seringueiros* pointed out that careful stewardship of their rubber trees is important and fruitful:

> When we arrived at this *colocação* the trails were already open but they were dead. They had been badly treated, badly cut...but we continued with them all the same...we cut carefully and today my rubber trees are good...When we arrived we would get only five or six *latas* of *leite*...these days we get more than ten *latas*, eh. It's much better. You have to be careful, the bark is thin and easy to ruin, if you're not careful with rubber trees they are finished...if you cut badly or too much, the tree can die.[10]

After preparing the new cut in the bark, cleaning the *risco* and placing the *tigela*, the *seringueiro* may do some brief cleaning up or maintenance of the *pano(s)* and perhaps take a few swipes with the machete in the small cleared area around the tree. He may spend two to five minutes at each tree depending on the number of cuts to be made and on how many log ladders (*escadas*) he has to climb to reach panos that are being worked

[9] Field research
[10] Field interview.

high up on the trunk. Then he sets off for the next tree at the brisk pace of one for whom the forest is the work place. It takes from four to six hours to complete the first round of an *estrada* at which point the *seringueiro* returns to the *barracão*. After the morning meal it is not long before the *seringueiro* heads back to the *estrada*, armed this time with a rubberized sack and a metal bucket to collect the few ounces of latex that have accumulated in each of the *tigelas*. The collection of the latex takes about one-third of the time that is required for the cutting. Whereas cutting is a solo task, at the collection stage other household members are likely to be involved (Field observation; Allegretti, 1989).

7.4 Producing rubber from latex

Three principal methods have been traditionally used in Amazonia for producing rubber from the latex of *Hevea brasiliensis*. Two of these approaches use a liquid coagulant while the third entails heating the latex over a hot smoke. A fourth technique has been adopted in recent years by some of the rubber tapper cooperatives in and around Xapuri in South-eastern Acre. In this process thin, high quality sheets are produced in small factories known as *mini usinas* (See Bakx 1986). To date there are no *mini usinas* along the Riozinho do Rola.

The simplest method of producing rubber is to pour the latex into a wooden box (*caixa*) made for the purpose, or as was once observed, into a rectangular hole carved in the ground. After coagulation the resultant block of solid rubber is variously known as a *prancha em caixa*, *coalha* or *coagulada* or just simply *prancha*. The most commonly used coagulant in the research area was the *leite* (i.e. sap or latex) from the gamileira tree which is added to the day's latex at a ratio of approximately 1:80.[11] In rare instances the latex may be left to coagulate on its own but this takes a very long time and is impractical for producing large quantities of rubber. Once the *seringueiro* is satisfied with the size of the *prancha*, it is removed from its enclosure and stored in a pond or in the river to prevent it from drying out and losing valuable weight.[12]

Alternatively, some *seringueiros* opt for producing pressed rubber known as *caixa prensa* or *prancha prensa*. Here the *prancha* is made in the process described above, except once a block of sufficient size has been coagulated, excess water is removed from the *prancha* by compressing it under weights or using the wooden, *farinha* press.

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[11] Possibly *Ficus* sp. also known as caxinguba along the Jurua in western Acre (Almeida 1992:237) also see Cruls (1958: 411) where caxinguba is identified as *Pharmacosycea anthelmintica*. Alternatively latex can be coagulated using manufactured chemical compounds such as Potassium Aluminum Sulfate or acetic acid, although this was not observed during the research (Reis 1953: 100)

[12] Field observation

Caixa prensa may command a marginally higher price than ordinary coagulated rubber because of its lower water content. Its marginally lower weight is a consideration for *colocações* located away from the main channels in the interior which are faced with more onerous transportation requirements. Interestingly, only households located in the interior were seen to be producing *prancha prensa*, although not exclusively; they also produce smoked rubber and regular *prancha*. No household situated at or near to a river appeared to bother with the added effort of pressing coagulated rubber.

The third method of producing rubber from latex is smoking which takes place at the end of each tapping day in the aptly named *casa de fumar* or *defumador* (smoke house). This usually consists of an A-frame structure covered with an açai palm roof. Inside is a cone of earth with a hole down the centre which acts as a chimney for a subterranean fire pit. The fire pit, built directly underneath the cone is accessed from an adjacent hole dug in the ground beside the cone (Appendix A). The cone itself is about 80 centimetres high. Two poles are situated, parallel to each other, on opposite sides of the cone and supported by posts sunk into the earth around the cone. A third, free-moving pole rests on the fixed poles about 20 centimetres above the top of the cone. In the afternoon on the days latex has been collected and brought back to the *barracão* a hot, smoky fire is started in the fire pit with small bits of green, resinous hardwood, husks from the jatobá (*Hymenaea* sp.) or urucuri seeds (*Scheelia princeps* arsten) (Field observation; Kainer and Duryea 1992: 420; Reis 1953: 98). Simultaneously a small fire is built beside the cone over which the latex is warmed in a large, multi-purpose aluminium bowl to make it less viscous and easier to work with. Once the smoke starts to billow out of the top of the chimney cone, a gourd scoop or tin can is used to ladle fresh latex along the middle half metre of the free moving pole while the other hand keeps the pole rotating constantly. This is done to one side in such a fashion that any latex dripping off the pole falls back into the receptacle containing the day's latex. The pole is then shifted, still rotating, into position above the smoke for a few minutes until the latex solidifies on the pole. Next the *seringueiro* slides the pole out of the smoke to dribble more fresh latex along the previous application and so on until the day's latex has been used, about a two to three-hour process.[13]

The smoked rubber takes the form of an oversized rugby ball known as a *pèla* or *bola*, and usually weighs between 40 and 50 kilograms. The *bola* is typically branded with a number and the initials or other unique mark of the *seringueiro* as well as with the estimated weight, which is calculated based on the amount of latex that went into making the *bola*. Smoked rubber has a lower moisture content and fewer impurities

[13] Field observation

than *prancha* and allegedly commands a higher price than coagulated rubber. According to one *marreteiro* interviewed during the field research the price for a *pèla* was Cr$56,000/kg ($0.66US/KG), compared to Cr$50,000/kg ($0.60US/KG) for the *prancha*.[14] Similarly, survey data recorded for 32 rubber transactions between April and August, 1993 (inclusive) shows a mean price of $0.49 US per kilogram for smoked rubber versus $0.44US for the coagulated product.[15] Although five cents per kilogram would appear to be a negligible difference, over a 600 kilogram season of rubber production a *seringueiro* could ostensibly stand to make an additional $30.00US by electing to produce *bolas* which represents a significant portion of an average household's annual cash income.[16] To put it in terms more relevant to a *seringueiro*'s livelihood, the difference amounts to more or less a year's supply of coffee or sugar, two year's worth of machetes or two pairs of rubber boots.[17]

On the other hand, the greater potential price for smoked rubber is not guaranteed. Survey data from 36 transactions for the period of June 1992 to January 1993 showed no significant difference in the average price between smoked and coagulated rubber, in fact *prancha* was marginally more lucrative at 41 cents per kilogram than *bolas* which apparently were only getting 41 cents per kilogram on average.[18]

The process of smoking rubber, furthermore, is long and arduous. There are also widely recognized health hazards associated with prolonged inhalation of the acrid smoke within the confined space of the smoking hut (Field research; Bakx 1986; Reis 1953:100). There is also the additional work associated with the collection and preparation of wood fuel for the smoking fire to be considered and the extra labour involved in the smoking process itself. In the view of one key informant, coagulation techniques are unquestionably superior:

> The *seringueiro* gets up to tap rubber very early, before dawn, and goes out for maybe six hours...then he goes back out at eleven to collect the *leite*, finally

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[14] Field interview.

[15] Field research - household survey

[16] According to the CNS survey of the Chico Mendes Extractive Reserve (CNS 1992:57) per capita income in 1991 was around $100.00US per annum. There are two important points to be made with regard to these figures. To begin with, the household unit, usually with a strong family core, is the crucial element that ensures the survival of both individuals and larger social groups. Therefore, household income is much more relevant to the discussion of the composition of seringueiro livelihoods. Secondly, cash in itself is only one component of the household economy and thus does not stand alone as a useful measure of household well-being (cf Schwartzman 1989, 1992).

[17] Field research - household survey

[18] Field research - household survey. In fact there were a total of 55 rubber sales/exchanges recorded for the period. See Chapter 8 for a discussion of variability in the price for rubber *seringueiros* receive.

> arriving at one or two in the afternoon to smoke the *leite*...you have to pour the *leite* into a pan, cut some fire wood and make a fire and then spend one or two hours smoking the rubber. Not anymore, now because of the gamileira tree you just pour the *leite* into a wooden box and add a little bit of the gamileira sap to coagulate the latex...it makes good rubber and it is much easier. The *seringueiro* then also has time for other things, he can work in the *roçado* or something, or go hunting...[19]

Nonetheless, two-fifths of the households surveyed continue to produce smoked rubber while two or three others employed both processes. It would seem, therefore, that the decision to produce smoked versus coagulated rubber is a decision based in part on personal calculations of which method may yield the best return. It was also apparent, however, that habit or household tradition influenced the method of production that was used by individual households.

Recently, a fourth method has been experimented with in other parts of Acre. The method is derived from the Malaysian practice of coagulating latex in pressed sheets. Investment in the small production facility or *mini usina* that is required usually involves a cooperative effort among families and neighbours, along with some moderate external assistance (e.g. in the form of rural credit or extension services). Initially, production costs may be higher but over the long term it is hoped that the high grade rubber produced will fetch a better return than either smoked or *prancha* rubber (Almeida 1992; Bakx 1986). The *mini usina* also provides the opportunity to reduce labour costs in the production of rubber from latex, effectively freeing up time for other livelihood pursuits. *Mini usinas* are as yet not in widespread use, primarily because of the capital investment required although this may change in the future.

7.5 The productivity of rubber tapping

By paying close attention to the number of *latas* of latex used to make a *prancha* or *bola* of rubber the *seringueiro* has a good idea of the weight of rubber he has produced and hence the approximate price he should receive. Estimates are most commonly calculated based on a latex requirement of almost two litres, (1 litre = 0.5 *lata*) of latex to yield one kilogram of rubber. In fact, there can be a substantial variation in the amount of rubber yielded from a litre of latex between different forest ecozones and even between individual trees. For instance, some *seringueiros* asserted that rubber trees occurring in areas of *varzea* forest tend to have a "strong" latex that yields substantially more rubber from a litre of latex than *leite* collected in the interior regions

[19] Field interview no. 14

dominated by *terra firme* forest. According to some respondents there are at least two varieties of rubber tree which they distinguish by the colour of the inner bark and by the relative productivity of the latex; *seringa real* is the "stronger" variety found predominantly in or near *varzea* (seasonally flooded) areas of the forest, *seringa vermelha* is described as producing the "weaker" latex and is most often encountered in *terra firme* forests such as *restinga* and *taquari*.[20] *Seringa real* can reputedly yield up to

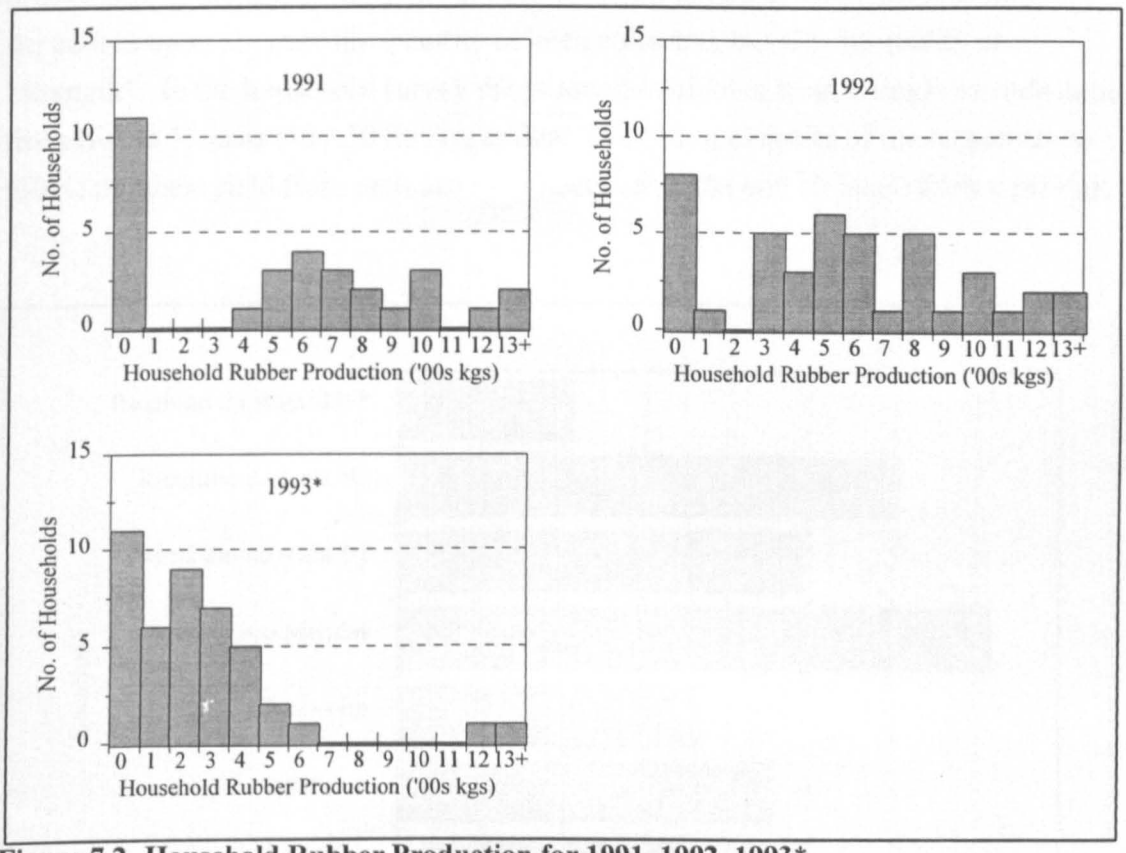

Figure 7.2 Household Rubber Production for 1991, 1992, 1993*
Source: Field research
*Data for 1993 is for partial year only.

[20] Elsewhere in Amazonia, principally in the state of Pará, rubber tappers refer to *seringa vermelha* (red), *seringa branca* (white), and *seringa pretâ* (black). In general botanical investigators have considered the distinctions made by rubber tappers as peripheral to the proper taxonomic identification of the genus and its species although these common names had been written about by the turn of the century (Schultes 1970:243). Schultes (1970) draws attention to a notable exception, Charles D. La Rue whom he quotes from 1926: "It seems to be almost an article of faith with the *seringueiro* that three types of (rubber) trees exist", and whom he accredits with being the first to point out "certain interesting ecological correlation with these 'varieties'" (ibid). From his own extensive work on *Hevea* species and that of R. J. Seibert both of whom have, "focused attention on these bark and other variations that the rubber tappers consider of such importance", Schultes has determined that, "while they may not represent variants clearly enough defined to warrant a technical nomenclature, they are possibly of great significance for the future of the rubber plantation industry" (Schultes 1970:244).

two kilograms of rubber from one lata of leite, in other words, one kilogram per litre of latex. *Seringa vermelha* on the other hand is considerably less productive, sometimes yielding less than half a kilogram per litre.[21]

The productivity of tapping rubber is highly variable. The *seringueiros* daily production of latex is determined by a variety of ecological factors which affect individual tree productivity, by the number and distribution of trees on the *estrada*, and by the proficiency of the tapper himself. In turn, the yield of rubber from this harvest is dependent upon not only the quantity of latex collected, but also its quality or "strength". In the household survey the production of latex from a single *estrada* ranged from five to 15 latas (10 - 30 litres) per day. Even so, a majority of the respondents (60%) put their yield from each *estrada* at between eight and 10 latas of latex per day.

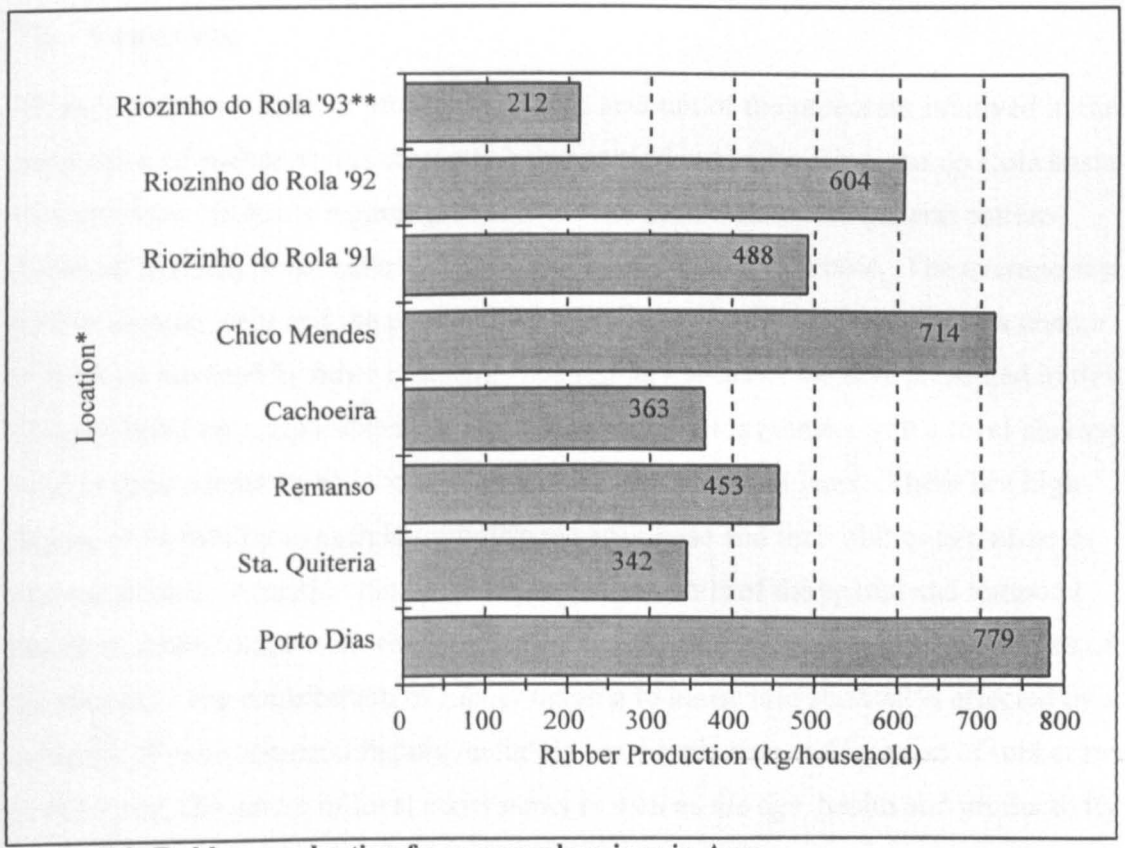

Figure 7.3 Rubber production from several regions in Acre.
Source: Household survey; Almeida 1992; CNS 1991; Rodrigues 1992**Error! Bookmark not defined.**

* All locations besides the Riozinho do Rola refer to declared or decreed Extractive Reserves. Data is for these extractive reserves are averages compiled from 1991 and 1992.

** Partial year only; approximately three-quarters of the tapping season.

[21] Field research - interviews and household survey

Finally, when the number of days actually spent collecting latex in a given season is considered it becomes evident how annual rubber production can range from tens to hundreds of kilograms. Figure 7.2 shows data from the household survey summarising rubber production over three years. Figure 7.3 illustrates the variability of rubber production from several regions in Acre. The former illustrates the variability of rubber production between households which fluctuates according to the factors noted above, but most significantly is tied to the availability and application of household labour to the task of tapping. The latter shows regional variation which may be a result of geographical differences in the distribution and productivity of the *hevea* trees. Social factors such as the possibility of landuse conflicts with other users (which would distract households from tapping) may also contribute to regional differences in household rubber production.

7.6 Conclusion

This chapter has sought to provide a detailed account of the processes involved in the production of rubber as it is currently being carried out in the Riozinho do Rola basin of western Acre. In many regards practices are not dissimilar to the general pattern followed in much of the state and throughout Amazonia as a whole. The average size of rubber tapping areas and the productivity of individual trails in the study area concur with those reported by other research. The primary focus of the data presented in this chapter, however, emphasizes that *seringueiros* are not presented with a level playing field in their pursuit of an income from the harvest of rubber latex. There is a high degree of variability in each household's resource base and their ability to realize an income from it. Attention has been drawn to the details of the spatial and temporal nature of rubber extraction which underlie occasionally misleading generalizations of the process. The contribution of rubber tapping to household survival is affected by a complex of environmental factors including the distribution and location of rubber trees in the forest, the nature of local ecosystems as well as the age, health and productivity of the trees being tapped.

The spatial organization of rubber *estradas* for instance, is not simple, and does not consist of circular trails that conveniently emanate from the *barracão*. The vagaries of the distribution of *Hevea* trees in the forest lead the *seringueiro* far and wide in the pursuit of 20 odd litres of latex. Meandering *estradas*, numerous "dead-ends" (*mangas*),

and strategically placed short-cuts (*varações*) form an uneven lattice of trails which are maintained to cope with this random distribution and facilitate the movement of goods and people within the forest.

In conjunction with ecological factors, social determinants such as the availability and skill level of labour, household decision making, and the way in which individuals manage their rubber resource affect production. The demands on household labour resources of rubber trail maintenance and the preparation of trees for tapping, for example, add significantly to the overall cost of wild rubber production which influences the contribution of rubber to *seringueiro* livelihoods. During this phase of the rubber tapping season the flexibility of labour resources is apparent. Households are able to absorb excess labour at will by combining their efforts to clear trails and bring *estradas* on-line as soon as possible after the rains have stopped. Such activities are especially helpful for *seringueiros* who, due to household demographics, are more heavily burdened by the tasks of trail maintenance.

The ecological soundness of rubber tapping is exemplified by the production process itself. Labour is invested in preparing trees carefully for cutting. Sound skills and management practices in tapping the trees are followed in order to maintain a healthy and sustainable rubber resource. Short term gains are rarely pursued by over tapping as the cost of maltreating the trees may jeopardize household livelihoods in the long term. *Hevea* trees are never cut down intentionally and, in fact, households consciously avoid making clearings for agriculture in areas of forest containing them and other important species. Ultimately, the conservationist nature of rubber tapper livelihoods is not governed by altruism, but by the more basic economic demands of household livelihoods. In other words, except for a small area cleared annually for agriculture the rubber tapper livelihood is wholly dependent on the undisturbed forest ecosystem. It is these characteristics of rubber tapper life that place them in stark contrast to land uses such as logging, ranching and non-mixed, small scale farming in which the ecological impacts are much more pronounced.

Absolute levels of rubber production were shown to be contingent upon ecological factors such as the quality of latex and the distribution of trees and on human factors, especially the availability of labour. The number of human-days applied to rubber tapping over the course of the season was shown to be highly variable. Labour is the

key factor in the relative output of rubber which is closely integrated with other livelihood activities. Through the application of flexible labour resources rubber production can be consciously manipulated to make a greater or lesser contribution to livelihood composition as circumstances require.

Silvicultural treatment of rubber trees in peasant agroforestry systems has not been fully explored as a dimension of increasing rubber production at the household level. Domestication of rubber trees in plantations has, historically, been fraught with difficulties and is widely accepted to be impossible. Both social factors, especially the scarcity of labour willing to engage consistently in wage work (Schwartz 1961 and Kenelly 1989 quoted in Almeida 1992: 59-63) and environmental constraints, in the form of endemic pests and diseases (Dean 1987) have mitigated against the successful implementation of large-scale rubber plantations in Amazonia. The focus on large-scale plantation and wage-based production misses an important middle range of production engaging independent rubber tappers in semi-domestication of *Hevea* trees (Almeida 1992: 60-61). Intensification of rubber tree production on a small scale and as part of an integrated agroforestry system involving forest and domestic plants has not been adequately tested in Acre. This, despite the fact that the socio-political and environmental barriers are not the same as they are for large scale, capital intensive plantation settings (Almeida 1992: 62).

By intentionally increasing the density of rubber trees individual households may be able to increase household production and eventually reduce per unit labour costs. Simultaneously, individual households will be enhancing the regeneration of *Hevea* within their holding and improving the long-term sustainability of their resource base. The initial investment of time and the long interim between planting and production implies land tenure adjustments that give rubber tappers requisite security and control over their resources. Extractive reserves, with their guarantee of user rights to a given amount of forest are an effective way of providing this security.

The multiplicity of variables that affect the return on rubber tapping labour and its contribution to household livelihoods is, however, not solely determined by natural conditions and the production process itself. Market conditions, social relations with rubber merchants and traders, and other external forces are equally important factors in

determining the role of rubber in household survival. It is to these aspects of the rubber economy that we now turn.

Chapter 8

Marketing Rubber: Transportation and Trade Between Forest and Town

8.0 Introduction

There is a diversity of trading relationships and processes by which rubber tappers realize the value of their productive labour. Whereas during the Rubber Boom, and throughout most of this century, traditional rubber estate owners (*patrões*) have held sway over most aspects of the rubber trade, in recent years producer-buyer relationships have changed dramatically. The liberalization of the rubber trade in eastern Acre and elsewhere in Amazonia has opened the way for independent river traders (*marreteiros*), *seringueiro*-traders, and community based cooperatives to play a much greater role in the exchange process. Rubber tappers themselves have also made gains in their influence over where, how, and with whom they enter into exchange relationships.

While the former patron-client system was in many ways more overtly oppressive, rubber tappers continue, under present conditions, to exert little control over prices and thus remain subject to exploitation in the exchange process. As the primary producers in the rubber economy rubber tappers are at the bottom of the trading hierarchy. As such, they must usually accept prices and terms of trade that are imposed from above and which, in the forest at least, are only partially determined by market forces and competition.

In regions where the influence of traditional rubber estate owners has waned, rubber tapper households are no longer obligated to trade solely with their *patrão* and now have a much greater say in the nature and method of the exchange process. The extent of their influence in this process is affected by a number of factors. Access to transportation affects the *seringueiro's* ability to choose where and to whom to sell. The location of the transaction affects the price as well as the mode of payment but is in itself also related to the access and cost of specific modes of transportation. In turn, these factors impinge on the availability of time and labour for other aspects of household production and subsistence.

Overall the household survey conducted along the Riozinho do Rola revealed a range of methods used to secure the sale of rubber. The trading relationships and modes of marketing rubber encountered during the fieldwork each carried specific advantages and disadvantages for the rubber tapping households. More so than the production of rubber itself, the marketing and sale of the product affects the return households receive for their extractive labour. Although rubber tappers do not have perfect mobility between

one mode of sale and another, the element of choice exists and ultimately enhances the rubber tappers' ability to control the composition of their livelihoods. One of the key factors for ensuring the long term prospects of rubber tappers as sustainable users of the forest is the pursuit of trading relationships that are more equitable than have typically been known in the past. This is likely to come about only if *seringueiros* can maintain access to a diversity of marketing options and ultimately become equal partners in the exchange process.

8.1 Trade with *marreteiros*

The itinerant river traders who ply the multitudinous river channels of Acre represent a contemporary manifestation of the old *aviamento* system which has characterized trade throughout Amazonia since the colonial era.[1] Traditionally referred to as *regatões* (singular: *regatão*) in eastern Acre, these small, independent traders are most commonly known by the regionalism *marreteiro*. Along the Upper Jurua in western Acre, Almeida reports a definite distinction between the *regatão*, "an itinerant river trader" and the *marreteiro* a "petty retail trader in [sic] a *seringal*" (Almeida 1992: xi, 97).

During the Rubber Boom tappers would sometimes sell to itinerant traders as a form of "resistance" to the oppressive terms of trade usually offered by the *patrão*, such as constant demands for increased rubber output, prohibition on farming and other subsistence activity, over-charging for supplies at the *barracão*, or simply not stocking the goods and supplies that the *seringueiros* required (Weinstein 1983:21-22). Half a century after the Boom trade with *marreteiros* was still considered a contravention of the patron-client arrangement by the rubber estate owners. Nevertheless, it persisted and eventually played a role in the formation of organized resistance on the part of the *seringueiros* (Schwartzman and Allegretti 1987:7). Gradually, as historical circumstances overcame them, the *patrões'* predominance over the sale of the *seringueiros'* production gave way to the formerly clandestine trade with *marreteiros* (Schwartzman and Allegretti 1987:7; Bakx 1986). While the traditional patron-client relationship continues to the present in western Acre (Almeida 1992) and elsewhere in remoter regions of Amazonas (Whitesell 1988; Sizer 1991) other systems of marketing and trade, in particular that of the *marreteiro*, have taken hold, especially in eastern Acre (CNS 1992; Rodrigues 1991; Bakx 1986).

During the period of the field work there were five or six *marreteiros* regularly trading with the *seringueiros* along the banks of the Riozinho do Rola and Igarapé Espalha.

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[1] See for example: Barham and Coomes 1994; Dean 1987; Schwartzman and Allegretti 1987:2-3; Bakx 1986; Weinstein 1983: *passim*; Cardoso and Müller 1978:12; Reis 1953.

Half of the respondents to the household survey stated that they always sold their rubber to these *marreteiros*. A further quarter of the households said they almost always sold in Rio Branco while the remainder claimed to sell more or less equally between both the forest and the city. Table 6.1 shows the distribution of actual rubber sales that took place in the study area during 1992 and 1993. The data indicates that in the last two years dependence on trade with *marreteiros* has been high by the rubber tappers' own standards, especially in 1993.

Year	City Transactions	Forest Transactions		Total Rubber Transactions
		Marreteiros	*Patrões*	
1992	23 (38%)	34 (56%)	4 (6%)	61 (100%)
1993 (to Aug)	10 (20%)	41 (78%)	1 (2%)	52 (100%)

Table 8.1 Distribution of rubber transactions between city and forest
Source: Field research - household survey

The *marreteiros* pursue their trade along the Riozinho do Rola in long, flat bottomed craft which are stocked with staples or *mercadorias*, tools, hardware and other essential supplies that cannot be made or harvested in the forest (CNS 1992:31.[2] These are most commonly exchanged for rubber or Brazil nuts and, on occasion, other forest or farm produce. Transactions which take place on the seringal between rubber tappers and *marreteiros* involved almost exclusively the exchange of goods. The exchange of cash for rubber and other *seringueiro* household production is almost entirely absent in the forest and in general only takes place during exchanges with merchants in the city.

Rubber tappers have historically been at a disadvantage in the exchange process, a situation not untypical in peasant societies in general. The primary reason for this is their dependency on the *marreteiro* or patrão for the exchange value of their produce. The variability in charges observed in the field from two independent transactions with the same *marreteiro* (Table 8.2) underscores the imperfect nature of the market at the point of exchange in the forest. Seemingly, prices can be set arbitrarily by the *marreteiro* as they do not always have to respond to market forces that only partially penetrate the forest economy. The only recourse available to the rubber tappers if they feel they are being cheated, is to wait for another *marreteiro* to come up river or take their produce to town themselves. In most instances these are not very viable options.

[2] Transportation on the river is dependent on the water level in the river channel. During the dry summer months from about June to September, especially on the upper reaches of the main waterways, movement can be severely restricted and only small, shallow draft canoes can move about effectively. During periods of high water many of the *marreteiros* use larger, covered craft with capacities up to around two or three metric tonnes.

In the forest news and information is constantly exchanged on virtually all aspects of *seringueiro* life. A key area of interest pertains to the *marreteiros*: which ones are currently on the river, when they will be at certain locations, whether they are bound up or down river, what goods they have for sale and, especially, their prices for specific goods.[3] Information on the cost of various mercadorias and the concomitant price of rubber forms a vital part of *seringueiro* livelihood strategies. As Table 8.2 illustrates, prices being offered by different *marreteiros* and even by the same trader to different customers can vary substantially. On a more general level, the volatile, inflationary economic climate in Brazil makes planning household economic strategies especially difficult. During the field work it was clearly evident that the inter-household exchange of up-to-date information was an important measure by which the *seringueiros* sought to ameliorate some of the uncertainties faced in the daily pursuit of their livelihoods.

Goods bought: (prices in cruzeiros)	Transaction "A" Prices: 7/8/93	Transaction "B" Prices: 11/8/93
Soya oil	Cr$150,000/900ml	Cr$100,000/900ml
Sugar	Cr$100,000/kg	Cr$60,000/kg
Coffee	Cr$130,000/250gm	Cr$80,000/250gm
Boots(leather)	Cr$1,000,000/pr	no purchase
Boots(rubber)	no purchase	Cr$1,200,000/pr
Machete	Cr$400,000/ea	Cr$200,000/ea

Table 8.2 Price variability for selected mercadorias
Source: Field Data/Observation, Riozinho do Rola, 1993.

It is frequently asserted in the literature that the prices paid for rubber and Brazil nuts by traditional rubber estate owners (i.e. the *patrões*) and itinerant river traders is exploitive in comparison to those available from buyers in the city (e.g. Schwartzman 1982; Allegretti 1989; Bakx 1986; Weinstein 1983). At the same time the rubber tappers are also forced to pay exorbitant prices for *mercadorias* and other essential supplies they may purchase (Romanoff 1992; Bakx 1986; Weinstein 1983; Reis 1953:125-126). Previous studies have revealed significant mark-ups on most items, often well in excess of 50% and it is a common refrain of virtually every *seringueiro* that their poverty is in part perpetuated by the poor terms of trade that they endure in the exchange process (Sizer 1991; Schwartzman and Allegretti 1987; Bakx 1986). For example, Sizer (1991) reveals that *patrões* in central Amazonas were, "supplying basic foodstuffs at over twice

[3] Field research. It was frequently observed in the field that values of salt and/or sugar and sometimes cooking oil were quoted to give a general impression of current price levels expressed in cruzeiros or kilograms of rubber.

their market value in Manaus (the nearest urban centre), paying 30% below Manaus prices for extracted products, and charging real monthly interest rates of 40% on parts of the outstanding debts." (Richards 1992). In Bolivia in 1981, Romanoff (1992:128, 1981) reports that traditional rubber tappers were typically faced with prices 50% above urban rates for some common food supplies such as rice, oil, flour, butter, crackers, and salt.

Data collected from a small sample of prices for goods in Rio Branco and from various *marreteiros* on the Riozinho do Rola indicate even more extreme mark-ups ranging from 47% to 275%. One *seringueiro* recounted to the author an exchange based on a rate of three kilograms of rubber for one kilogram of sugar exemplify the exploitive nature of his trading relationships with *marreteiros*. The informant claimed that this represented a gross profit ratio of 7:1.[4]

Item	Prices on the *seringal* †	Prices in the city
Salt	$0.50/kg-$0.75/kg	$0.20/kg
Sugar	$0.75-$1.25/kg $0.45/kg (bulk buy - 30kg)	$0.34/kg $0.27/kg (bulk buy - 30kg)
Coffee	$1.00-$1.60/250gm	$0.90/250gm
Soya oil	$1.25-$1.90/900ml	$0.85/900ml
Batteries	$0.90 each	$0.35 each
Machetes	$2.50-$5.00 each	$2.00 each

Table 8.3 Prices for *mercadorias*: forest and city
Source: Field research - household survey and interviews
† Prices in US dollars

The high charges levied by *marreteiros* and *patrões* alike are partially justified by the high transportation costs associated with moving goods between the city and the *seringal* (Romanoff 1992:129; Almeida 1993:107-108). Accordingly these prices also tend to fluctuate in direct proportion to the distance that the *marreteiro* must travel from his supply point. A *marreteiro* interviewed on the Riozinho do Rola explained the reason for the high mark-ups:

> I've spent ten years as a *marreteiro*. I make a living, enough to provide for my children but not a lot, eh...the *marreteiro* doesn't make a large profit, not like the *seringueiros* think. They think that when they buy from the *marreteiro* or sell their rubber to him that he is taking advantage of them because he charges a lot more for the goods he sells on the river than what he paid for them in the city...The *seringueiro* doesn't think about the costs that the *marreteiro* has. He has the cost of fuel for the motor, the cost of the boat and parts if something

[4] Field interview

> breaks down and then he has to make a living, perhaps provide some help for family and relatives in town or on another *colocação*. All of this he has to take from the things he buys in the city and sells to the seringueiros. And yet the *seringueiro* is always against the marreteiro...even though they need him. The *seringueiro* doesn't have the ability to take what he produces here on the *seringal* to the city to sell because he usually doesn't have the use of a boat. They say that the *marreteiro* makes a profit of 50 or 70 per cent and that he must be a rich person, but it isn't like that, the *marreteiro* doesn't make a big profit.[5]

Almeida's (1993:107-129,137-142) comprehensive analysis of trading relationships on the upper Jurua draws attention to the multiplicity of avenues at the *patrão's* disposal to extort profit from the *seringueiros'* production through monopoly price control and the manipulation of rubber tapper accounts. Despite abuses on the part of *patrões*, however, there are inherent limitations to the prices they could charge their *seringueiro* clients (Almeida 1993:90,120). Almeida goes on to caution that, "in the 1980s (*patrões*) did not control the labour process and only partially realized its [sic] function of controlling the circulation of goods. There remains no doubt as to the existence of a 'labour-repressive' system on the rubber estates. But repression...must be understood as the repression of individuals (such as clients owing rent or selling rubber) and not as the control over the labour process."(ibid:129).

Marreteiros, on the other hand, do not have access to the same mechanisms of control over the *seringueiros* and their production as is the case with *patrões* engaged in the traditional patron-client relationship. Nonetheless, *marreteiros* are alleged to be at least as extortionate as *patrões*.[6] This stems primarily from the fact that *marreteiros* are only partially constrained by market forces and competition. *Marreteiros*, furthermore, tend to have a more sophisticated grasp of accounting and arithmetic than most rubber tappers and subsequently the unscrupulous are able to manipulate transactions to their advantage.[7] Whether or not *marreteiros* make more or less profit than *patrões*, some respondents claimed that they were in some respects better off under the subjugation of a patrão. Indeed, several older *seringueiros* along the Riozinho and Espalha lamented the passing of the "*epocá de patrão*", even though their reasons were often as much to do with better hunting conditions and the absence of conflict with loggers and ranchers

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[5] Field interview.

[6] Field interview; Almeida 1992; Schwartzman and Allegretti 1987; Bakx 1986.

[7] This is also a point often made about the patron-client relationship.

in the past (Chapter 11) as they were to do with perceived better trading conditions under the *patrões*.[8]

It is important to note, however, that the during the early 1980s the price of rubber was significantly higher in real terms than it has been during the early 1990s (Cota 1989). The current study encountered a profusion of grievances pertaining to the fact that rubber tappers in general could buy a lot more with a kilogram of rubber 10 or even five years ago than they can now. The following was a common refrain among residents of the Riozinho do Rola:

> You can take 300 kilos of *farinha* or 300 kilos of beans to sell in Rio Branco but you won't make very much, barely enough to pay for the fuel. But at least with rubber you have enough left over after the costs of transportation to buy a few supplies, food and so on. These days its getting more difficult with rubber as well, the price is very bad. There was a time, eight or nine years ago, when you could take 450 kilos of rubber to town and buy everything you needed for the year. You could buy a new shotgun, a kilo of lead, a kilo of gunpowder, you could buy supplies in bulk so that you would get a better price, and clothes for your children and you could afford to stay in town for a month...The price of rubber was about 500 cruzeiros per kilo then, but that was good. Now the price of rubber is so low and everything in the city is so expensive because of inflation, that you could take 850 kilos of rubber to sell and you wouldn't be able to buy as much as you could with 450 kilos before.[9]

The decline in the real price of rubber probably accounts in part for the "worse conditions" experienced in conjunction with the transition along the Riozinho do Rola from a *patrão* to a *marreteiro* based trading regime. Although, as mentioned above, other factors such as land conflicts and reduced hunting and fishing resources complicate the picture. It is not unreasonable to suppose that relatively better economic times in the past – whether real or perceived – result in favourable recollection on the part of some individuals of the overall socio-economic system under which they used to operate.

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[8] Field interviews.

[9] Field interviews; cf Almeida 1992; Romanoff 1992.

Younger respondents and those with at least a rudimentary education placed a higher value on the freedom and independence of being a *seringueiro autonomo* than the "security" of working for a *patrão*:

> The *patrões* left the Riozinho around 1970-75...There are still some on the Upper Jurua and a few on the Iaco...Now is a good time for the *seringueiro* because in the past he was a prisoner, a subject, he could only sell his rubber to the *patrão*. Today the *seringueiro* is free, he has equal rights to any other Brazilian. Before he didn't have any rights, the *seringueiro* didn't have the right to choose anything...Today it is better for this, only the problem of inflation makes it very difficult to survive.

Whether or not things were better for the rubber tappers under the old patron-client system they ultimately had less control over their livelihoods. Since the strength of their livelihoods is dependent on the flexibility and diversity of their composition, it follows that more, not less, autonomy is required if long-term survival is to be achieved. In dealing with *marreteiros*, the rubber tappers are engaged in a more interdependent trading relationship which is at least partially determined by market forces. Furthermore, the social ties between rubber tappers and *marreteiros* are arguably closer than they were between patron and client.

At the beginning of this section it was stated that the river-bound *marreteiro* is part of a forest based culture that is historically bound up with the Amazonian rubber trade and the system of *aviamento*. Despite mutual antagonisms between the *seringueiros* and *marreteiros* they are to an extent socially and economically interdependent. To begin with, the socio-cultural roots of both groups are often the same. Many *marreteiros* have originated from the *seringueiro* community itself.[10] The *marreteiro* quoted above was born and grew up as a rubber tapper in the region and has many *seringueiro* relatives living on *colocações* along the Riozinho do Rola and the Igarapé Espalha. He and his family continue to live on a *colocação* near to the junction of the two rivers:

> To begin with I was a seringueiro, I used to cut rubber. Then I went away, I left cutting rubber and went to work as a labourer on a *fazenda*. I also worked a bit as a carpenter before I got a boat and started to trade *mercadorias* along the Riozinho, to work as a *marreteiro*...I financed the motor with a store in Rio Branco, I paid 40 per cent down and paid for the rest over 10 payments...the boat I made myself. I was born on [sic] this

[10] Field interview; Almeida 1992.

> river, on *seringal* São Francisco and I worked here in this area until I was 18. Then I went to the city with my father and worked there for eight years...but I have returned to my birthplace...it's important, eh.[11]

Other river traders while not originating from the immediate area are, nonetheless, descended from *nordestinos* who came to Amazonia to tap rubber either during the Battalha da Borracha or subsequently. Thus, rubber tappers often share similar socio-cultural roots which may put them on more even, although not necessarily equitable, trading terms. It was evident during the research that tension existed between the two groups, but there was also recognition that their livelihoods are bound up with one another. *Marreteiros* provide a service that allows the *seringueiro* to market products in exchange for needed goods that they would otherwise have to make a long and expensive trip to Rio Branco to obtain. Farther upstream, on the more remote *seringais*, it becomes virtually impossible for most households to contemplate such trips themselves.[12] *Marreteiros* for their part fill a niche in the forest based economy and which effectively has broken the *patrões'* monopoly control over prices through their willingness to negotiate the risky business of transportation between town and the *seringal.*

During their trips along the river, *marreteiros* often stay with *seringueiro* families at night, hanging their hammocks in the multi-purpose front section of the forest house. It is not unusual for the *seringueiros* to allow the use of their kitchens and to generally accommodate the traveling merchants. During the dry months, from June to September, movement along the river becomes increasingly difficult as sand bars and deadfall becomes increasingly exposed and the channel narrows. The *marreteiros* will often be on the river for a month or more, selling their wares on the outward portion of their journey for a guarantee of payment in kind on their way downstream. The extension of credit to the *seringueiro* in this way puts the *marreteiro* at risk as he is normally in debt himself to merchants in the city for the goods he takes to trade along the river.[13] Thus the *marreteiro* cannot usually afford to leave payment until his next trip. If upon his return downstream, the *seringueiros* to whom he has extended credit have not produced enough rubber to settle their account(s), the trader may be forced to wait on the river until he can be paid and suffer the cost of subsequent down time.[14]

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[11] Field interviews.

[12] Field interviews; cf Romanoff 1992; Bakx 1986.

[13] Field interviews; cf Almeida 1992; Schwartzman 1987; Weinstein 1983.

[14] Field interview no. 10

Very little work has been done on the socio-economic position of the *marreteiro* and they have as a consequence been somewhat over demonized in recent accounts of rubber tappers (Allegretti 19889; Bakx 1986).[15] While not denying the apparently stronger economic position they occupy compared to that of the *seringueiros*, the *marreteiro* remains an important agent in the local economy. Any increase in their numbers can only serve to increase competition and thereby improve the negotiating position of the rubber tappers by giving them greater flexibility in the sale of their rubber product and providing at least the possibility of seeking out the highest bidder.[16]

Nonetheless, many of the rubber tappers interviewed recognize that they are still subject to exploitation by river traders through poor terms of trade, high transportation costs and market imperfections. When possible some households seek out alternatives to circumvent trading with the *marreteiros* and adopt slightly different trading patterns.

8.2 *Seringueiro* traders

Rivers and their tributaries remain the most important link between forest communities and the market. A boat and motor, therefore, remain unchallenged as the key to the movement of goods and people between the seringal and the city. Ownership or access to a boat not only allows the freedom and flexibility to market produce at will but also permits the household to bypass the *marreteiro* middlemen and deal directly with merchants in the city. Households can diffuse the cost of running a boat by combining trips with other households and providing a transportation service or by engaging in small scale trade with neighbouring households and relatives.

Along the Riozinho do Rola an emergent sub-group of rubber tappers is making inroads on the trading monopoly traditionally held by *patrões* and more recently by *marreteiros*. Ten *colocações* in the study area were in possession of a boat and motor with which they were able to supplement the sale of their own production through trade and/or by providing transportation for the production of other households. Some of these "*seringueiro*-traders" were, as suggested above, merely engaged in the provision of a transportation service, rather than the full business of the *marreteiro*, buying and selling rubber and Brazil nuts in exchange for supplies from the city. Most of their transactions would be conducted with relatives and neighbours whom would often accompany them on the journey to town. There were, however, four or five boat-owning households who were substantially involved in small scale trade with their fellow *seringueiros*. In this sense they can be construed as virtual *marreteiros*, the composition of the household

[15] Toby McGrath personal communication. Rio Branco, June 1993.

[16] See Chapter 9 on the greater competition between marreteiros during the Brazil nut season.

livelihood being in large part generated through buying and selling, rather than through primary production. It is significant to note, however, that in their own opinion and indeed in that of the *seringueiro* community at large, these households remain, "*seringueiros* themselves" even though they make some of their income, "like a *marreteiro*".[17]

In many cases the transport of goods on craft owned by fellow *seringueiros* entailed only a small payment or contribution in kind to help offset the cost of fuel and motor oil for the journey. Occasionally other terms would be negotiated for payment to be made as a proportion of the value of the goods being shipped. By the *seringueiros*' own assertions, inter-community trade is preferential to dealing with full-time *marreteiros*. Respondents explained that *seringueiro* traders were less prone to exploit other *seringueiros* to the same degree as *marreteiros*.
For example, one of the *seringueiro*-traders most involved in the river trade described two recent transactions in which he had bought and sold the rubber production of neighbouring *seringueiros*. In both cases, which took place during the field work, he made a 20 and 15% gross profit on sales of 200 and 1,000 kilograms of rubber respectively.[18] This is considerably less than the profit margins reported in the literature and noted in the field that are typically achieved by *patrões* and *marreteiros*. What is not clear is the degree to which the apparent benevolence of *seringueiro*-traders towards their fellow rubber tappers is a result of altruism and to what degree it is a result of social pressure associated with being part of the rubber tapper community.

The current research reveals a category of forest producer that floats between the traditional categories of *seringueiro* and *marreteiro*, producer and trader, and lessens the distinction between them as two separate social groups. While for now *seringueiro*-traders form a small minority, they represent an interesting development in the socio-economic structure of the rubber tapping community. It may be tempting to construe this as evidence of the gradual penetration of capitalist relations in the forest economy. But historically this transformation has repeatedly failed to take place under similar circumstances in Amazonia (Barham and Coomes 1994; Weinstein 1983). Diverse, integrated livelihood systems appear to be better adapted to the Amazonian environment and economy which limits the penetration of capitalist relations.

Seringueiro-traders are marginally better off than the "average" rubber tapper, but only insofar as they possess a significant asset, namely a boat. The success of their

[17] Field interviews.
[18] Field interviews.

livelihoods still depends on a diversity of activities and the flexibility to apply labour as best suits the needs of the household. A boat provides a comparative advantage for marketing household production and an additional avenue for generating some moderate income. But *seringueiro*-traders are still very much a part of rubber tapper society and through their transportation and trading activities provide opportunities for the wider community to market their produce under better terms than may otherwise be available. From a conservation standpoint *seringueiro*-traders will, especially if their economic advantage increases, be important indicators of how economic development effects the sustainability of rubber tapper livelihoods.

8.3 Marketing rubber in Rio Branco

Transactions carried out with rubber merchants in Rio Branco are of a substantially different nature to those that take place in the forest with *marreteiros* or *seringueiro*-traders. For about nine months of the year the journey to Rio Branco from the research area on the Riozinho takes from six to eight days round-trip . During the driest two to three months it can take considerably longer. A major impetus for making the journey to town is the anticipation of superior prices to those which are generally available from the *marreteiros*. However, as will be seen, sometimes the difference is only marginal. Some of the households in the survey favoured always dealing with the same merchant while others preferred to shop around for the best deal.[19] *Seringueiros* received their payment for rubber in *mercadorias* or cash. While *mercadorias* were almost the exclusive form of payment in transactions that took place on the seringal, cash transactions were more common in the city. On the consumption side, the cost of *mercadorias* and other supplies is lower in the city and bulk purchasing is more feasible which further reduces their cost.

Interviews with *seringueiros* and *marreteiros* in early August revealed that the latter were paying around 60 cents per kilogram for rubber that they claimed would sell in Rio Branco for between 80 cents to one dollar per kilogram. Data collected in the household survey on actual rubber transactions, however, showed considerably less discrepancy between forest and city prices. For sales recorded in the forest the mean price being paid by *marreteiros* was 46 cents versus an average of 58 cents reported for sales that transpired in the Rio Branco between June and August, 1993.[20] Comparative data from 1992 was similar at 42 cents per kilogram for rubber sold on the seringal and 56 cents

[19] Field research - household survey. It was common for respondents who regularly sold their rubber to the same merchant to refer to him as their *patrão*.

[20] Field research - household survey. Data is from only those transactions for which prices were available. In total there were 52 transactions (42 forest and 10 city) in the 1993 period and 61 transactions (38 forest and 23 city) for the 1992 period.

for rubber sold in the city. According to these data the *marreteiros* were realizing approximately one-third to two-thirds of their purchase price for rubber in gross profit. In comparison the *seringueiros* who sold their rubber in the city on average gained one-quarter in 1993 and one-third in 1992 over their counterparts who sold in the forest.

Once again the reader's attention is drawn to the broad range of values recorded in the household survey. The actual transactions for which hard data were available varied considerably in all aspects, including the size and number of rubber sales and the prices paid per kilogram of product. As far as the prices were concerned, in both 1992 and 1993, the highest prices paid were six times the value of the lowest prices. In most areas of the rubber tapper's livelihood diversity is a source of strength which enhances the timely meeting of household needs. However, variability in the price of rubber contributes negatively to the household economy by creating uncertainty and undermining the overall resilience of the rubber tapper's livelihood. Uncertainty in the price of rubber makes it difficult for the *seringueiro* to know in advance the results of rubber tapping labour and, therefore, what contribution it will make to the household livelihood. The data suggests that city prices are marginally more consistent than those offered on the seringal and it is this, more than the marginally higher average prices, that may contribute to the *seringueiros'* expressed preference for selling in the city when and if possible.

	Rio Branco n=6			*Seringal* n=26			*Marreteiros*	
Price	Low	Average	High	Low	Average	High	Paid (forest)	Sold (city)
1993 $/kg	$0.47	$0.58	$1.27	$0.23	$0.46	$0.65	$0.60	$0.80 to $1.00
1992 $/kg	$0.30	$0.56	$1.23	$0.20	$0.42	$0.70		

Table 8.4 Rubber prices received by *seringueiros* and *marreteiros.*
Source: Household survey, field interviews.

Despite the apparent incentives to exchange forest produce for supplies in the city, there are significant costs associated with the journey that, from an economic perspective, are important to consider. It requires about one hundred litres of fuel or about $45.00US to make the round-trip to Rio Branco from the Riozinho. This was equivalent to about eighty kilograms of rubber which takes on the order of six to eight days to produce.[21] On top of the fuel costs, the trip to town also requires an expenditure for food supplies for the journey itself, plus food and sundry costs while in the city. Even though most *seringueiros* from the Riozinho do Rola have family or friends in the city with whom

[21] Field interviews.

they can lodge, the cost of living in Rio Branco remains a substantial financial burden.[22] Furthermore, the rate of inflation makes it senseless for forest dwellers to hold onto cash and, therefore, they often arrive in town penniless and in need to make a quick sale of at least some of their produce. As one *seringueiro* explains in an interview, even though the prices may be better in the city, it is not always the case. The rubber tapper's already weak bargaining position is compounded by pressure to sell a portion of his produce promptly:

> Even if a *seringueiro* takes his rubber to sell in the city he still has difficulty getting a good price because the merchants know he has to sell it...nobody is going to carry his rubber back to the *seringal*, so he has to accept whatever price he is offered. The *marreteiro* is in a better position to find a good price because he lives in the city, he can wait. The *seringueiro* can't wait too long because it costs money to stay in town and pretty soon he won't have anything left. There is always lots of work to be done back on the *colocação* too.[23]

Finally, there is a significant opportunity cost associated with leaving the *colocação* to go to the city. As alluded to in the preceding quote, a significant cost of undertaking the trip to Rio Branco is tied to the fact that forest product extraction is not the sole pillar of family livelihoods. The demand for labour, to carry out the tasks of maintaining the *seringueiros*' subsistence based livelihood fluctuates throughout the year. But, the variation arguably lacks any pronounced low period in labour requirements when a household may easily afford a reduced labour pool. The opportunity cost of having one or more key members of the household away from the colocação for an extended period is perilously high, especially in the case of agricultural work forgone. In the case of extended absences from their *colocações* respondents expressed concern about falling behind in regular maintenance tasks such as weeding, not being able to protect their crops and livestock from predators, and the risk of being late for crucial activities governed by seasonal environmental conditions (Chapter 10).[24]

Nonetheless, in spite of the costs and drawbacks of undertaking a journey to Rio Branco, respondents were generally unequivocal in their preference for bypassing the *marreteiros*. For reasons given above, the apparently better or more consistent prices on offer for rubber in the city are not necessarily sufficient to offset the costs of the journey. Households do have the option to wait until there is added reason to make the trip, such as for medical treatment or to make an important purchase. The ability to

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[22] ibid

[23] Field interview.

[24] Field interviews.

market household production in the city and to buy supplies in bulk, however, is not evenly spread throughout the *seringueiro* community. But for those who can make the trip, it is a beneficial addition to overall livelihood composition as it improves the diversity and flexibility of responses available to confront the variability and uncertainty of the price of rubber.

8.4 Trade along the AC90

As roadways continue to gradually penetrate the Acrean countryside a third method of marketing rubber has emerged (cf Almeida 1992; Schwartzman and Allegretti 1987; Bakx 1986). For a short time during the dry season it is possible for vehicles to reach far into the forest along highways such as the *Transacreana* and the intermittent feeder roads which branch off from the main artery. For households located within a reasonable distance, these roads provide a convenient avenue for getting household production to market. A mode of transport is key to taking advantage of these roads, but for the most part, access to private motor vehicles is extremely limited. In some parts of Acre rubber tapper communities have been fortunate enough to receive vehicles from international development projects such as that of the Canadian International Development Agency in the municipality of Xapuri, but this is the exception rather than the rule. The rather obvious trading niche that the roads create has subsequently spurred the emergence of "road-*marreteiros*".

The greatest advantage that the roadways provide is an efficient, alternative transportation route that becomes available during the worst time of year for travel by river. From the heart of the research area it was a two day walk to the nearest point on the AC90; from there it took another eight hours by bus or truck to reach Rio Branco. By river the journey is at least eight to 10 days during the dry season. The second advantage of the highway route is lower fuel and time costs which put road-*marreteiros* in a position to offer a potentially better price for rubber than their counterparts on the river. One such transaction was observed in the field where the road-*marreteiro* paid 74 cents per kilogram for *prancha* rubber, about seven cents more than that being offered by river-bound *marreteiros* at the time.[25] If this were to indicate any sort of pattern then trade along the AC90 may offer an economically competitive option for marketing rubber, without the expense of traveling to and staying in the city.

Nonetheless, for households in the study area there are still three essential barriers to using the road as an avenue for commercializing forest production. To begin with, the limited time for which the road is actually open each year restricts the viability of this

[25] Field research - household survey.

option to three months at best. The second disincentive to using the road is the greater distance between the majority of *colocações* in the research area and the nearest branch of the AC90. Most of the *colocações* within seringal Belo Horizonte are situated on the south side of the Riozinho while those in seringal São Francisco are even more remote. For most households, therefore, the river *marreteiros* are both more proximate and certainly more abundant. Trade along the highway for now remains limited seasonally and by the short supply of traders. In the future, however, it may come to play a greater role in the local economy and thereby add another dimension to rubber tapper livelihood composition in the region.[26]

8.5 Cooperative efforts in the rubber trade

There is one, final avenue rubber tappers in the Riozinho do Rola basin have been experimenting with in recent years. This involves cooperative efforts within the community to share the investment and operating costs of a boat and motor in order to be able to by-pass the *marreteiros* and so get a better return for their labour through selling their production in town. In the late 1980s a group of residents of the Riozinho do Rola joined forces to build a large river boat. With the help of a local branch of the Catholic church 10 households were able to complete the boat and purchase a motor. For two years the so called "*Associação*" functioned effectively. Trips to Rio Branco were planned every few months and members could choose whether or not to join these excursions as necessary. Each household would contribute a small percentage of the value of the goods they were shipping towards fuel and operating costs. The *Associação* provided them with a relatively low cost means of transporting goods to the city where they could reap the benefits of better prices for their products and make more cost-effective, bulk purchases of supplies before making the return journey to the seringal.

Ultimately, however, the *Associação* disbanded after a falling out among some of its members. Interviewees from the informal cooperative reported that the dissension within the group was initiated by "rumours and gossip" spread by outsiders – mainly *marreteiros* who felt threatened by the competition presented by the *Associação* – who convinced some of the rubber tappers involved that the *Associação* was not operating in their best interests. The boat is now controlled by one of the former members of the group who continues to provide transportation services for other households in the same vein as *seringueiro*-traders discussed above.

[26] Field interviews.

The idea of inter-household cooperation and communal strategies for marketing rubber and so on, however, is neither dead nor obsolete. During the fieldwork several households, some of them from the original *Associação*, were actively pursuing a proposal by the mayor's office in Rio Branco to provide a boat on a long-term lease for residents of the Riozinho. The plan was very much in its infancy but there was considerable enthusiasm expressed by many of the households involved, in particular those who at the time were entirely dependent upon *marreteiros* to sell their produce and purchase supplies.

Cooperatives and other communal initiatives have made real progress in other parts of Acre in the last 10 years in enhancing the livelihoods of rubber tapper communities, specifically in the municipality of Xapuri. Part of their success has been due to a relatively high level of external involvement and investment from the National Rubber Tappers Council (CNS) and other rural workers unions as well as from international aid organizations and development agencies.

In the context of extractive reserves as a strategy for sustainable development such cooperative efforts have an important role to play. One of the gravest restrictions on the viability of *seringueiro* livelihoods stems from the remoteness of forest based communities from the urban market. The social and economic costs of isolation are greatly improved by adequate access to transportation. Communal ownership, while not without its own limitations, is one way of overcoming the large capital investment that motorized transportation requires and which individual households generally cannot afford.

8.6 Conclusion

This chapter has presented the range of means available to the *seringueiros* to market rubber and other household production. For the most part, the evidence at hand confirms that greater control over the sale of household production is central to improving the *seringueiros*' return on their labour and thereby helps to ensure the viability of extractivist livelihoods. Attaining such control is primarily dependent on access to adequate transportation, along with the commensurate ability to afford trips to the city. Households must be able to finance the journey itself as well as the costs of staying in the city and, simultaneously, have sufficient labour resources to remain on the *colocação* and prevent falling too far behind on other livelihood activities.

The transition of certain *seringueiro* populations to the more independent status of the *seringueiros autonomos* has potentially far-reaching consequences for the future

viability of forest based livelihoods in Acre. Control over their production and the allocation of labour, allows the *seringueiros* to optimize their chances of survival by maintaining diversity and flexibility in the composition of their livelihoods. The evidence presented here from eastern Acre suggests that presiding over the process of exchange of forest produce is at least as important to the viability of extractivist livelihoods as is the freedom to determine the composition of those livelihoods.

It should not be assumed, however, that the *seringueiros*, or at least their livelihoods, are somehow inherently conservationist. It remains an open question as to whether or not a substantial improvement in the economic well-being of rubber tappers would effect the sustainability of their livelihoods as this has yet to occur on a large scale. On the other hand, it is not solely their relatively weak position within the *aviamento* that predetermines ecologically sustainable livelihood patterns. In fact it is a general pattern in Amazonia and elsewhere in the tropics that drives the poorest strata of society to adopt manifestly unsustainable practices. There are real social, cultural and economic reasons to maintain livelihoods based in the forest which coincide with the ecological requirements of maintaining there resource base. Households for the most part adhere to those practices and values that will perpetuate the viability and sustainability of their livelihoods. *Seringueiro*-traders present one path by which better-off households can increase their economic well-being. Future research should track such developments or transitions in rubber tapper society in order to monitor, among other things, their ecological impacts.

At present, trade with the *marreteiros* remains predominant in regions where autonomous *seringueiros* occur (CNS 1992:58). The greater importance of *marreteiros* in the local economy is generally attributed to the liberalization of trade and the decline in the direct influence in the countryside of the traditional *patrão*. A body of evidence contends that in spite of this "liberation" many autonomous rubber tappers are no better off now than they were under the *patrões*. Allegretti (1989:12) asserts that the liberalization of the rubber trade in Acre has not led to a general improvement in livelihood conditions for the *seringueiros* and that in fact, "as a result of the unfavourable market situation, their ability to survive has become more precarious than when they were subordinate to the extractive firms [sic]".*

However, while some of the older *seringueiros* interviewed in the study recalled the former patron-client system favourably, most respondents did not regret their autonomy.

* Author's translation.

Younger, usually more educated rubber tappers realized that in part, current economic difficulties within the *seringueiro* community had as much to do with circumstances in the broader political economy (for example, inflation and the removal of the rubber price subsidy), as with what they described as the exploitive terms of trade proffered by *marreteiros*. At the same time, most households agreed that one of the most effective means to improve the value of their production was to take greater control of the exchange process by acquiring a boat and motor, either through cooperative community efforts or, if they had the resources, through independent means.

Chapter 9

Brazil Nuts and Rubber Tappers

9.0 Introduction

In the state of Acre the harvest of Brazil nuts and its role in household livelihoods is often overshadowed by discussions of rubber and the rubber economy. For historical reasons forest based producers in Acre, themselves a subgroup of Amazonia *caboclo* society, are universally known as rubber tappers or *seringueiros*. Nevertheless, Brazil nuts play a prominent role in the livelihoods and local economies of Acrean peasantries. The harvest adds substantially to the diversity of rubber tapper livelihoods by occupying labour and generating income. The current chapter is concerned with the ecological and socio-economic factors which govern the Brazil nut resource. The discussion will focus on variability in the resource itself, the manner in which Brazil nuts are integrated with rubber tapping and agriculture in terms of labour usage, and the nature of their contribution to the household livelihoods.

There is considerable overlap in the general attributes of rubber production and the Brazil nut harvest, especially with regard to their role in the peasant livelihoods of rubber tappers as the main points of contact with the wider economy. In certain respects, however, Brazil nuts and rubber differ markedly in the demands they place on household labour resources and their temporal location in the seasonal cycle of rubber tappers' livelihoods. The harvest itself does not overtly harm the trees although there is a need to manage the resource for ecological sustainability. The Brazil nut harvest diversifies the livelihood base and is sufficiently flexible as to be easily incorporated into the daily stream of activities. Clearly Brazil nuts have an important role to play in the future viability of rubber tapper livelihoods and the success of extractive reserves.

The history of Brazil nut extraction in the Amazon is rather less lurid than the excesses of the rubber trade, although consumption and management of the species by indigenous people goes back at least as far as that of rubber. Some researchers suggest that it may have been intentionally planted in the forest by Amerindians to enhance the sparse, natural occurrence of the species (Balée 1989:9; Posey 1985). The commercial importance of Brazil nuts followed gradually on the heals of European expansion into the Amazon basin and the subsequent exploitation of other forest species. The explorer Alexander von Humboldt gave the Brazil nut its scientific appellation *Bertholletia excelsa* in 1802 (Humboldt 1962:270). Captain William Herndon, on his exploratory journey through the Amazon for the US Navy, reported that the annual export volume

from the lower Rio Solimões was 1,400 *alquieres* (40,600 kilograms) between 1839 and 1842 and subsequently increased to 10,406 *alquieres* (302,000kg) by 1850 (Herndon 1854: 265-266). Herndon noted that an important usage of Brazil nuts at the time was in the preparation of a "clear and good burning oil" (*ibid* pp282).

During the 1870s rising prices led to a brisk trade in Brazil nuts principally from the state of Pará (Weinstein 1983:54) and by the following decade production was an important constituent of the Amazonian export economy (Pereira 1992:16). Nonetheless, the Brazil nut trade remained in the shadow of the Rubber Boom until several years after the collapse in the price of rubber. While the early 1920s saw Brazil nuts surpass rubber as Pará State's most valuable export commodity, Weinstein (1983:258) points out that this was as much a result of the precipitous decline in the price of the latter as it was a result of a surge in demand for the former. The incorporation of Brazil nuts into household livelihoods was in many cases part of a general diversification of livelihoods pursued by rubber tappers and other *caboclo* groups in response to the crisis in the rubber market (Weinstein 1983:241-246 *passim*). Brazil nuts have continued to play an important role in the livelihoods of, small scale, forest based, rural producers in many parts of Amazonia. This has been particularly true of *seringueiros* in eastern Acre who, in 1985 for example, produced a third of the nations' Brazil nut output (Pereira 1992:14).

9.1 Distribution and productivity of *Bertholletia excelsa*

The Brazil nut tree, know in Brazil as the *castanheira* (the nut itself is the *castanha*), is found throughout much of Amazonia. The best know Brazil nut producing region is that of the so called "Brazil nut Polygon" situated in the state of Pará, hence the appellation *castanha do Pará*. This region boasts a particularly high density of castanheiras which has been partly attributed to anthropogenic influence (Pereira 1992:85; Balée 1989:9).

The distribution of *Bertholletia excelsa* in the state of Acre is considerably less widespread than that of the rubber producing *Hevea*. According to the Environment Institute of Acre (IMAC 1991), it is prevalent over much of the eastern half of the state that lies within the drainage of the Rio Purus, whereas in the western half of the state, encompassed by the upper reaches of the Rio Juruá, the species does not occur at all. In fact, according to INCRA officials in Rio Branco, the range of Brazil nut trees begins to decline rapidly around the Rio Iaco, a right bank tributary of the Purus that lies some 100-150 kilometres east of the Purus-Juruá divide.[1] This was corroborated in field

[1] Field interview.

interviews conducted along the Riozinho do Rola. Several respondents had, over the years, gradually migrated into the Riozinho do Rola from seringais along the Rio Iaco in the neighbouring municipality of Sena Madureira (Figure 2.1). These respondents stated that one of the advantages of moving east into the Riozinho do Rola was the greater occurrence of Brazil nuts which, as will be seen, can add significantly to the diversity and viability of forest based livelihoods.

The distribution and productivity of Brazil nut trees varies considerably over its range in eastern Acre. For example, the average density of Brazil nut trees among households in the survey was 145 trees per *colocação* although half of the *colocações* reported having fewer than one hundred *castanheiras*. By comparison, in the Chico Mendes Extractive Reserve that lies to the south of the study area, an average of over 250 Brazil nut trees per *colocação* was been reported (CNS 1992:44). Even within the relatively localized area of the Riozinho do Rola the distribution of Brazil nut trees is highly variable. This is partly due to the naturally sparse occurrence of Brazil nut trees in the interior, terra firme forest in contrast to their relative abundance in riverine and *varzea* influenced areas.[2]

The study area encompassed 28 households situated along or within a short walk, of either the Riozinho do Rola or Igarapé Espalha (*beira do rio*) and 22 that were located in the interior (*no centro*). Twenty-three (82%) of the riverine households reported having productive Brazil nut trees within their *colocações* in comparison to only nine (40%) of the interior households. The former also reported a higher density of *castanheiras*, averaging about 170 trees per *colocação*, compared to 117 per *colocação* in the interior. Extrapolation from household data on the number of Brazil nut trees and the levels of production reported for 1991 through 1993 suggests that individual tree productivity is also greater in riverine areas to than it is in the interior (Table 9.1) (cf Pereira 1992). One-quarter of the households surveyed stated that the contribution of Brazil nuts to their livelihood was negligible or nonexistent. Most of these *colocações* were located in *no centro*. This disparity between riverine and interior locations reinforces other advantages associated with river bank locations, such as better access to transportation and the market (Chapter 6), better fishing resources (Chapter 11) and in some cases, superior rubber tree production (Chapter 7).

There is, in addition to spatial irregularities, a temporal dimension to the variability in the contribution of the Brazil nut harvest to household livelihoods. This stems from the

[2] Pereira (1992:124) found a distribution of 3.1 Brazil nut trees per hectare proximate to river areas compared to only 1.8 individuals per hectare in the interior during his research along the Solimões in the state of Amazonas.

cyclical nature of Brazil nut yield from individual trees. In one season yield may be relatively high while in the following one it may be substantially lower. Some respondents reported that occasionally the yield in "low years" is so diminished that the nuts are hardly worth collecting except, perhaps, for domestic use and consumption only. The pattern, however, is predictable and once a household is familiar with its local and the variability in the Brazil nut harvest it is possible to manage the resource for the benefit of the household livelihood.

Household	1991		1992		1993	
Location	Latas/Hh	Latas/tree	Latas/Hh	Latas/tree	Latas/Hh	Latas/tree
Beira do Rio	13.3 n=10	1.3	30.6 n=17	1.8	31.8 n=20	1.6
No Centro	4.8 n=4	1.2	7.4 n=7	1.1	8.6 n=8	1.1

Table 9.1 Brazil nut tree productivity: *beira do rio* vs *no centro*.
Source: Field research

Ultimately, variability in the potential value of the Brazil nut harvest in different, often highly localized areas of the forest has an important influence on the productivity of individual *colocações*. The distribution and density of Brazil nut trees in the forest is of prime importance but individual tree productivity may also vary considerably. One key informant declared that, "some *castanheiras* never produce (Brazil nuts), others maybe produce just a few nuts, but not every year."[3] The CNS survey reports that on average only one in two Brazil nut trees are productive among the households in the Chico Mendes Extractive Reserve (CNS 1992:44).

Recently, concern has been rising regarding the future viability of the Brazil nut resource. In certain parts of Amazonia, eastern Acre included, natural regeneration of the species is being threatened by the long-term effects of harvesting. *Caboclo* livelihoods impact the resource in two ways. Firstly, Brazil nuts are large and easily located and so virtually all of the seeds are collected during the harvest, effectively eliminating the possibility of reproduction. Secondly, the paca (*Agouti paca*), a key dispersal agent of Brazil nut seeds, is a frequently killed game species for *caboclo* populations. Whether or not hunting is sustainable it certainly has an impact on the paca population which in turn can be assumed to affect its role in the reproduction of Brazil nut trees (Field interviews; Pereira 1992; Nepstad and Schwartzman 1992: 5).

[3] Field interview.

The Brazil nut harvest is a very important constituent of rubber tapper livelihoods in eastern Acre and, therefore, the sustainability of the resource is a significant concern. This increases the importance of current research in Acre which is looking at ways to manage the regeneration of Brazil nut trees and the possibility of increasing the resource base through silvicultural techniques (Karen Kainer pers. com.).

In 1993 Kainer was commencing doctoral field work with a project to recruit rubber tappers on the Cachoeira Extractive Reserve to plant Brazil nut seedlings along existing rubber trails. The long-term goal was not only to assist the procreation and conservation of Brazil nut trees, but to ultimately increase Brazil nut production and household income. There was no obvious evidence in the field that Brazil nut trees were actively managed or conserved by residents of the Riozinho do Rola. No rational *seringueiro*, however, would knowingly destroy a productive or juvenile *castanheira* (Field interview). As with their rubber trees, households are careful to ensure their annual clearings do not infringe on economically important plants such as the valuable *Bertholletia excelsa*.

9.2 The Brazil nut production: season and process

Ecological factors such as the distribution and density of Brazil nut trees as well as individual tree productivity are key elements in determining the contribution of Brazil nuts to household livelihoods. Social factors, such as the availability of labour, is less of a constraint despite the fact that the Brazil nut harvest must be integrated with a wide range of activities that take place concurrently at the end of the rainy season. Labour is not a primary constraining factor partly because of the relatively straight forward production process which makes it possible for virtually all household members to participate. The importance of the Brazil nut resource stems from its timely occurrence in the annual livelihood cycle, the relatively high return on labour that can be realized, and the relatively favourable market conditions under which it is normally sold.

By the beginning of July the red, grapefruit sized fruit of the Brazil nut can be seen hanging from the lofty branches of the *castanheira* some 30 to 50 meters above the forest floor. Each fruit consists of a large, woody capsule or *ouriço* which contains approximately two dozen of the distinctive, triquetrous Brazil nuts and weighs about 500 grams. In December the nuts begin to fall although most households reported that it was not safe to start the harvest until mid-February.

Most Brazil nut trees are surrounded by a circular clearing that more or less conforms to the area of the tree's crown and is usually peppered with several piles of split *ouriço*

shells from previous harvests. The clearings are maintained to facilitate the collection of Brazil nuts and to reduce the risk of stumbling upon a snake or other hazard. The *ouriços* are collected in a pile and then each one is cracked open with a few well-placed blows of a *terçado* or axe.[4] This is the extent of processing that Brazil nuts receive before they are transported for storage and eventual sale. Unlike the production of rubber, most household members, including children, participate in the collection process (Field interviews; CNS 1992; Rodrigues 1991:31). Breaking open the *ouriços*, however, is primarily carried out by male adult members of the household.

Brazil nut production for 1993, as reported in the household survey, ranged from one to 560 *latas* per household.[5] Average household harvests were around 170 *latas* of which some 20 would typically be used or consumed domestically. Of the 31 households reporting a harvest, an average of three weeks per household were spent collecting and processing the *ouriços*. However, determining the investment of labour in Brazil nut production is problematic because the application of labour is unevenly applied over the course of season. On some days the entire family may be engaged in Brazil nut production while on others it may only be one or two individuals.[6]

Location * = Extractive Reserve	Production *latas*/ household	Household Labour			Worker Productivity *latas*/ person-day
		harvest-days/yr	collectors/ household	person-days/ year	
Riozinho do Rola	165	20.5	2.7	55.35	2.98
São Luis Remanso*	165	36	3.2	115.2	1.43
Cachoeira*	351	52	3.5	182	1.93

Table 9.2 Brazil nut production and household labour.
Source: Field research. Rodrigues 1991.

The integrated nature and diversity of rubber tapper livelihoods is exemplified during the Brazil nut harvest season. As was mentioned earlier the harvest coincides with the end of the rainy season. Rice is ready for harvest, processing and storage at this time of year and is immediately followed by preparation and planting of beans (Chapter 10). There is usually some maize and manioc to be harvested and early preparations for the rubber tapping season to be commenced (Chapter 7). But despite the apparent conflict

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4 *Terçado* is a regionalism for machete, arguably the most essential and versatile implement in the forest dweller's repertoire.

5 The *lata* is the *seringueiros'* standard measure for Brazil nut volume derived from the large oil tins used to determine quantity for their transactions. One *lata* = eighteen litres = approximately 12 kilograms.

6 Although the field research took place well outside of the actual Brazil nut season, I was able to partake directly in the collection and breaking processes on two occasions. In both instances one expert (the *seringueiro*) and one enthusiastic novice (the author) produced approximately two *latas* of Brazil nuts in about one hour, not including travel time.

with other livelihood pursuits, evidence from interviews held in the field indicates that the Brazil nut resource is highly valued precisely because of when the harvest takes place. As the second major forest product harvested by rubber tappers in eastern Acre, Brazil nuts complement the production of rubber by providing a timely source of income.

The comparison of average daily production between households or regions is less significant than the annual costs of production, mainly in terms of labour. According to the CNS survey Brazil nut production absorbs approximately 12.5% of annual household labour while contributing one-quarter of the average annual household income (CNS 1992:44). The apparently high return on labour from Brazil nut production is just one aspect of the resource which makes it a very valuable sector of household livelihoods. If household productivity of Brazil nuts is higher in the Riozinho do Rola region then the potential contribution of the nut to household livelihoods would be even more significant. Regardless, the opportunity costs of integrating the Brazil nut harvest into the household's overall livelihood strategy are comparatively low.

9.3 Brazil nuts and household livelihoods

Brazil nut production contributes to household survival on several levels and in many regards plays a substantially different role to that of rubber in the composition of livelihoods. As mentioned above, one important difference is the contrast between the Brazil nut harvest and the rubber tapping season. The Brazil nut season is relatively short and essentially does not overlap with rubber tapping, so there is no conflict over the application of household labour to either task. The Brazil nut harvest also represents a readily available source of cash at an awkward time of the year. Several respondents commented on the fact that the Brazil nut harvest can make an important contribution to family incomes at the time of year when rubber income is likely to have been spent, when the previous year's bean crop is probably running low, and the current rice crop is only just being harvested. Unless the household has been able to stock-pile rubber from the year before, options are severally restricted for acquiring needed goods from the city without the prospect of increasing debt.

The exchange process of Brazil nuts takes place in much the same manner as that of rubber. That is, in most instances the nuts are either exchanged for *mercadorias* with a *marreteiro*, or they are taken to Rio Branco and sold, usually for cash, to a merchant. However, there is an important difference in the terms of trade which confront the rubber tappers during the Brazil nut season. The harvest and sale of Brazil nuts takes

place at the tail-end of the rainy season; river levels are high and as a result there are many more *marreteiros* doing business on the river. According to one *marreteiro* who lives along the Riozinho do Rola, the exchange process of Brazil nuts is essentially less exploitative than is commonly the case with rubber:

> The Brazil nut [sic] is a different harvest...it happens from January to March only, when the river is higher and there are many more *marreteiros* on the river. This is good for the *seringueiros* because there is more competition... it is easy to sell your Brazil nuts for a good price because if you don't like the price from one *marreteiro* you can find another one to sell your harvest to...[7]

There were a total of 46 transactions carried out between the 29 households which sold Brazil nuts from the 1993 harvest. Almost two-thirds of these transactions took place on the seringal, all but one with *marreteiros* – the exception was to the *patrão* of *seringal* Bom Destino. Seventeen sales (37%) were made in Rio Branco. Data on prices from these transactions shows an average price in the city of $1.47 per *lata*, as compared to an average of $1.20 per *lata* paid for Brazil nuts in the forest. Overall prices ranged considerably, from less than 50 cents per *lata* to over two dollars, but in general the prices were concentrated between $1.00 and $1.50 per *lata* and remained quite stable throughout the harvest. The sale of Brazil nuts during the year of the survey was spread out over several months, from early January to the end of May, although half of the transactions took place in March.

The CNS found in its study that the Brazil nut harvest contributes on average about 25% of the annual cash income to the *seringueiro* household (CNS 1992:43). Along the Riozinho do Rola Brazil nuts generated an average income of $283.00 in 1993 compared to an average of $212.00 generated from the sale of rubber in 1992.[8] Once again these averages conceal a considerable range in the incomes generated from both resources. For their respective years the lowest household incomes were $7.69 from Brazil nuts and $12.00 from rubber while the highest were $925.00 and $774.00 respectively. Clearly the income potential of Brazil nuts is on par with that of rubber, although the especially low price of rubber at the time of the research may be responsible for the comparatively high value of the Brazil nut harvest. The range of values is characteristic of rubber tapper livelihoods. It illustrates the diversity of the resource base and the flexibility of labour which together determine levels of output

[7] Field interview.

[8] Brazil nut and rubber sales data from 28 and 14 households respectively.

and, therefore, the relative and absolute contribution of each resource to household livelihoods.

A significant portion of the rubber tappers' Brazil nut production goes to the local market, primarily in Rio Branco, but most of the nuts are exported from the state. An anomaly in the local market is the presence of Brazil nuts from the state of Pará observed on the shelves of super markets and grocery stores in Rio Branco. The Acrean Brazil nut harvest, it would seem, must surely be able to expand its share of the local market given its substantial competitive edge, at least in terms of transportation costs. As far as the international market for Brazil nuts is concerned, demand has been on the increase in recent years. This can be attributed at least in part due to a heightened interest in rainforest products in Primarily Europe and North America (Padoch 1992; Plotkin and Famolare 1992). The most common examples of the trend are Ben and Jerry's Ice Cream Company and the The Body Shop Corporation. The former uses Brazil nuts in their rainforest crunch ice cream which they claim have been sustainably harvested from the forest. The latter has led a high profile marketing campaign promoting hair care products that include Brazil nut oil as a major ingredient. The Body Shop has established a relationship with communities of the Kayapó in the region of the Rios Tocantins and Araguaia in eastern Amazonia.[9]

Whether or not the market for Brazil nuts in Acre is fluctuating up or down or holding steady, there is already concern that regeneration of the species under current and historical harvesting rates is insufficient (Posey and Balée 1989). From a sustainability standpoint, therefore, there is little reason to simply increase Brazil nut production as a means of improving rubber tapper incomes. Some form of silvicultural intervention is probably necessary. At the present time there is a distinct advantage for households which have access to a viable Brazil nut harvest; partly because of the strategic timing of the Brazil nut harvest within the annual cycle of activities and partly because of the relatively good return on labour from Brazil nuts. There were several households on whose *colocações* Brazil nut trees did not occur or at best produced minimal fruit. In

[9] The impact of the business relationship between the Body Shop and the Kayapó is controversial and has been hotly debated within the environmental movement most notably between the organizations Cultural Survival of Cambridge, Massachusetts and Survival International of London. One side argues it is wrong to prevent indigenous peoples from freely competing in the market place and making land use decisions within indigenous reserves based at least in part on profit considerations and market criteria. The other side maintains that socio-cultural and environmental costs becoming overly integrated with the marketplace are too high. They resent the commodification of nature and argue, among other things, that the stratification inherent in the inequality of capitalist relations both intra-community and inter-community, is in conflict with traditional values and distributional aspects of indigenous cultures. It is also feared that environmental concerns may also increase under pressure from the market.

these instances a common strategy was to enter into an arrangement with another family for a share of the latter's harvest. For example, one *seringueiro* interviewed had agreed to make a onetime payment of 250 kilograms of rubber to another household in return for the right to harvest half of the Brazil nut trees on the latter's *colocação*. A more common situation, one often applied in the production of rubber, was that of the *meeiro*, an arrangement whereby the owner of the Brazil nut trees allows someone to collect Brazil nuts on his *colocação* in return for half of the harvest. These examples once again illustrate the importance of inter-household exchange of both labour and goods on the *seringal*.

Finally, on a level often only fleetingly acknowledged in much of the literature (Padoch 1992), Brazil nuts are prominent in the composition of *seringueiro* livelihoods as an important supplementary food source. According to the survey data household consumption of Brazil nuts ranged from one to 50 *latas* for the 1993 season with an average household consumption of 17 *latas*. Two households reported extraordinary consumption levels of 100 and 250 *latas* respectively. However, in all but a few cases there appears to be little or no relationship between the size of the Brazil nut harvest and the quantity of nuts consumed domestically (see Figure 9.1).

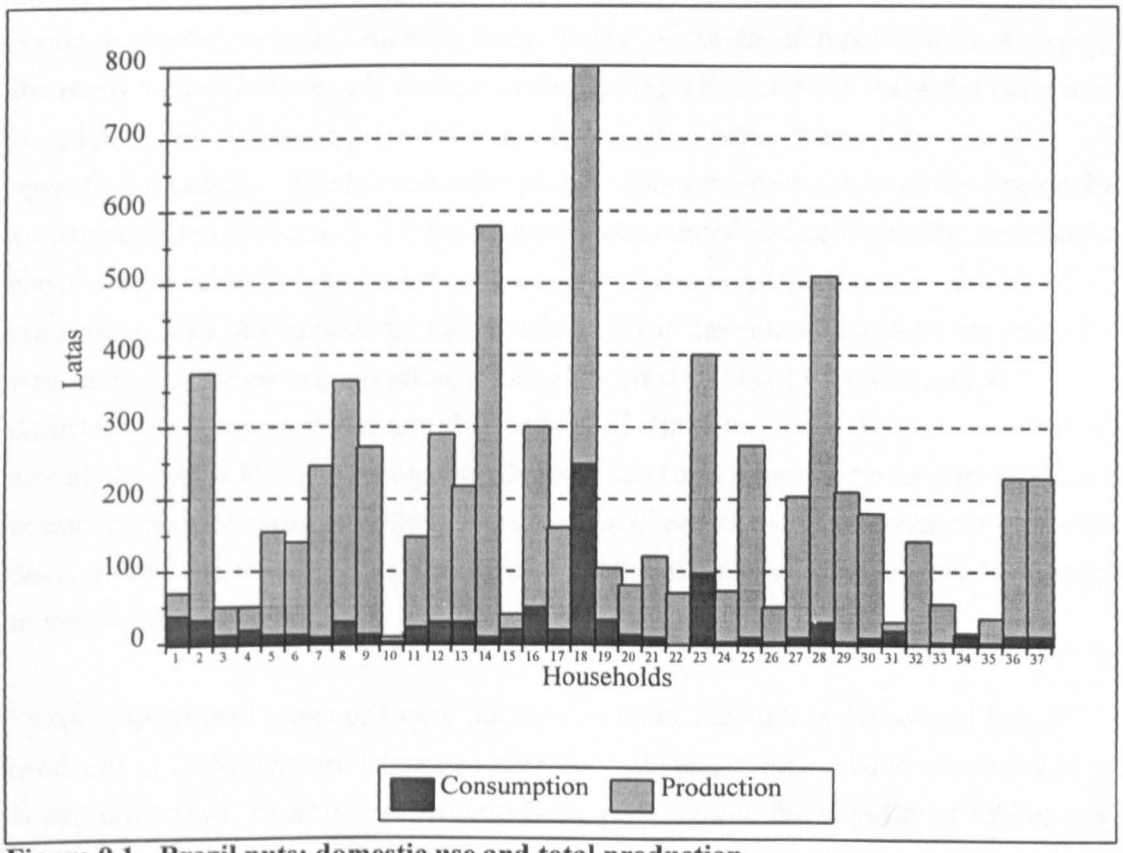

Figure 9.1 Brazil nuts: domestic use and total production.
Source: Household Survey

One of the more important domestic uses is in the preparation of so called *leite de castanha* (Brazil nut milk), a thin white broth made by soaking grated Brazil nuts in water for several hours and then straining off the liquid. The "milk" is used as a stock for cooking a host of meats, in particular armadillo, tortoise and monkey. Alternatively, *leite de castanha* may be processed further to produce a useful cooking oil that is preferable to alternatives available from certain forest palms (Kainer 1993:411). Although of lower quality than manufactured soya oil, the fact that Brazil nut oil is a forest resource is an advantage in itself, especially for more remote *colocações* where *mercadorias* are harder to obtain and terms of trade are generally worse. Kainer's study of plant use by women *seringueiros* reports numerous applications of Brazil nuts including several food uses as a condiment or ingredient in preparation of jams, sweets, and breads and as part of a medicinal tea for the relief of diarrhea and dysentery (Kainer 1993:420). Non-food uses made of Brazil nuts are primarily confined to the hard husks or *ouriços* which are often fashioned into small mortars for crushing spices or as a receptacle for the collection of rubber latex.

9.4 Conclusion

Brazil nuts, like rubber, are an important forest resource that are exchanged on the market in return for basic supplies and manufactured goods that cannot be directly produced on the *seringal.* As with many "types" of Amazonian peasantries, especially the many variants of *caboclo* society, *seringueiro* participation in the wider economy is based on forest resources (i.e. rubber and Brazil nuts) rather than on the sale of agricultural surplus. The harvest takes place without the destruction of the tree or the surrounding vegetation and for this reason can be considered ecologically sustainable, especially in comparison to most competing landuses currently being practiced in Amazonia. The one impediment to sustainability is the potential to over harvest the nuts and so endanger regeneration, although it must be noted that widespread deforestation is a graver threat to the survival of Brazil nut trees. Rubber, in contrast, is already managed by most *seringueiro* households so as to prevent over harvesting and maintain the long-term viability of the resource (Chapter 7). The Brazil nut resource does, ultimately, lend itself to silvicultural treatment and can, indeed must, be managed to ensure its sustainability.

Despite the limited range of Brazil nut trees in Acre, the state is the second largest producer of Brazil nuts in Amazonia after Pará (Pereira 1992). The productivity of the Brazil nut harvest in eastern Acre contributes positively to the viability of rubber tapper livelihoods in the region. Brazil nuts also have the potential to absorb additional labour and provide employment through additional processing which adds to the value of the

resource and to the return received by the rubber tapping community. This is currently being tried in the municipality of Xapuri where an "agro-extractivist" coop has been set up to run a small operation using simple technology and local labour to deshell the Brazil nuts and improve their marketability (Karen Kainer pers. com.).

The reasons that the Brazil nut resource has an important role to play in the establishment of extractive reserves as a strategy for sustainable development are twofold. Firstly, Brazil nuts represent a comparative advantage for household livelihoods in regions that they occur. This is important given that the viability of extractive reserves has as much, if not more, to do with the sustainability of forest based livelihoods as it has to do with the sustainability of the forest and its resources. Secondly, the absence of a Brazil nut resource, such as in western Acre, implies a comparative disadvantage for the establishment of extractive reserves in those regions. Given that there are already attempts being made elsewhere in Brazil to grow Brazil nut trees in plantations, it is reasonable to assume that Brazil nut trees could be introduced or intensified in certain regions of Acre and wider Amazonia to enhance the productivity of extractivist livelihoods. It is arguably more sensible to introduce Brazil nut trees where extractivist activities are already part of the existing socio-economic system of Amazonian *caboclo* society. In this way Brazil nuts can be incorporated into sustainable development strategies and contribute to the long-term viability of extractivist livelihoods.

Chapter 10

The *Seringueiro* Farming System on the Riozinho do Rola

10.0 Introduction

Although most commentators have long recognized that there is more to the *seringueiros'* forest based livelihoods than the production of rubber and Brazil nuts, much of the discourse, especially on Acre, has been preoccupied with production and income from the two key species; *Hevea brasiliensis* and *Bertholletia excelsa* (Chapters 7-9). Recall that rubber tapper society is a type of peasant society, a central feature of which is agricultural production based on household labour and pursued with the primary objective of satisfying household consumption needs. Agriculture, hunting, fishing and the use of non-timber forest products have, in the past, been researched in rather less detail, with little analysis of the role they play in *seringueiro* household survival or their relationship to extractivist production. This and the following chapter will consider some of the main ethnographic details and explore some of the key relationships that characterize the two other "legs" of the rubber tappers livelihood triangle; agriculture and extractive production of forest resources other than Brazil nuts and rubber.

During the heyday of the rubber boom indebted rubber tappers were forced to tap rubber to the exclusion of other activities. Historical accounts suggest that when the price of rubber was at its highest, most forms of agriculture were strenuously discouraged so that the maximum amount of effort could be applied to the tapping of rubber (Barham and Coomes 1994; Dean 1987; Bakx 1986; Weinstein 1983; Collier 1968 among many others). With the decline of the Rubber Boom *seringueiros* followed an historical tendency of *caboclo* communities to (re)diversify their livelihood base, largely because it was no longer profitable for the *patrões* to provide food and supplies or to force maximum effort in the production of rubber (Parker 1985). Even so, the marketing of forest produce by rent-paying rubber tappers continued to be closely controlled by the *patrões* for the better part of this century (Weinstein 1983). During the latter stages of the military regime, when the *patrões* were compelled to sell their rubber estates to southern investors (Chapter 5) the so called *seringueiro autonomo* emerged as a more or less independent rural producer, able (in theory at least) to sell his produce when and how he saw fit (Chapter 5). This new found emancipation stimulated the ascension of the role of farming in *seringueiro* livelihoods in many areas of Amazonia, especially in the eastern portion of the state of Acre. During the fieldwork rubber tappers interviewed in the Riozinho do Rola basin asserted

the importance of agriculture to their livelihoods, stressing in particular the value of being self sufficient in food. The comment was frequently made that, "you can't eat rubber" to emphasize the crucial role of farming in the overall composition of their livelihoods.[1] But the real value of self sufficiency comes first of all, from the elimination of the rubber tappers' dependency on the *patrões* for basic supplies which often kept households in perpetual debt. Secondly, it has reduced the impact on their livelihoods of fluctuations and uncertainty in the prices of rubber and Brazil nuts.

The aim of the current chapter is to add to the still limited ethnographic record on rubber tapper agriculture. To begin with the discussion will look at the nature of *seringueiro* shifting cultivation by following the rotation of a given piece of land through the various stages of forest clearance, the succession of crops, and (in most cases) eventual reversion to forest. In conjunction with this temporal perspective on landuse, the discussion will also adopt a spatial point of view in order to examine the complexity and diversity of landuses. Attention will focus on the floral and faunal components of the *seringueiros*' farming system, specifically the mix of crops, fruit, vegetables, and livestock available and the variable roles that each plays in the composition of livelihoods. It will be argued that many of these components simultaneously occupy specific niches of the *seringueiro*'s livelihood and fill multiple roles or serve multiple needs for the household.

Next, the chapter will explore the application of labour to various farming activities, in particular the prominent role of women in seeing agricultural production through to harvest. It will address the advantages and disadvantages of marketing agricultural production in contrast to its arguably more crucial subsistence role. The discussion will emphasize the relative importance of agriculture within the overall composition of forest dwellers' livelihoods and will show that it is the integrative nature of farming and extractivism which is the source of the resilience of *seringueiro* livelihoods. It will be argued that food self-sufficiency and alternative sources of income provided by agriculture increase the viability of forest based livelihoods. At the same time the contributions to household livelihoods from forest products frees the rubber tappers from the need to generate a substantial agricultural surplus. Ultimately, it is the complementarity of the different strands of the rubber tappers' livelihoods that underpins their viability in a socio-economic sense and their sustainability in an ecological sense.

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[1] Field interviews.

10.1 *Seringueiro* shifting cultivation: land clearance

The farming practices of rubber tappers along the Riozinho do Rola is comprised of a variety of tasks, crops, and landuses. These reflect both local and regional environmental constraints as well as broader cultural patterns of Amazonian *caboclo* society (Nugent 1993; Almeida 1992; Moran 1974: 145-146). Most pieces of land utilized by the *seringueiros* for farming go through a specific cycle of uses initiated by the clearance of standing forest to make way for the annual field or *roçado.*[2]

Site selection is based on numerous criteria including soil characteristics, slope, fluvial influence, local forest type and location relative to the *barracão.*[3] New *roçados* are often located adjacent to older ones which serve as a useful points of reference for determining the size and orientation of the present clearing. It also permits the use of established trails for travel to and from the *roçado.* Agricultural areas were observed both near and far from the homestead, sometimes up to a 45 minute walk away.[4]

One of the more important considerations of site selection hinges on the dichotomy between *mata bruta* and *capoeira. Mata bruta* refers to previously uncut, largely unaltered forest characterized by high biodiversity and complex structure. Throughout Brazil the term *capoeira* has broad connotations. In Acre and other parts of Amazonia, it is used specifically to describe secondary forest of lower diversity and complexity, usually characterized by a preponderance of soft, pithy, fast-growing, pioneer species.[5]

The large, hardwood trees that are prevalent in mature forest make the clearing of *mata bruta* considerably more arduous than that of *capoeira.* Forest clearance is still done with hand tools by most small scale farmers in Amazonia although the use of chain saws is spreading. At present only two rubber tapper households on the Riozinho do Rola possess chain saws in addition to the *marreteiro* that lives on the Igarapé Espalha (Chapters 8 and 9). Felling *mata bruta* consequently entails two passes through the same area. The first pass, know as *brocar*, is made to clear the underbrush, lianas and small trees, which can be hacked through with one or two blows of a machete or *foiça.*[6]

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[2] The roçado is field or clearing made in the forest where the main crops are planted. After *roçar*: to clear.

[3] Field interviews.

[4] Field interviews.

[5] The term "virgin rainforest," often used in English discourse to describe some forms of "*mata bruta*," was to most respondents both humourous and irrelevant when translated into Portuguese.

[6] The foiça is a hybrid tool comprising a broad, short, curved blade on a long handle used for felling small trees and clearing underbrush.

The second pass - *derrubar* - is then made using a large, long handled axe to fall the remaining trees. The strategy commonly employed during the second stage is to chop three-quarters of the way through the trunks of a dozen or so neighbouring trees. Then by felling a single, large, well placed tree the whole lot can be brought down efficiently and in relatively safety.[7]

Key informants reported that as a rule of thumb, clearing one *tarefa* of *mata bruta* requires approximately two to three human-days for *brocar* and the same again for *derrubar*.[8] On the other hand, one *tarefa* of *capoeira* which in most cases can be felled in one pass using only a machete and/or foiça, requires about three to four days to clear.[9] The greater labour requirement of clearing *mata bruta* is offset to a large degree by the superior quality of soils that occur under mature forest and the subsequently better crop yield farmers can expect. This was stated as the main incentive for clearing *mata bruta.*

Data from the household survey on *roçado* clearances for 1992 and 1993 is summarized for each household in Figures 10.1 and 10.2. The graphs show that in general households clear primarily *mata bruta* or a combination of both forest types and only on rare occasions clear only *capoeira.* This is partly a reflection of the greater incidence of *mata bruta* forest in the research area, although several of the older *colocações* were surrounded by large areas of *capoeira* of varying ages. In the two years for which data was recorded a total 183 *tarefas* in 1992 and 233 *tarefas* in 1993 (i.e. 46 and 58 hectares respectively) were cleared for agriculture by the residents of the research area.[10] The average amount of forest cleared per household was four *tarefas* in 1992 and five in 1993.[11]

A given piece of land may be actively farmed for 2-3 years after which soil fertility becomes too depleted to support a viable crop. At this point households may take one of two courses, either allow natural regeneration of *capoeira* on the site, or convert it to

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[7] Field research - participant observation; see also Hames and Vickers 1983.

[8] One *tarefa* is defined as twenty-five *braças* square, one *braça* equals two metres. Thus there are four *tarefas* to one hectare. Occasionally respondents estimated areas in terms of *alquieres,* a more traditional measurement equivalent to eight *tarefas.*

[9] Field research - interviews

[10] Only very little land clearance is carried out for the express purpose of creating pasture for livestock. In these instances it is almost certainly young or otherwise marginal *capoeira* forest which is cleared. Interviewees made it clear that they were loathe to carry out the arduous work of forest clearing and burning without the prospect of raising at least a crop of manioc.

[11] Field research - household survey. Averages are calculated for only those households that made a clearing. Where no clearing was reported this was usually because the family was recently arrived or soon to depart the *colocação* in question.

pasture composed of native and/or introduced grasses or *capim* (field interviews; Rodrigues 1991). Land that reverts to *capoeira* may be replanted after as few as five years, although the general consensus was that this was insufficient to produce a decent crop of rice and beans. In general, 8-10 years was considered a more appropriate time scale to allow a reasonable rebuilding of nutrients in the forest biomass. For the sake of argument, it may be assumed that it takes 15 years for a piece of land previously under *mata bruta* to recover from a rotation of intensive agricultural usage. In this instance it would take a maximum of 25 hectares of land to support the agricultural needs of an average household clearing 1-1¼ hectares per year (cf Hecht et al 1988: 30). This is quite a low figure in comparison to the 50-100 hectare plots allotted to migrant farmers in many of Acre's troubled colonization projects where colonists are often unable to meet household needs through agriculture alone (cf Nepstad et al 1992: 6; Goodman and Hall 1990; Bakx 1986). Along the Riozinho do Rola rubber tappers are able to survive farming a smaller area of land than most colonist farmers because of the diverse resource base they exploit and their independence from the need to generate an agricultural surplus. The reclearing of *capoeira* which is more prevalent in some parts of Acre than others, further reduces the overall impact of rubber tapper livelihoods on the forest (Rodrigues 1991: 49-50).

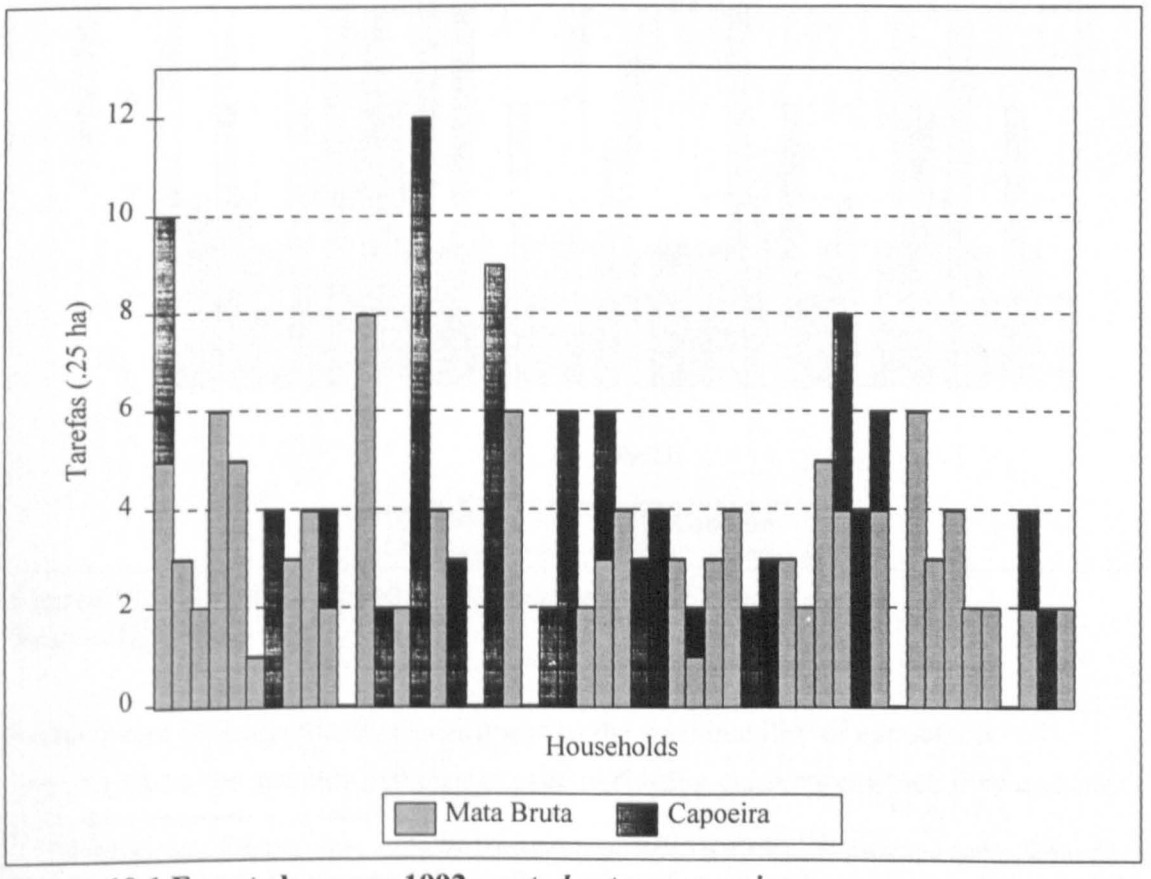

Figure 10.1 Forest clearance 1992: *mata bruta* vs *capoeira*
Source: Household survey

The appellation *capoeira* was applied to stands of forest that had not been cut or otherwise disturbed for 50 years or more.[12] Clearly their is a distinction to be made between the fallow period used (or believed by the rubber tappers to be necessary) to regain soil fertility and the period it takes the forest to regain the biomass and biodiversity similar to its pre-deforestation level. Furley (1990) reports that it often takes at least 100 years before original nutrient equilibrium is restored and that, "the diversity and species composition of the vegetation is likely to be very different from the initial state" (Furley 1990: 333). Another study which focused on carbon storage and land use on an extractive reserve in Acre, calculated that a community of 22 rubber tapper households deforested about 0.5 % of their land base per year. At this rate, "turnover time for the forest in the seringal with respect to human activity would be close to 200 years" (Browder et al 1992: 2).

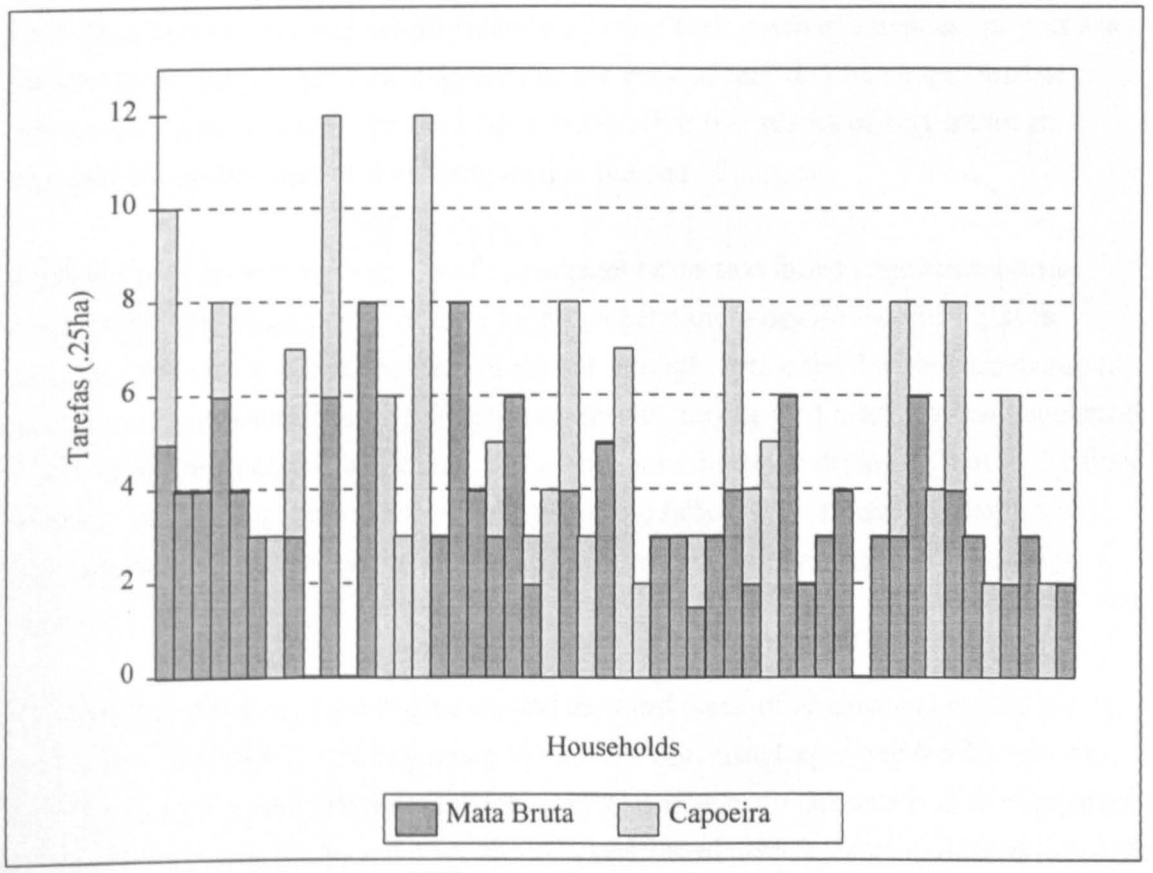

Figure 10.2 Forest clearance 1993: *mata bruta* and *capoeira*
Source: Household survey

Some critics of Extractive Reserves question the sustainability of extractivist livelihoods on the grounds that they engage in shifting cultivation which they consider

[12] Field research. Exactly when *capoeira* becomes *mata bruta* is difficult to ascertain and is, from the seringueiros' point of view, a moot point. The forest dwellers nomenclature is oriented towards their relationship with the forest more so than to consideration of its physical structure (Chapter 6; cf Almeida 1992: 205).

to be a major cause of Amazonian deforestation. Such a thesis is weak in light of the example cited above and according to the abundant research which shows that shifting cultivation is not a cause of deforestation, so much as it is an effect of wider political and economic forces, historical processes, and the unequal distribution of resources (Nugent 1993; Anderson 1990; Millikan 1989). Shifting cultivation is a viable agricultural technique at appropriate population levels such as those found in rubber tapping and other forest dwellers' livelihoods. The key here is the diversity and flexibility of livelihoods which prevents over-dependence on any single source of income or subsistence and which permits the effective use of household labour resources throughout the year.

During the field work virtually all of the households visited were in some way or another involved in the annual task of clearing forest for the new roçado. Some households stated that they usually started clearing their patch of forest as early as May. Observations made in the field suggest that the peak of the "deforestation" season occurs during the last two weeks of June and the first two weeks of July although several households were still clearing land at the end of August.

It is very important to the success of subsequent crops that felled vegetation burns thoroughly. Allowing plenty of time for the vegetation to dry out is crucial, as is ensuring that all vines and underbrush are cut through, hence the double pass technique used for clearing *mata bruta*. For optimum results the jumbled pile of fallen vegetation is left as it falls to allow for air circulation and more thorough drying. Then in the final days before burning some strategic limbing of the fallen trees is done so that the vegetation packs down close to the ground and ensures a hotter and more thorough burn.

The burning season in Acre begins around the third week of August and by the end of September the majority are beginning to smolder out. The larger tree trunks are only slightly charred by the fire unless it gets very hot. The main concern is that all or most of the smaller trees, limbs and underbrush is consumed both in order to release nutrients into the soil and to facilitate subsequent work in the fields (Nugent 1993; Furley 1990; Moran 1974: 145). In some instances a second burning, known as *coivara*, is made to release nutrients from plant material that may have escaped the primary blaze (Almeida 1993: 207). The clearings made in the forest for cultivation by the rubber tappers are

the antithesis of the smooth, uniform fields most northerners would associate with the term agriculture or farming. Scattered logs and half-burnt branches lurk throughout the new field, hindering movement but at the same time providing a convenient source of firewood.

10.2 Components of the rubber tappers' farming system

The components of the rubber tappers' farming system are broken down and discussed in three broad categories. The first includes the four major crops that form the backbone of household staple supplies. The second includes minor crops, fruits and vegetable which add important variety and quality to household diets. The third refers to livestock and in particular the duality of their role in livelihood composition.

The big four: rice, manioc, beans, and maize

By the time the smoke has cleared from the September air the rainy season is upon the inhabitants of the Riozinho do Rola and the river level is on the rise. The tapping of rubber is drawing to a close and most hands are turned to the planting of dry land rice. Rice is the first crop grown on "fresh" soil and is planted only on land cleared from *mata bruta* because of its relatively high demand on soil nutrients.[13] In rare instances the rubber tapper will plant rice on land under older *capoeira*. For example, it was not unusual for long established *colocações*, especially the former headquarters of old rubber estates, to be surrounded by large areas of *capoeira*. In these situations the selection of *mata bruta* sites was impractical due to the distance from the *barracão* and hence old stands of *capoeira* would be cleared for the coming year's *roçado* instead.

Seringueiros along the Riozinho do Rola plant a variety of strains of dry land rice, distinguishable primarily on the basis of how long they take to produce a crop. Some varieties take as little as three months to come to harvest while others take on the order of five to six months. The trade off between the length of time from planting to harvest and the quality and quantity of the yield provides an additional source of flexibility to the rubber tapper's livelihood. The selection of which variety of rice to plant can, thus, in part be based on household requirements, whether these are for an early crop to meet short term subsistence needs or to generate an agricultural surplus which can be sold to supplement extractivist output.

[13] Field interviews.

Beans are planted at the end of the rainy season, immediately following the rice harvest (Figure 10.3). There are two principle varieties of beans planted by the *seringueiros*, *feijão de corda* and *feijão de arunca*, of which there are several sub-varieties within each. The main difference between the two is that *feijão de corda* may be planted marginally earlier and has a greater total yield than that of *feijão de arunca*. It is also the more marketable of the two varieties. *Feijão de arunca*, on the other hand, yields only once and produces a larger and more tender bean that was, for the most part, preferred by the households visited. Due to its relatively lower yield *feijão de arunca* is grown almost exclusively for subsistence purposes. It is planted a little bit later than *feijão de corda*, in May rather than April and after about three months the entire plant is pulled up.[14]

By the time the last of the bean crop is being harvested it is late summer. The rubber tapper household is quite likely to be still engaged in rubber production and the process of clearing a new piece of forest should be well underway. Demands on household labour resources at this time of year are high. On the original plot the third crop, manioc, is planted.

Manioc (*Manihot esculenta*) is probably the most pervasive subsistence crop grown by small scale rural producers whether they are indigenous tribes, *caboclos*, or recent migrant farmers. It is a remarkably hardy and versatile plant which grows well in the acidic, nutrient poor soils common throughout much of the *terra firme* forest of Amazonia (Moran 1989: 25). There are two broad groupings of the many varieties of manioc grown, these are *mandioca braba*, or bitter manioc as it is sometimes called, and *macaxeira*, otherwise known as *mandioca manca* or sweet manioc. The former is highly toxic to both humans and livestock and can only be consumed as *farinha*, a specially prepared flour made from grated manioc that is pressed and then toasted to remove the toxic liquid.[15] *Macaxeira* on the other hand, may be fed to animals in its raw state or simply boiled for human consumption, although it too is widely used to make *farinha*.[16]

[14] Field interviews.

[15] See Carneiro 1983 for and exhaustive discussion of on manioc.

[16] Field interviews.

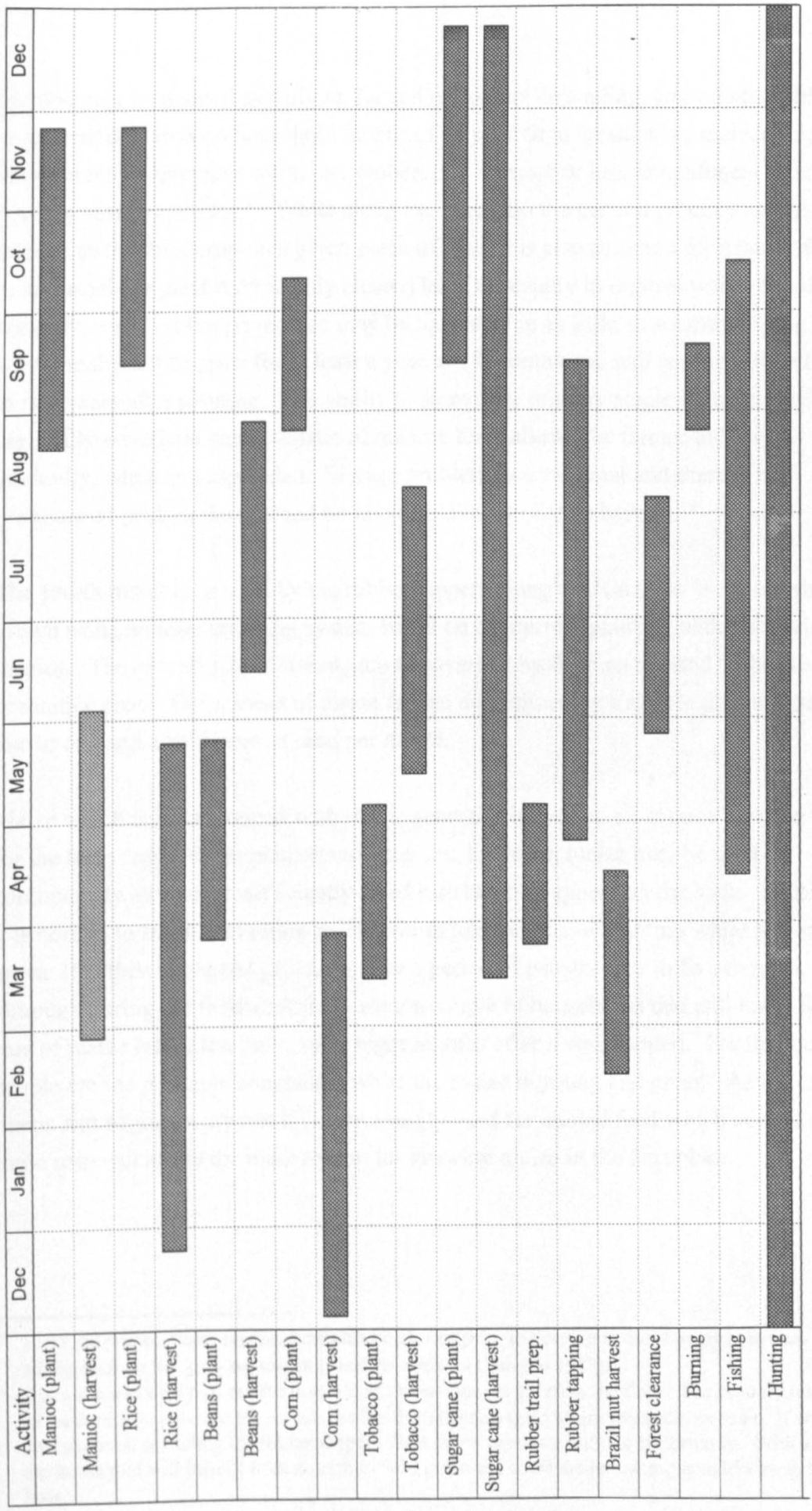

Figure 10.3 Seasonal rotation of livelihood activities.
Source: Field research.

Manioc may be planted as early as the end of August depending, among other things, on current demands on household labour. The peak time for planting manioc falls between mid-September and mid-October, that is, more or less immediately after the burning of new *roçados*.[17] While along the Riozinho the general practice was to plant manioc as the third crop on a given piece of land, it is also common for peasant farmers in Amazonia to plant it on freshly cleared land, especially in regions where rice does not grow well. Although manioc may be harvested in as little as six months, the tubers are normally left to grow for at least a year to 18 months and will remain edible for up to two years after planting. The ability to store their primary staple in the ground is an especially beneficial characteristic of manioc for it allows the farmer to harvest gradually, when and as needed. Storage problems are minimal and there is no pronounced peak in the demand on household labour for its harvest.[18]

The fourth major crop used by the rubber tappers along the Riozinho is maize which is grown using an inter cropping system based on concurrent planting with either rice or manioc. The overall size of the *roçado* is governed by the area allotted to the rice, bean or manioc crop. The amount of maize is then determined by a simple planting ratio of one to one and a half litres of seed per *tarefa*.

Maize which is inter cropped with rice is generally harvested all at once to make way for the bean crop. When planted with manioc, however, maize may be used continuously as soon as sufficiently sized ears begin to appear on the stalk. In this case it is normal to begin harvesting maize within two months of planting while it is still green. It is then harvested gradually over a period of usually four to five months, although during the fieldwork there were a couple of households that still had a few ears of maize left in late July, some eight months after it was planted. For the most part people are the principle consumers while the maize is young and green. As the crop ripens and begins to dry out it is increasingly used for animal feed which according to some respondents, is the main reason for growing maize in the first place.

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[17] Field interviews. Some manioc may also be planted prior to burning in order to give the crop a head start on the growing season (Field research; cf Carneiro 1983).

[18] Domestic and wild pigs are the main threats to manioc crops left in the field. The primary response to the former is to locate the *roçado* farther from the *barracão* where livestock are kept. If wild pigs are suspected to raiding the rubber tapper's field this is used as a hunting opportunity. With any luck the household will benefit from a catch of wild game and scare the remaining invaders away for a time.

Minor crops, gardens, and fruit trees

The variegated distribution of crops throughout the area under cultivation is especially apparent with minor or supplementary crops. Individually these crops do not contribute to household consumption on the same scale as the staple crops discussed in the previous section. Taken together, however, they enhance the variety and diversity of the *seringueiros'* diet and livelihood.

Sugar cane is grown within the *roçado* itself in one or more small patches that rarely exceed more than half a tarefa. Planting can take place at any point between September and January. After some six months the canes begin to reach maturity and are subsequently cut as needed, continuing to produce for up to four or five years.

Children can often be seen sucking on a piece of raw cane but in general, more refined products are derived from the sugar cane juice or *garapa*. *Garapa* is used domestically as a substitute for sugar or is boiled down to make a thick syrup, *mel de cana* or further refined to make a solid confection known as *rapadoura*. Sugar cane products are generally produced for domestic consumption or trade with neighbours and relatives on the *seringal*. There is a small market for *rapadoura* in the city which the rubber tappers are occasionally able to take advantage of to earn extra cash while they are Rio Branco.

Tobacco was planted by about half of the households in the survey in small patches within the *roçado* or between fields of the major crops. As with sugar cane it is usually confined to a half *tarefa* of land. It is planted at the end of the rainy season more or less concurrently with beans, although it was also observed being planted in the summer. It takes just three months before tabacco is ready to be harvested at which point the leaves are picked, tied in bundles and hung to dry. After about ten days the leaves are placed in the *farinha* press for a further day or two before being rolled and bound into tight, elongated cylinders for curing and storage.[19]

Most of the households who reported growing tobacco on a regular basis grew it primarily for household consumption although, similar to sugar cane, it was frequently used in small inter-household exchanges as well. The survey showed only six households regularly growing tobacco with the intent to sell in Rio Branco.

Most *seringueiro* families plant a variety of vegetables in small patches along the perimeter of the *roçado*, interspersed in accessible areas between blocks of major crops, near out buildings such as the *paiol* or the *casa de farinha* or even along trails between

[19] Field research - observation

the *roçado* and *barracão*.(Figures 6.5 and 7.1) Virtually every *colocação* also grew a small quantity of vegetables and herbs close to the household in small, raised wooden beds known as a *canteiras*.

Garden produce includes a variety of leafy, root, trailing vine and bush vegetables plus certain non-arboreal fruits. Women are the primary caretakers of vegetable gardens which usually fall under the direction of the female head of household. The most common reason cited for not planting a particular vegetable was the lack of seeds followed by the conviction that the plant in question was not suited to the local growing conditions.[20]

In addition to garden produce, rubber tapper households may possess a combination of at least 20 different species of both endemic and exotic fruit trees. The most profuse by far are several varieties of banana and papaya, which are concentrated mainly in the *roçado*. Other fruit trees, of which orange, guava, avocado and cashew are the most common, tend to be planted in areas of more permanent clearance, such as would be found around the *barracão* or the *casa de farinha*, and in areas of more or less permanent pasture. In general fruit is available to rubber tapper households throughout the year, although July through August tend to be the leanest months.
Several types of fruit trees continue to produce, albeit at a lower level, well after they have been engulfed by *capoeira*, for instance in abandoned *roçados* or around the *barracão* of abandoned *colocações*. Some *seringueiros* continue to harvest from these trees for a considerable time after they have become part of the forest matrix. In some cases groves of a particular species such as the guava (*Psidium guajava*) remained intact and were not overrun by secondary forest. Similarly, banana trees continue to be harvested for many years after they have been enveloped by the surrounding forest although ultimately it is simpler to replant bananas closer to the homestead or in an active *roçado* (Hecht et al 1988: 25; cf Posey and Balée 1989; Posey 1983).

It is next to impossible to quantify the gross harvest of fruit and vegetables that are grown and consumed by individual households or to determine in quantitative terms their caloric or nutritional role in *seringueiro* livelihoods. Nonetheless, rubber tappers along the Riozinho do Rola repeatedly mentioned the qualitative benefit of garden and orchard produce that contributes to household livelihoods; (a) as an important constituent of household nutrition, especially for children and, (b) are appreciated for

[20] Field research - household survey. The list of commonly grown garden plants, in ranked order of average number of plants includes: onion, sweet pepper, squash, water melon, spring greens, tomatoes, okra, *pipim*, cilantro, potatoes, sweet potatoes, gherkin, and garlic.

the variety they add to diet which are otherwise confined to meat and three or four staple crops.[21]

Livestock

It is a common practice in peasant societies everywhere to keep domestic livestock as a source of protein and as a form of savings or investment. Along the Riozinho do Rola livestock form an integral part of rubber tapper livelihoods. One of the primary roles of livestock in the composition of rubber tapper livelihoods is for security. Security against minor shortfalls in other areas of the household livelihood and security against catastrophes that can potentially jeopardize household survival. As a food source, livestock are conserved for use in a supplementary capacity in the event of shortfalls in wild game meat and fish supplies or when there are extra mouths to feed.

The exchange value of certain livestock is especially important to *seringueiro* households. Cattle in particular, but also other large farm animals, are a relatively liquid asset which are extremely important as a last line of defense in the event of a sudden catastrophe effecting household survival. There were numerous examples recounted to the author regarding the sale of livestock when serious illness or injury befell a member of the household. Monies earned were used to pay for medical treatment and travel expenses as well as to help cover other costs associated with the loss of labour resources and general disruption of the household livelihood system.

In addition to their security function livestock also represent wealth, the accumulation of which is extraordinarily difficult for *caboclo* communities in Amazonia. Raising livestock enables rubber tappers to not only save for "a rainy day", but also to accumulate capital that may be used for investment in, for example, a gasoline engine, a boat or even the "purchase" of a *colocação*. Without the additional income provided by livestock, large capital investments may not be attainable through regular income channels such as rubber production, Brazil nuts or the sale of agricultural surplus.[22]

Cattle are coveted by small rural producers throughout Latin America, not least in Amazonia, where in certain colonist areas they occupy extremely large areas of converted forest land (Millikan 1989: 16). Along the Riozinho do Rola they are far and away the most valued livestock animal for savings and investment purposes, as a check against the uncertainties associated with forest based livelihoods, or simply as a hedge Other livestock are primarily kept for food usage or as draught animals. Poultry were

[21] Field interviews.

[22] Field interviews.

the most widely kept farmyard animal and the most frequently killed for food.[23] Draught animals, mainly horses, were owned mostly by households located in the interior, usually some distance from the Riozinho do Rola or other navigable waterway.

Colocação (year)	No. of cattle sold	Price or Exchange value	Objective of transaction
Santa Monica	2 1	• 3/4 hp motor • Medicine • 4 mos. Mercadorias	• Motor to power boat, run manioc grater • Treat malaria - dona de casa • Sickness of several family members
Macauba (1992)	1 1 (lge. bull)	• Medicine • Young bull • Mercadorias	Dono and dona de casa: • treat sickness, • supplement food supplies
Fortaleza (1992)	1	• mercadorias - 6 mos.	Debt avoidance: due to low rubber price.
Extrema (1993)	6	Cr$45,000,000 value: (fridge, television, furniture, and other household items).	• Cost of moving to colonist holding near Rio Branco

Table 10.1 Some examples of transactions involving cattle
Source: Field research, interviews, household survey

against inflation.[24] Nonetheless, only 28 of the households surveyed possessed cattle. There were a total of 346 cows held among these households although 100 head were owned by one exceptionally well-off household while the majority of cattle owners had ten or fewer animals. Some specific examples of transactions involving cattle are summarized in table 10.1.[25]

Other key species of livestock that are kept, as much for investment purposes as they are for a food source, include pigs and sheep. Pigs are highly valued in part because they are comparatively robust and well suited to the forest environment. Their principal drawback is their propensity for raiding manioc crops and the fact that they are aggressive and difficult to transport. Sheep, on the other hand, are easier to raise and handle and are not such an overt threat to cultivated food supplies, but they are more vulnerable than other livestock to infection, sickness and snakebites. Sheep are

[23] Field interviews.

[24] Field research - interviews, household survey; Hecht and Cockburn 1989: 69-74 *passim.* Note that inflation has only very recently become less of an issue in Brazil.

[25] Field research - interviews, household survey.

considerably less valuable than cattle or pigs, but they are a more attainable investment for poorer households and younger families just starting out.

10.3 Farming and household labour

The *seringueiro* farming system is both characterized by, and dependent upon, the flexible application of labour. In general, agriculture probably occupies more household labour resources overall than other areas of forest based livelihoods. Unlike the two key extractivist activities along the Riozinho, collecting Brazil nuts and tapping rubber, farming requires labour input throughout the year. While there are fluctuations in labour requirements, in any given month there is almost always something to do in the fields. Furthermore, there is a high incidence of participation by most family members, especially women, in agricultural work (Kainer and Duryea 1992; Schwartzman 1989). The allocation of labour in specific instances is highly variable and is determined by a range of factors, including the demographic structure of the household, the type and amount of crops being grown and alternative demands on labour from other livelihood activities. Peak usage of household labour in agricultural pursuits occurs late in the dry season at the time of forest clearance and the subsequent planting of rice, manioc, maize, and sugar cane. A second, "harvest peak" is drawn out between February and April, generally coinciding with the Brazil nut harvest and the preparation of rubber trails (Figure 10.3).

In general, throughout the year women are probably more intimately involved than men in agriculture on a full-time basis. Women play a pivotal role in overseeing and carrying out the harvests of agricultural production, especially in the case of ongoing or periodic harvests of crops which are "stored" in the ground or on the vine and only used as needed. The direct involvement of male members of the household in agricultural activities, at least physically, tends to be concentrated around times of peak demand on household labour, such as during the arduous period of forest clearance (cf Almeida 1992: 206). Crops that have a relatively short but intense harvest season may also involve more male household members including those that might otherwise be engaged in rubber tapping or hunting.[26]

Ultimately, the application of labour to agricultural pursuits is a high priority for most households. Rubber tapping and hunting, as the primary, male dominated livelihood activities, are easily put aside when there is a need to concentrate on farming.

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[26] Field interviews.

10.4 Agricultural production, consumption, and exchange*

Along the Riozinho do Rola the primary objective of agriculture is household subsistence. Results of the household survey show that between 60 and 80 per cent of the households utilize their crops solely for subsistence purposes. Household estimates of production and consumption levels suggest that on average net harvests do satisfy demand for the three staple food crops; rice, beans, and manioc. However, there are numerous risks to farming in the Amazonian environment and poor harvests or outright failures are certainly a factor in overall livelihood strategies. Rice and bean harvests in particular, seemed to be highly variable and more prone to failure than the much hardier manioc. In some cases production was well below average consumption levels.

Shortfalls or outright failures of either rice or bean crops, however, were not considered especially threatening to household survival. Firstly, manioc and, specifically *farinha*, is the principal staple for the residents of the Riozinho as it is throughout most of rural Amazonia. Manioc is widely and consistently planted and, therefore, is almost always available. In one respondent's words, "when we run out of rice we eat more *farinha*." Secondly, by applying more labour to alternative pursuits such as rubber tapping or hunting the *seringueiros* are able to compensate for poor or failed harvests.

Despite the risks that permeate small scale agriculture in the tropics, rubber tappers are able to generate an agricultural surplus, although this usually requires that labour be shifted from extractive production to farming. Once household needs have been met households have the option to sell or trade their surplus. Furthermore, most of the households that were interviewed complained about the decline in the real price of rubber in recent years and of the weak market for Brazil nuts which was giving many of them cause to shift effort away from extractivist production and towards a greater emphasis on agriculture.

There are basically two modes of exchange that occur with agricultural surplus. First, there is the cultural practice of *vizinheiro* which refers to the internal exchange of goods and services between neighbours in the forest. Inter-household exchanges involve trade in agricultural production, livestock, rubber, game meat, ammunition supplies, *mercadorias*, and even labour. The practice of *vizinheiro* is very widespread along the Riozinho do Rola and indicates yet another dimension of the *seringueiros'* multi-faceted livelihood strategies (cf Almeida 1992).

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* As part of the survey, matrices of production, consumption, and exchange were compiled on the agricultural output of each household. These were done in consultation with members of each household for 1991, 1992, and 1993.

Twenty-two of the households surveyed reported having made a sale of one or more of their agricultural products in the three years prior to the fieldwork. A further three households were intending to sell produce from the 1993 season if harvests were good. In all 65 transactions were recorded, nine of which were inter-household exchanges. In addition to these actual transactions, there were approximately 30 more commercial exchanges of agricultural surplus being planned at the time of the fieldwork. Although it was too early to tell if an actual shift in the composition of household livelihoods was taking place, several households were attempting to earn more income from agriculture or were intending to place more emphasis on farming in the future.

Despite the desire within certain households to increase sales of agricultural surplus, transportation remains a major barrier. For certain agricultural products, especially fruit, the rigours of the journey between forest and market are the problem. During the dry season when the river level is low, the trip from the research area takes more than a week. The low water level at this time of year means that boats often run aground and have to be literally dragged and pushed across sand and mud bars. Agricultural products are, for the most part, more susceptible than rubber or Brazil nuts to damage from water and the frequent unloading and reloading of the cargo that takes place during the low water months. During the rainy season when the river level is high it is more common to take produce to sell in the city, for example, by adding a sack of farinha, a few extra stalks of bananas or an animal to a shipment of rubber or Brazil nuts bound for Rio Branco. Significantly, most respondents claimed that only very occasionally would agricultural produce be traded with the *marreteiros* whose prices were said to be, "worthless, even worse than rubber".[27]

10.5 Conclusion

The agricultural practices of *seringueiros* in Acre, similar to their counterparts in many Amazonia *caboclo* societies, are characterized by their diversity and flexibility, low external input, labour intensiveness and subsistence orientation (cf Nugent 1993). These of course, are classic attributes of peasant social formations(Chapter 3). The focus of this chapter has been to examine the diverse contributions of agricultural pursuits to the overall composition of rubber tapper livelihoods. Of particular importance has been to look at the spatial and temporal nature of farming activities, including the cycle of landuses and the various components that make-up the farming system. One of the most important conclusions is the vital role of agriculture in ensuring the viability of rubber tapper livelihoods. Firstly, by the provision of a diverse

[27] Field interviews.

food base that is able to satisfy basic household demand and to meet most subsistence requirements. Secondly, by the provision of supplementary sources of income which function as a form of savings or capital investment or are used to meet unforeseen demands on household resources.

Agriculture absorbs a considerable amount of household labour throughout the year and is closely linked with the main extractive activities during the rubber tapping and Brazil nut seasons. The flexible application of labour, however, allows both areas of production to be brought along concurrently. The timely completion of agricultural work is especially dependent on women who, on a daily basis, are often the primary caretakers of crops and gardens.

The integration of farming with other areas of the forest dweller's livelihood reduces the scale of shifting cultivation that occurs on the *seringais* because there is no inherent need to generate an agricultural surplus. Instead, with rubber and Brazil nuts filling most household income needs, agricultural production is oriented primarily toward the satisfaction of household subsistence requirements. Agricultural surpluses are not unknown and may be marketed, but they tend to result from bumper harvests of specific crops, rather than from intentional planting beyond household needs. The land under cultivation at any given time by a "typical" rubber tapper household is a mosaic of fields, each at a slightly different stage of the landuse cycle. Agriculture plots from different years often adjoin one another or may be distributed in the forest as islands of cultivation around the *barracão* (Figures 6.5 and 7.1).[28] Either way, the overall area that is directly impacted by *seringueiro* agriculture is much smaller than is the case under most other landuses currently being practiced in Amazonia. It is argued, therefore, that at appropriate population levels the extent of forest clearance necessary for farming is ecologically sustainable under the rubber tappers' system.

Agriculture is a major component of the rubber tapper livelihoods encountered along the Riozinho do Rola and its adjoining hinterland. Most respondents expressed the importance of agriculture to their livelihoods in terms of the self-sufficiency and independence it provides. At the same time, they were quick to point out that in the forest, agriculture is most beneficial when integrated with the other sides of their livelihood triangle. That is, extractivist production of the main commercial species, *Hevea brasiliensis* and *Bertholletia excelsa* on the one hand, and the harvest or capture of other non-timber forest products, wildlife and fish on the other. The pivotal role of

[28] These maps were sketched in consultation with the respective owners of two *colocações*. They are useful to illustrate the spatial diversity of household agricultural systems and general patterns of landuse around the *barracão*.

hunting, fishing, and NTFPs in meeting subsistence needs and adding to the quality of forest life is discussed in the following chapter.

Chapter 11

Hunting, Fishing and NTFPs: The Third Dimension of *Seringueiro* Livelihoods

11.0 Introduction

In the previous chapter it was argued that the importance of agriculture in rubber tapper livelihoods has been overshadowed by a preoccupation with the two major forest products; rubber and Brazil nuts. Other livelihood activities such as hunting, fishing and the collection of other non-timber forest products have similarly been cast as appendages, rather than as essential and integrated dimensions of overall livelihood composition. It is a central thesis of the current research that the rubber tappers' ability to shift and to adapt their dependence on one productive activity or another, are key factors in maintaining the viability and sustainability of their livelihoods.

The current chapter considers a few of the so called minor or secondary products and activities that nonetheless form an integral part of the rubber tappers' forest based livelihoods. This is an especially diverse branch of *seringueiro* livelihoods that involves the exploitation of a wide variety of both faunal and floral, timber and non-timber forest resources. The individual, quantitative contributions of these resources to household livelihoods are relatively small, but collectively they make a significant contribution to the quality and the viability of rubber tapper livelihoods. On another level these resources complement other areas of household production and enhance the diversity of opportunities available for meeting household needs. Extractive reserves may help in the conservation of these resources by, for example, precluding outsiders from hunting within extractive reserve boundaries thereby leaving the stock of wild game to be used and managed at the discretion of the local population.

11.1 Hunting

In the course of the field research it was found that the contribution of wild animal meat to forest based livelihoods is significant from both a qualitative and a quantitative standpoint. Rubber tappers along the Riozinho do Rola placed a very high value on wild meat and considered their access to hunting resources to be one of the principal benefits of their forest based livelihoods. The availability of wild meat was cited as a quality of forest life that was not available to residents in the city and was substantially reduced in the case of colonist farmers and squatters. Access to hunting resources was also valued for the pressure it takes off domestic livestock resources for food. The costs of hunted meat are primarily accounted for in terms of the time and effort invested in

hunting. Domestic livestock, on the other hand, represent one of the rubber tappers principal forms of savings or investment in addition to their more mundane food value (Chapter 10), hence, there is an additional opportunity cost associated with the consumption of livestock. Finally, there is a cultural preference for wild meat over domestic livestock which was very evident among the *seringueiro* households visited during the research.

The game food resource exploited by the residents of the Riozinho do Rola consists of about a dozen genera representing at least 20 species of mammals, birds and reptiles. Individually these animals vary considerably in both their size, availability, and the ease with which they are hunted. Table 11.1 summarizes the principal game species and the frequency of kills.[1] On average, households were successful in capturing two large and five small animals per month, although the actual range of success was considerable. Respondents indicated that smaller animals typically provide the household with from one to three days' meat supply while larger animals frequently yield enough for a week to 10 days. If there is ever a surplus of meat it is often traded with other households (the custom of *vizinhar*) or is salted and dried.

While making the rounds of an *estrada* or traveling through the forest, rubber tappers are always hunting or at least looking out for signs of potential game. In general, however, hunting is undertaken in a purposeful manner. Figure 11.1 illustrates that over 90% of the survey respondents claimed to make two or more hunting trips per week and many claimed to adopt a strategy of hunting everyday until they were successful.[2] While Sunday was generally taken as a day of rest from many of the daily chores, such as tapping rubber or working in the *roçado*, it was widely used as a day for hunting.[3]

Hunting is primarily the responsibility of male members of the household. Boys begin to learn the skills of hunting at a very early age, in some cases even before they are taught the techniques of tapping rubber. The social importance of hunting was evident from the amount of conversation dedicated to the exchange of information and stories on current hunting conditions and exploits. Women also hunt on occasion, although not with the same regularity as their male counterparts. They tend to undertake hunting

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1 Data is for January to August 1993, inclusive.

2 Field research - household survey and interviews.

3 Field research - household survey and interviews. Gender divisions of labour were especially pronounced on Sundays. While senior male members of the household frequently would go hunting, women would often do the laundry in addition to their daily repertoire of domestic work. It should be noted here that there is a qualitative difference in the relative "drudgery" of tasks that are socially ascribed to specific genders. This is particularly evident, for example, between washing clothes on the hot bank of the river and stalking wild game in the cool of the forest.

more out of necessity while for men hunting is an integral part of their social position in the household and the community at large.

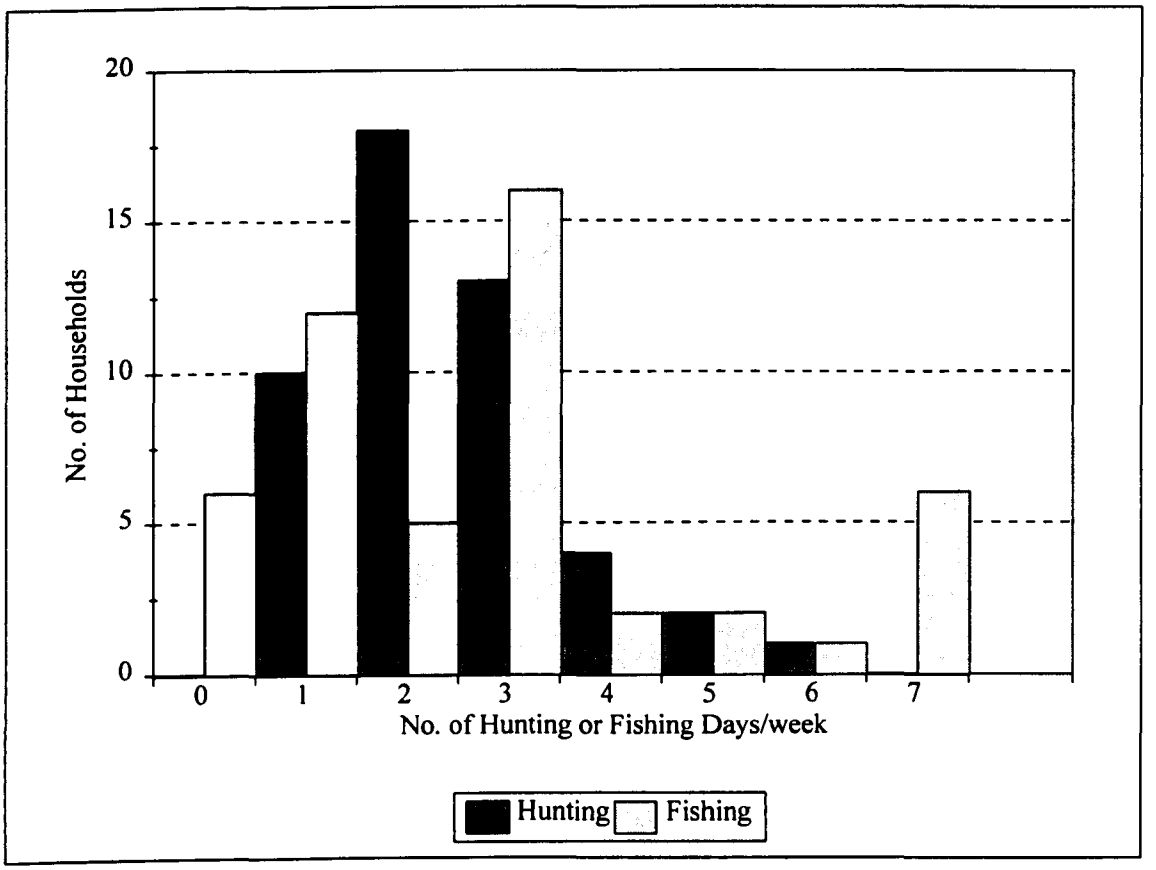

Figure 11.1 Frequency of hunting and fishing forays per week.
Source: Household survey

Interviewees demonstrated a broad range of ethnoecological knowledge concerning the behaviour and habitats of game species and deployed a number of techniques and strategies in the pursuit of wild game. One of the principle methods of hunting involved simply waiting by a known feeding spot or *comida*. Rubber tappers in the household survey exhibited knowledge of at least 85 associations between *comidas* and the principal game species that they hunted. The various *comidas* were represented by some two dozen tree species. Each association had three components: (a) the time of year each species was in fruit, (b) which animals feed on particular fruit and, (c) the time of day when there was the highest probability of encountering specific game animals at a given *comida* (Table 11.2). The method of hunting known as *esperar* (to wait) was reported to be most effective at night because of the nocturnal activity of many forest animals and because of the camouflage afforded by darkness. The general procedure was to string a small hammock one or two metres above the ground in the

vicinity of the *comida* where the hunter would then wait for the sounds of potential game coming to feed.[4]

Principal Game Species		Hunting success (No. of kills)					
Common name	**Latin name**	**0**	**1-5**	**6-10**	**11-15**	**16-20**	**21+**
Large Mammals							
Deer	*Mazama gauazoubira; M.americana*	13[1]	26	3	1	2	
Wild pig	*Tayassu tajacu T. pecari*	1	15	12	12	5	4
Queixada	*Tayassu albirostris*	46	1	2	0	0	0
Capybara	*Hydrochaeris hydrochaeris*	44	5	0	0	0	0
Tapir	*Tapirus terrestres*	38	11	0	0	0	0
Small - Medium Size Animals							
Agouti	*Agouti paca*	6	24	11	4	2	2
Armadillo	Family: *Dasypodidae*	18	24	4	2	0	0
Monkey	Family: *Cebidae*[2]	10	18	10	7	3	0
Tortoise	*Chelonoidis denticulata*	7	20	12	2	7	1
Cutia	*Coendu prehensilis*	11	28	7	1	0	2
Birds							
Inambú	*Tinamus guttatus; Crypturellus berlepschi; C. cinereus*	10	25	11	1	2	0
Jacu	*Penelope ochrogoster*	8	25	11	1	3	0
Other game		43	6	0	0	0	0

Table 11.1 Common game species hunted on the Riozinho do Rola

Source: Field research - household survey. Latin names from IMAC 1993; Frechione 1989.

1 Number of households reporting for period; January - August. 1993.

2 There are a dozen or so primate species in the Riozinho do Rola basin (IMAC 1993) some of which the *seringueiros* do not hunt. The Guariba is the largest and most desired for consumption; estimated yield is for this species only. Numbers killed includes all species. Mainly: *Alouatta seniculus, Cebus apella.*

The second principal method of hunting involved tracking through the forest itself, often leaving the familiar trails of the *estradas de seringa* in the hopes of encountering an animal sleeping during the day or a group of animals on the move. By and large tracking is more effective during the rainy season. Respondents stated that when the *varzea* is flooded, animals are generally easier to come across by walking in the forest. *Esperar*, on the hand, was widely considered to be a dry season hunting technique, firstly because this is when most *comida* trees are in fruit and secondly because the low water levels during the summer months exposes more land and so makes tracking more difficult (Field interviews; Almeida 1992).

4 Field research - interviews and observation. A battery powered torch is an indispensable tool for night hunting because during the night the forest floor is in utter darkness.

Tree *comida* Common name	Latin name	Fruiting Season	Associated Game Animals	Best time to hunt
Gamileira	?	All year	deer, wild pig, tapir, agouti, cutia, armadillo	Day/Night
Gamilinha	?	All year	deer, wild pig, tapir, agouti, cutia, armadillo	Day/Night
Copaíba	*Copaifera* sp.	June-Aug.	deer, wild pig, agouti, cutia	Day/Night
Biribá	*Rollinia mucosa*	June-Aug.	deer, tapir, agouti, armadillo	Day/Night
Envireira caju	*Guatteria* sp.	Feb.-Mar.	deer, wild pig, cutia, armadillo	Day/Night
Ata de Anta	*Ephedranthus amazonicus*	Mar.-Apr.	deer, tapir, armadillo	Night
Cajuí	*Anacardium spruceanum*	Oct.-Dec.	deer, wild pig, cutia,	Day
Guariuba	*Sorocea muriculata*	June-Aug.	deer, wild pig, agouti, cutia,	Day/Night
Caucho	*Castilla ulei*	Aug.-Sept.	deer, wild pig, agouti, cutia,	Day/Night
Niaré	?	July-Aug.	deer, wild pig, agouti, cutia, armadillo	Day/Night
Buruti	*Mauritia flexuosa*	June-Aug.	tapir, agouti, armadillo	Night
Louro	*Ocotea caudata*	July-Aug.	deer, wild pig, agouti, cutia,	Day/Night
Itaubá	*Mezilaurus palcazuensis*	June-July	deer, wild pig, birds: inambú, jacu	Day/Night
Tucumã	*Astrocaryum tucuma*	Feb.-Mar.	wild pig, tapir, agouti, cutia,	Day/Night
Pitaica	*Swartzia polyphylla*	June	deer, wild pig, cutia,	Day/Night
Jatobá	*Hymenaea* sp.	July-Aug.	deer, tapir, agouti, cutia,	Day/Night
Mata mata	*Eschweilera alba*	July-Aug.	deer, wild pig, agouti	Day/Night
Cumaru de ferro	*Dipteryx odorarta*	July-Aug.	agouti	Night
Tuari	?	Sept.-Oct.	deer, wild pig, tapir, agouti, cutia, armadillo	Night
Jaracatia	?	Feb.-Mar.	deer, agouti,	Day/Night
Cagaça	?	Feb.-Mar.	tapir, armadillo	Night
Abil de maça	?	Mar.-Apr.	deer, wild pig, agouti, cutia,	Day/Night
Abil de leite	?	All year	deer, wild pig, tapir, agouti, cutia,	Day/Night
Kuari Kuara	*Siparuna* sp.	No data	deer, wild pig, agouti, cutia,	Day/Night

Table 11.2 Tree *comidas* and associated game animals
Source: Field research. Latin names of trees from Kainer 1992; Anderson 1990; Frechione 1989; Cruls 1958.

The rubber tappers also employed a variety of traps and snares to kill or capture both small and large animals. In some parts of Acre as in wider Amazonia, they are known to make use of dogs to track and hunt wild animals. Along the Riozinho do Rola this practice seemed to be frowned upon, partly because it was considered ineffective and

partly because it was thought to put unnecessary, additional stress on hunting resources that was detrimental to their longer term sustainability.[5]

Hunting technology is confined to the ubiquitous shotgun (*espingarda*), and homemade ammunition. Shotguns are the only viable firearm for hunting in the forest which occurs mostly at close range and in dense vegetation. In many respects the *espingarda* epitomizes appropriate technology; they are effective, durable, easy to maintain and perhaps most importantly, the *seringueiros* are able to assemble their own cartridges rather than buying pre-manufactured ammunition which is prohibitively expensive.

When asked to compare current hunting success with past years almost two-thirds of the households stated that hunting was, for various reasons, worse. The remaining third was split between those who claimed that their hunting success was unchanged and those who felt it was actually better than in the past. A decline in hunting success was most frequently attributed to the impact of logging which was becoming increasingly prevalent along the Riozinho at the time of the research. The destruction of habitat from road building, dragging logs through the forest to the rivers' edge and the noise of machinery itself, were blamed for driving game resources deeper into the forest and were cited as the most negative direct, impacts of logging activities. An additional impact of the encroachment of logging and road building on hunting resources was attributed to the logging crews themselves. While living and working in the forest these crews were expected by their bosses to supplement their own food supplies with hunting. The rubber tappers charged that the loggers often hunted indiscriminately and beyond their immediate needs. Even a relatively small work crew of four or five men was considered to impact local hunting resources at a level equivalent to at least three or four rubber tapper households.[6]

Loggers, however, are not the sole threat to the sustainability of hunting by rubber tapper populations along the Riozinho do Rola or in the forests of Acre in general. It is widely suspected that the *seringueiros* themselves have, over time, brought considerable pressure to bear on hunting resources (Nepstad et al 1992;). Folk beliefs, superstitions and ethnoecological knowledge that are part of *seringueiro* culture are not necessarily geared towards the long term sustainability of hunting to the same degree as indigenous social systems (cf Balée 1989). In regions where rubber tapping has been actively pursued for several generations, hunting resources have already been substantially depleted, although it is not known to what degree. Where the forest population is on the

[5] Field interviews.
[6] Field interviews.

rise, or where colonization and other forms of development are encroaching, pressure on hunting resources is especially acute. A possible outcome of the establishment of extractive reserves may be increased population densities on the *seringais*. Under such circumstances the sustainability of hunting and its contribution to rubber tapper livelihoods becomes increasingly tenuous. On the other hand, extractive reserves, by restricting the right to hunt in the area to local residents may provide a better opportunity to conserve wild game stocks in so far as there is a clear correlation between serving the self-interests of the community and not exceeding sustainable levels of exploitation of the resource.

11.2 Fishing

Fishing, similar to hunting, requires only time and a nominal amount of simple, inexpensive equipment. Success is highly variable with regard to both the time of year and location. Only six of the households in the surveyed did not fish on a regular basis. Of the remaining households, over half stated that at least one member of the household fished three or more times per week (Figure 11.1). Location is the most significant factor governing the contribution of fish to household subsistence. In addition to the main channels of the Riozinho do Rola, the Igarapé Espalha, and their main tributaries, fish were also taken from numerous *igapos*, small streams, lakes, and ponds that permeate much of the interior.[7] However, smaller channels often dry up during the summer months and so provide only a seasonal fishing resource. Poor access to fisheries is another example of the difficulties that confront households located in the interior in comparison to those households situated closer to the river for whom fish are a year round resource (Chapter 7).[8]

Again, like resources of wild game, most of the respondents to the survey reported a drop-off in their catches in recent years. The decline was attributed to greater pressure on the resource from increasing population, siltation of streams and pollution due to logging, and to the commercial exploitation of the fishery by outside interests.

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[7] Oxbow lakes associated with the meandering nature of Amazonian rivers and streams.

[8] The current study did not undertake a detailed study of fish or fishing per se. It is revealing that in their ethnoecology study of lake Coari on the Rio Amazonas Frechione et al (1989: 270) recorded some 60 varieties of aquatic animals that were important to *caboclo* subsistence. This study was conducted in a significantly different environment where the main river channels are kilometres rather than metres across and where both the size and the diversity of fish species is probably much higher. Nonetheless, the Lake Coari study indicates the potential of aquatic resources for contributing to the livelihoods of Amazonian *caboclos* and the depth of the ethnoecological knowledge associated with the use of these resources.

11.3 Other forest products and plant use

There is a corpus of literature on plant use by indigenous societies and their *caboclo* counterparts in Amazonia in which lists of useful plants and their applications often run into the tens, if not hundreds of species (Kainer and Duryea 1992; Posey and Balée 1989; Schwartzman 1989: 165; Prance and Lovejoy 1985; Cruls 1958 and others). Kainer's study (1992: 412-419) for example, of plant use among *seringueiro* women on the Cachoeira Extractive Reserve in eastern Acre reported 145 plant species with an aggregate of 245 different uses. Although a comprehensive ethnobotanical study of the Riozinho do Rola has not been made here, discussions with the *seringueiros* about forest product and plant use revealed a wide range of uses and knowledge of species similar to those discussed by Kainer. The contribution of forest products to household livelihoods may be broken down into several categories including; food and beverages, spices, medicine, cosmetics, construction materials, fuel, tools and implements, fertilizer, animal feed, and game attractants.[9] Within these categories there is often more than one plant suitable to a given task and, similarly, many species have multiple uses.

NTFPs may be garnered from virtually any part of a plant; from the fruit, nuts, seeds, leaves, flowers, bark, wood fibre, roots, resins, oils or latex. The contribution of these "other" plants and forest products to *seringueiro* livelihoods is primarily for domestic consumption. While rubber and Brazil nuts are usually a household's primary source of income, the combined contribution of minor forest products is also significant to household well-being.

Figure 11.2 shows data collected on three individual forest products which were most frequently mentioned as forest resources with a current market value and a general utility in the household livelihood. The fourth category in the graph, so called "other NTFPs" refers to a diverse list of plants used in the manufacture of crafts and implements and in the preparation of various medicines and beverages, some of which were sold sporadically by a small number of the households. These "other NTFPs" include a plethora of fruits and nuts that are often used as a spontaneous food source when traveling or working in the forest (cf Kainer and Duryea 1992), and which are generally not marketed.

Honey is highly valued as a special food but even more so for its medicinal properties. It is also one of the potentially most lucrative, by weight, of the forest products available

[9] Field research. Kainer and Duryea 1992.

to forest based population. During the field work one litre of forest honey was reportedly worth Cr$500,000 ($5.00) in Rio Branco but few households engaged in selling it.[10] This is partly explained by the high social value of honey, as a therapeutic product and as a prized food which takes precedence over its market value (Dain 1991). The harvests of honey that were witnessed by the author were carried out with great care. Even if the collectors had felled the tree they made an effort, after the honey and a portion of the beeswax had been collected, to leave as much of the hive intact as possible in order to encourage the bees to remain, rebuild and hopefully reproduce subsequent batches of honey.[11]

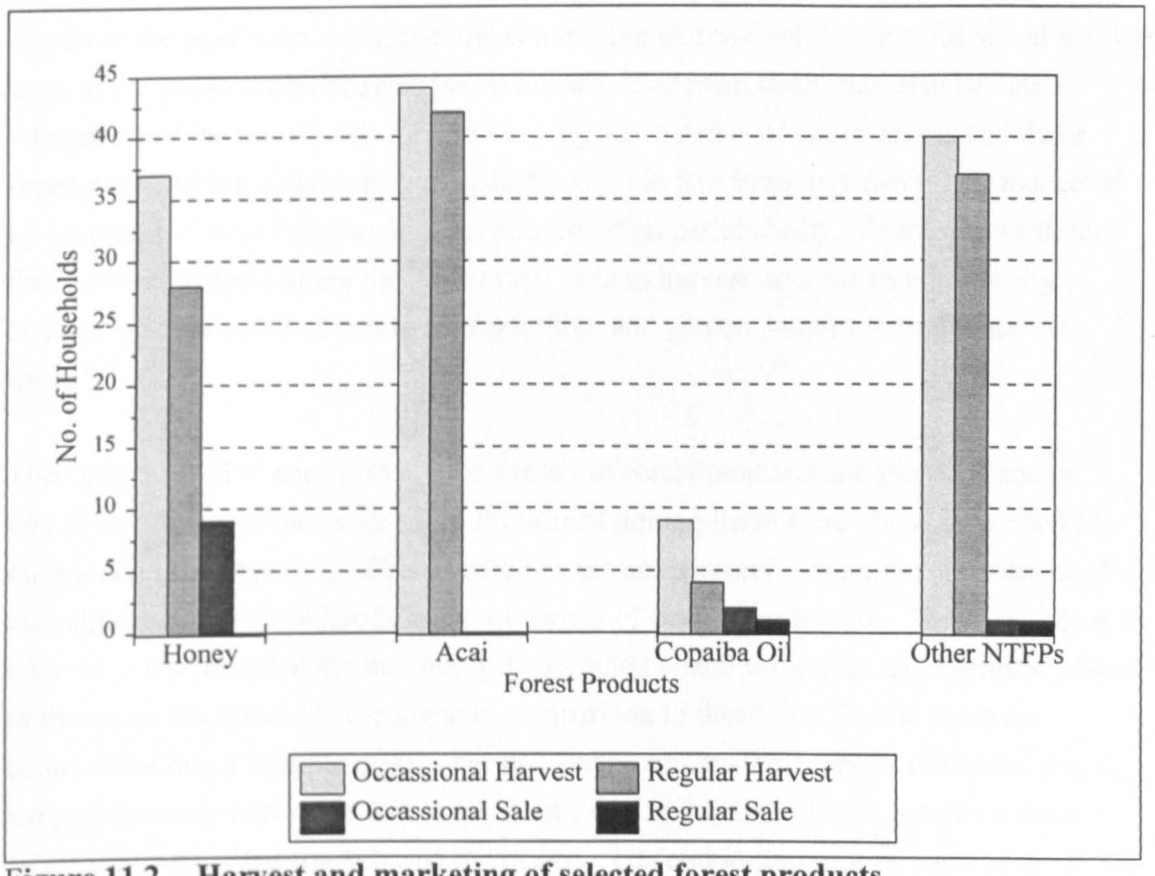

Figure 11.2 Harvest and marketing of selected forest products
Source: Field research - household survey

Copaíba oil is collected by draining off an oily resin through a small hole augured into the heartwood of a mature *copaíba* tree (*Copaifera* sp.). The oil is often mixed with honey and other plant extracts to make a powerful cough suppressant and as a general treatment for respiratory ailments.[12] Only one-fifth of the households were engaged in

[10] Upwards of twenty species of honey producing bees, most of them indigenous stingless varieties, have been recorded in parts of eastern Acre (Dain 1991).Indigenous species include most importantly *Melipona* spp. Dain (1991) records 20 or more species including the discovery of two new species.

[11] Field research. Dain 1991.

[12] ibid

the regular harvest of *copaíba* oil and fewer still had ever sold it.[13] Nonetheless, as was the case with honey, a larger proportion of the households were aware of the commercial value of these products and several respondents expressed an intention to exploit both forest honey and *copaíba* oil to a greater extent in the future. Again the domestic medicinal use of *copaíba* oil took precedence over its commercial value and it was stated that it generally only became a commodity if there was a surplus supply and/or if there was a specific need for extra income.

Açaí juice is a favorite beverage throughout much of Amazonia that is made from the fruit of the tall and elegant *açaí* palm, *Euterpe precatoria.* In addition to the fruit, the fronds of the *açaí* palm are important as a roofing material while the trunk wood is often used in the construction of *seringueiro* houses. The palm heart may also be eaten. Almost all of the households reported having harvested *açaí* between one and three times per year, but despite an established market in Rio Branco it was rarely marketed by residents of the Riozinho do Rola because of its perishability. Respondents stated that colonist farmers along the AC90 were able to harvest *açaí* for sale in the city because of their better access to transportation and greater proximity to the market itself.[14]

The "Other NTFPs" comprise a wide variety of forest products and plants, some of which on rare occasions were sold. Prominent among these were plants harvested for their medicinal properties. Plant medicines are an extremely important component of the rubber tappers' livelihoods in the treatment of common ailments. The data shown in table 11.3 suggests that the number of households which use forest and domestic plants as their primary source of medicine in comparison to those that depend more on commercial drugs is about equal. For the rubber tappers, however, commercial drugs are prohibitively expensive and as such, on a day to day basis forest remedies remain a significant part of the forest based livelihood. The real importance of western medicine lies in the treatment of malaria, myriad bacterial infections, and other more serious diseases.

Wood resources are immensely important to rubber tapper livelihoods, for construction material, for tools and implements, and as a fuel. Recently, certain species have also

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[13] Many more households made a tea with similar properties to the oil from the bark.

[14] This is representative of a trend in Amazonian rural economies noted by several commentators (Nugent 1993; Schmink and Wood 1992; Parker 1986 *passim*, among others) whereby the penetration of roads is usurping the importance of river networks as the main conduits for transportation and communication. Roads of necessity are usually built along high ground in between river channels creating a physical and social dichotomy on the landscape (Schmink and Wood 1992; Lisansky 1990).

become a controversial means of generating income through the sale of trees to loggers. In the Riozinho do Rola region there appeared to be about 30 species of trees that had regular applications in the rubber tappers' livelihoods. Some trees were best known for making dugout canoes, others made the best posts because they last for decades in the ground. Some species are used for their strength as floor beams or as parts of the *farinha* press and others because they are easier to work with to fashion furniture, floor boards or in the manufacture of the intricate parts of the *enginioca* (the sugar cane press). Table 11.4 was compiled during interviews with several *seringueiros*, and illustrates the diversity of species and uses obtained from 24 tree species.

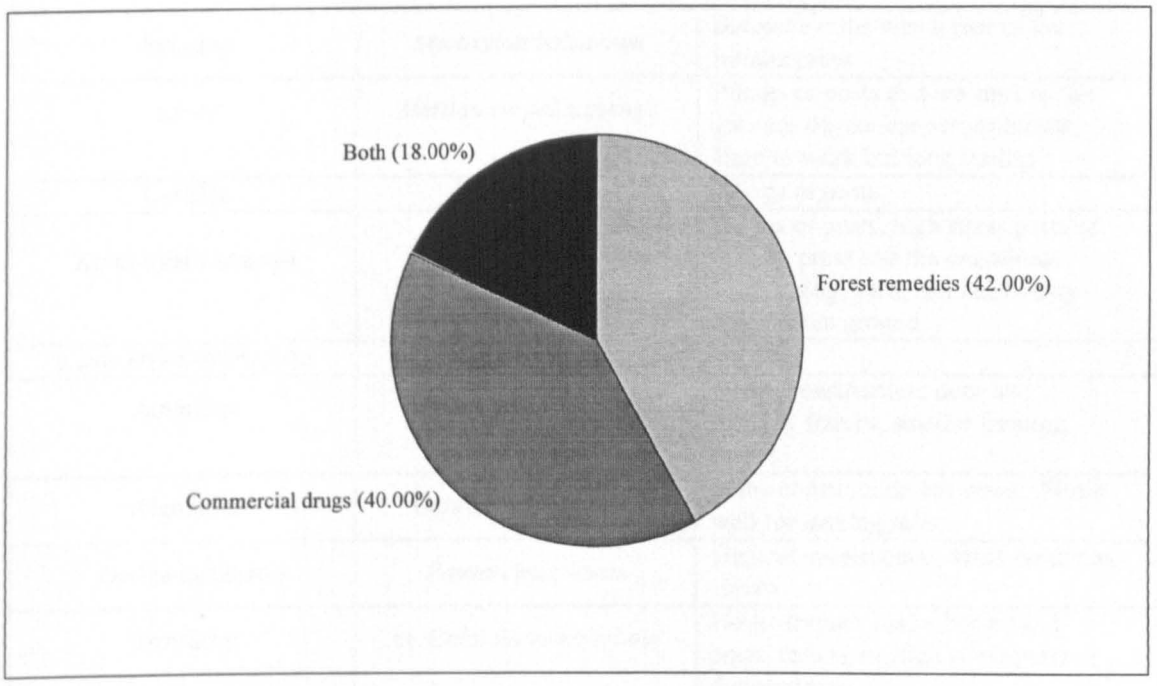

Figure 11.3 Sources of medicine (Per centage of households in survey)
Source: Household survey

The fact that the rubber tappers make use of so many different types of trees and wood is in stark contrast to the commercial extraction of timber resources, in Acre at least. Loggers operating in the Riozinho do Rola basin were interested in just two or three species of tree, primarily in response to the narrow focus of traditional timber markets (Nepstad et al 1992). Due to the low density and scattered distribution of species characteristic of biologically diverse tropical forest the resulting pattern of logging is extensive, with a commensurately greater impact on similarly extensive forest resources exploited by the rubber tappers. Increasing the number of commercially logged species may reduce the area of forest needed to support timber operations (Veríssimo et al 1989). Intensifying logging operations within smaller areas of land may also reduce the conflict between loggers and rubber tappers which was on the increase during the research in several parts of Acre, including the Riozinho do Rola.

Tree species		Uses, applications, comments
Portuguese name	**Latin name**	
Cedro	*Cedrela odorata*	House frames: major beams and posts; shingles; floor boards; cargo saddle; tool handles; rifle butt. Some commercial value.
Aguana (Mahogany)	*Swietenia macrophylla*	Furniture. Most sought after commercial species.
Envireira	*Guatteria* sp.	House frames; roofing shingles - easier to make than cedro, shorter life.
Envireira ferra	*Ephedranthus amazonicus*	Roofing shingles.
Cumaru de cheiro	*Amburana cearensis*	Floor boards; ceiling beams; dugout canoes; *pillão.*
Bálsamo	*Myroxylon balsamum*	*Bulinette* = the winch part of the farinha press.
Itaúba	*Mezilaurus palcazuensis*	Pilings or posts that are sunk in the ground; dugout canoes; *bulinette.* Hard to work but long lasting.
Canelão	*Aniba canelilla*	Pilings or posts.
Kuari-kuara amarela	*Minquartia guianensis*	Pilings or posts; high stress parts of *farinha* press and the *enginioca.* Very strong, hard, can last twenty years in the ground.
Kuari-kuara mole, preta	*Siparuna* sp.	No data
Amarelão	*Aspidosperma vargasii*	House construction: door and window frames; smaller framing pieces.
Algodeiro	*Ochroma pyramidale*	Some construction but weak. Floats well for making rafts.
Orelha de burro	*Pausandra trianae*	General construction; same family as Hevea.
Estralador	cf. *Calatola venezuelana*	House frames: major beams and posts, rafters etc.high stress parts of *farinha* press.
Guariúba	*Sorocea muriculata*	Dugout canoes.
Maçaranduba	*Manilkara* sp.	Roofing shingles; fence posts; smoking rubber - burns hot.
Laranjinha	*Rinorea* sp.	Smoking rubber - burns hot.
Family Palmae:		
Açaí	*Euterpe precatoria*	Roofing thatch; siding planks for buildings.
Ubim comum	*Genoma deversa*	Roofing thatch.
Paxiubão	*Iriartea deltoidea*	Siding and floor planks - the most commonly used.
Abacaba	*Oenocarpus mapora*	Floor beams.
Jarina	*Phytelephas macrocarpa*	Roofing thatch.
Urucuri	*Scheelia princeps*	Roofing thatch.
Paxiubinha	*Socratea exorrhiza*	Flooring planks.

Table 11.3 Important tree species and principal uses

Source: Field research - interviews. Latin names are from Kainer and Duryea 1992.

As the field work was wrapping up in August 1993, disputes over logging in active rubber tapping areas were dividing the community of households along the Riozinho do Rola. Six or seven households were engaged in selling trees form their *colocações*. In exchange for permission to take a specified number of trees from his *colocação*, the *seringueiro* received a slip of paper redeemable only at the logging company offices in Rio Branco. It was widely reported that if a *seringueiro* chose not to sell trees within his *colocação* he would likely be subject to threats and other forms of coercion. Mill owners were paying between $12.00 and $20.00 dollars per tree, a tiny fraction of what the wood was being sold for after moderate processing at mills in Rio Branco. Some households considered it an easy way of making money while others felt that the resultant impact on the forest resource base was in conflict with the maintenance of their collective livelihoods.[15]

11.4 Conclusion

This chapter has been primarily concerned with exploring the contribution of the "third leg" of the rubber tappers' livelihood triangle to household livelihoods. The roles of the broad collection of forest resources that have been discussed are marked by a diversity of activities, goods, and services, and a primary orientation towards domestic uses. Major contributions occur in the areas of food, particularly protein, implements and building supplies.

Under certain circumstances some of these products were sold or traded, but their overall contribution to household income was small in comparison to that of rubber, Brazil nuts, or even the sale of livestock. While the level of integration with the market place was low at the time of the research, certain products do have commercial potential which could be important to the future of rubber tapping communities. In other parts of Acre rubber tapping communities have experimented with periodic country markets where artisan products, forest and cultivated fruits, and other produce from the *seringal* are sold. These attempts to broaden the economic base of the extractivists' livelihoods have met with some success, particularly in providing women with the opportunity to participate more directly in the local economy (Kainer and Druyea 1992).

The importance of tertiary activities and products to household livelihoods remains inherently difficult to quantify, partly due to significant variability in the contributions

[15] Field interviews. Organization against the loggers by the local community of *seringueiros* was intensifying during the field trip. Community leaders were actively campaigning to have their region included in the Chico Mendes Extractive Reserve whose northern boundary terminates about 30 kilometres to the south of the Riozinho Do Rola.

of individual components, the predominance of subsistence oriented end uses, and the associated difficulties of reliable and accurate data collection (cf Godoy and Lobowski 1992). Qualitative aspects of forest plant and animal resources are more immediately apparent because they are more significant to the rubber tappers' assessment of the relative satisfaction of household needs. The social values of products that are consumed or used directly by the household tend to outweigh purely economic values, at least at present levels of market integration.

To a large degree many of the products discussed in this chapter exist as resources-in-waiting, there to be used as household needs dictate or circumstances permit. Their absorption of labour is flexible to the point that there is seldom conflict with other, seasonally constrained activities. Availability, in the end, is the primary restriction on the absolute contribution of resources, such as wild meat or honey, to household survival. The question of sustainability in the rubber tappers' use of certain forest resources is especially salient in the case of some of these resources which in certain areas are showing signs of stress from extended exploitation by forest based populations. Such pressure can be expected to increase as population levels rise or if market demand increases.

Extractive reserves offer the potential to protect and secure the livelihoods of existing rubber tapper communities by removing some of the uncertainties they face over access to and survival of their forest resource base. With such security, households will be able to adopt longer term approaches to the use of other resources similar to their management of rubber. Of particular note, extractive reserves may offer crucial protection of the hunting resource which is an important dimension of rubber tapper livelihood composition. Although protected areas in Amazonia are notoriously non-resistant to incursions and abuse, the majority of rubber tappers interviewed felt that extractive reserve status would have a positive influence on their livelihoods.

Chapter 12

Conclusion

12.0 The sustainability debate revisited

Amazonian *caboclo* society and its variations are uniquely situated to inform the debate on what sustainability ought to mean and how it might be achieved in Amazonia and elsewhere. The concept of sustainability rests on the assertion that conservation and development are not mutually exclusive objectives (Gow 1989). Sustainability implies an element of time and a continuity of the integrity and interdependence of ecological and economic realms. Conservation refers to a custodial relationship with the natural environment whereby environmental services and natural resources are used but are not used up. Social and economic development, in its broadest sense, is derived from the use and conversion of naturally occurring substances and relationships in order to fulfill human needs. Sustainable development, therefore, involves the use or development of land and resources for social ends without jeopardizing the ability of future generations to meet their own needs from the same resource base. A more inclusive definition of sustainable development addresses issues of social justice, distribution of the economic values of development, compatibility with existing (local) social values and institutions, and the involvement of local people in the development process (Barrow 1990; Pearce and Myers 1990; Barbier 1987; Redclift 1987; Bunch 1982).

Sustainable, or as it has otherwise been put, conservation oriented development, is particularly germane in Amazonia where the highly diverse, but delicate tropical environment and its rich floral and fauna resources have historically formed the economic foundation of Amazonian society. Throughout the basin there are examples of population groups that derive part of their livelihood from the extractive production of forest resources. Most of these groups fall within a broadly defined typology of Amazonian peasantries – *caboclos* and related social groups – that are distinct from their Amerindian antecedents and from contemporary post-*Transamazônica* peasants (Nugent 1993). With certain exceptions, *caboclo* landuse practices tend to be compatible with the objectives of sustainable development. It has been argued here that *caboclos* and related social groups pursue livelihood strategies that make comprehensive use of a variegated natural resource base and yet are gentle on the environment and inflict minimal long-term ecological impacts. Furthermore, these livelihoods have withstood the test of time under changing and often hostile economic and political pressures. The practitioners of these livelihoods are, in short, practitioners of sustainability.

12.1 Sustainable livelihoods in Amazonia

Caboclo societies vary enormously throughout Amazonia. Except on the most general level, in different parts of Amazonia they have emerged from different historical experiences. Local economies and contemporary socio-political circumstances are highly diverse, as are the ecosystems and resources upon which rural livelihoods are based. The need to address conservation issues and to achieve sustainable development objectives in Amazonia are, therefore, regionally specific and require focused policy and planning solutions. Generalizations about "the Amazon" are of scientific interest and raise levels of awareness on a national and international scale about widespread social and environmental problems in Amazonia. However, the level of abstraction at which such generalizations must occur limits their usefulness for dealing with practical conservation and development issues. The pan-Amazonian approaches to development policy pursued during the military period failed in part due to broad brush policies and programs. What emerged were inappropriate strategies that to a large degree created the "crisis in Amazonia". In the implementation of these policies and programs there was neither the institutional capability to handle the size and complexity of the problems, nor the understanding or receptiveness to local conditions to implement them effectively or to ensure their success.

The livelihoods of Amazonian *caboclos* fall along a broad a spectrum of activities. At one end is the simple collection, harvest or capture of forest resources that involves minimal management of resources and manipulation of ecological relationships. At the other end is small-scale agriculture and gardening that while physically separated from the surrounding forest is, nonetheless, governed by ecological processes. Between these two ends of the spectrum lie numerous activities that involve varying intensities of management and manipulation of species, resources and ecological relationships. In the estuarine region of the Amazon River, for example, *caboclos* engage in relatively intensive agro-extractivist livelihoods that take advantage of a strong market supported by the city of Belém (Anderson 1990). In certain *varzea* influenced areas of the Amazon and its main tributaries the livelihoods of the resident rural population are highly diverse. Significant contributions to household livelihoods come from aquatic resources as well as from forest product extraction and farming systems that are more intensive and diverse than those typically found in *terra firme* areas (Frechione 1989; Denevan 1984). Oligarchic forests (those dominated by one or a few species of trees) such as the Babassu palm (*Orbignya phaterata*) forests in eastern Amazonia, have a strong but underrated potential for establishing sustainable solutions to Amazonian development over large areas (Peters 1992; Hecht et al 1988). By the same token, some regions with histories of potentially sustainable, extractive based economies, such as

the Brazil nut Polygon in Pará, have not faired well under modern changes and the pressures of development.

The specific situation that has emerged in Acre in recent decades has placed the state at the forefront of the search for sustainable solutions to local as well as global conservation and development issues. The combination of the departure of the *patrões* from eastern Acre and the almost immediate conflicts that arose between rubber tappers and the advancement of the "ranching front" (Bakx 1986, 1990), helped spawn the rubber tappers' movement in the 1970s and 80s. The bold stance adopted by the rubber tappers in resistance to high rates of deforestation and rural violence attracted considerable attention to what was otherwise a relatively isolated corner of Brazil. During this period increased political awareness and community organization among Acrean rubber tappers led to an innovative approach to problems of land tenure, access to resources, and sustainability (Allegretti 1989, 1991; Schwartzman and Allegretti 1987; Schwartzman 1989, 1991, 1992).

The concept of extractive reserves was proposed by rubber tappers and their supporters to ensure access to traditional forest resources and to improve land tenure security. The rubber tappers' objectives were focused on the preservation of their livelihoods and the protection of their principal source of income, the forest. To this extent their objectives coincide with those of sustainability and conservation.

12.2 Extractivism in Amazonia - its role in sustainability

The extraction of forest resources by native and non-native Amazonians defines the economic history of Amazonia and yet until relatively recently, extractivism has been anathema to development planners. The historical dependence of the Amazonian economy on extractivism has been considered a liability to development and modernization. Amazonia's "primitive" economy was thought to be at odds with the national vision of progress. The contemporary rediscovery of Amazonia (Nugent 1993) has included a rediscovery of extractivism and a new understanding of the potential role it can play in the search for sustainable solutions to development and conservation.

There are several criticisms of extractivism and extractive reserves regarding their suitability for addressing rural development and conservation issues (Browder 1992a, 1992b; Homma 1989, 1992; Torres and Martine 1991). Perhaps most telling is the question of their long-term economic viability. One model of the economic life cycle of extractive products predicts a series of stages that end with the eventual decline in the economic value of the product. The central assumptions are that products originally harvested from their natural environment will eventually be either domesticated or

replaced by synthetic substitutes. Alternatively, the natural supply of the product may be exhausted or simply become obsolete. However, this model is only useful for the analysis of certain extractive products that have an international market and which are, therefore, subject to global economic forces. In fact, the forest provides many more resources that on several different levels play important roles in the composition of household livelihoods. Some of these products serve primarily domestic purposes, others are traded locally or within regional markets, and a few are plugged into the wider national and international economies. The price of rubber, the classic example of the latter category, collapsed dramatically once plantations of *Hevea brasiliensis* were successfully established in South East Asia. Ever since then rubber has had a much diminished role in the Amazonian economy. The model, however, does not explain why the gathering of rubber has persisted as an important part of the livelihoods of several tens of thousands of Amazonian *caboclos*.

As a result of widely dispersed resources, extractivist livelihoods are land extensive and subsequently can support only relatively low population densities. It misses the point, however, to characterize this as a shortcoming that negates the contribution of extractivism in the realms of either sustainability or development. Weak tropical soils and complex but delicate ecosystems, such as are typical in Amazonia, do not standup well to human intervention. The productivity of land drops off quickly after the original forest has been cleared. In the context of sustainable development in Amazonia, therefore, intensive landuses are only appropriate under specific and generally localised conditions (Anderson 1990, 1992; Pinedo-Vasquez 1992). Rubber tappers and others engaged in extractivist livelihoods have achieved a balance between meeting their material needs and using forest resources sustainably. Although on a global scale extractivist production may not effectively confront the need to support more people on a shrinking resource base, it does support productive rural populations that contribute to local and regional economies.

In absolute terms many extractivists are extremely poor which leads some commentators to question the logic of promoting a development strategy that may perpetuate, rather than alleviate, rural poverty. Such a restrictive viewpoint, however, ignores the relative nature of poverty and hides the fact that the vast majority of rural Amazonians are poor. For rubber tappers in Acre the alternative to a livelihood based in the forest is often an equally, if not more impoverished existence as a colonist farmer or as an under-employed urbanite. Significant differentiation in the material well-being of individual households is further evidence that extractivism *per se* is neither the cause of poverty nor are extractivists inherently poor. Field interviews revealed that rubber

tappers tend to be unequivocal in their preference for forest based livelihoods over most alternatives.

The historical record provides compelling proof that *caboclo* livelihoods are viable and sustainable under a wide range of socio-economic, political and environmental conditions. Nonetheless, questions remain regarding the long-term environmental sustainability of extractivist livelihoods especially under increasing population pressure, or in the case of increasing demand for particular forest products. The grassroots initiative behind the proposal for extractive reserves is undeniably motivated by the self-interest of extractivists, mainly rubber tappers, themselves. Their interest in environmental conservation is to protect and ensure their own communities' access to resources ahead of competing interests. While this may not coincide perfectly with the more altruistic objectives of western environmentalism, it is also true that economic incentives are a crucial element in ensuring the sustainable treatment of resources. In other words, if a group's economic interests are served by the conservation of resources then the sustainable use of those resources becomes more likely. For rubber tappers and other forest dwellers household survival is a far more compelling reason to control the environmental impact of resource use than conservation of species or the "greenhouse effect."

Sustainability is best served by sustainable livelihoods and therefore is dependent on the practitioners of sustainability. It is very difficult to implement sustainable development practices where none already exist. For this reason extractive reserves are important because they involve people with a tradition of sustainability (Barrow 1990; Pearce and Myers 1990; Barbier 1987; Redclift 1987; Bunch 1982).[1]

12.3 The viability of rubber tapper livelihoods

The question then arises as to what makes extractivist livelihoods sustainable. What are the mechanisms and characteristics of these livelihoods that contribute to their sustainability? To what extent are extractivist practices responsible for the sustainability of livelihoods? What factors contribute to the viability of extractivist livelihoods and are they sustainable over time? The answers, it has been argued, lie in a better understanding of the composition and dynamics of forest based livelihoods.

The composition of rubber tapper livelihoods in eastern Acre consists of three broad categories of production. The generic term "extractivist" or "extractivism" refers

[1] Also see Brandon 1994 and Wood 1994 and 1995 for a discussion of the role of local communities in conservation.

primarily to one side of the so-called triangle of livelihood activities: forest product extraction of commercial products such as rubber latex and Brazil nuts. The second side of the triangle is represented by the *seringueiros*' farming system: shifting cultivation of annual crops and animal husbandry. The third side of the triangle is also extractivist in nature: based on the collection, harvest or capture of a wide range of forest and aquatic plants and animals, the majority of which are exploited for domestic ends or used in inter-household gift giving and exchange.

The diversity of rubber tapper livelihoods is a reflection of the variability of the resource base from which they are derived. Land, forest and aquatic resources are highly variable in terms of their productivity, distribution, and seasonality, all of which affect the pattern and timing of resource use. A further cause for diversity in the makeup of livelihoods is the marginal position of rubber tappers vis á vis the market and wider society. In response, rubber tappers have adopted or developed numerous practices for obtaining a livelihood from their environment. The economic and ecological viability of rubber tapper livelihoods is underpinned by a complex of highly integrated activities and the flexible allocation of labour. This enables households to shift the emphasis of their production within and between different sectors of the household economy according to their objectives and circumstances. Herein lies the strength of the rubber tappers' livelihoods.

12.4 The future of extractivist livelihoods in Amazonia

It has been argued that the most effective way of achieving sustainable development is to encourage the spread of sustainable livelihoods. In contemporary Amazonia the opportunity exists to protect or otherwise ensure the survival of traditional peasant groups which have historically achieved many of the requirements of sustainability. These groups are highly differentiated and adapted to local conditions. The extractivist dimensions of their livelihoods means that they also have a vested interest in maintaining the health of the forest and aquatic resources upon which they depend. As development pressure intensified throughout much of Amazonia during the 1970s and 80s, the rationale behind extractivist livelihoods, in particular the dependence on large areas of intact forest, made the demand for extractive reserves essential if not inevitable. The competition for land instigated the emergence of extractive reserves on the Amazonian policy agenda and, significantly, involved resident rural populations in the development process.

Future policies that aim to embrace extractivism as a means of achieving sustainable development must focus on livelihoods that include extractivism as part of more

complex and integrated livelihoods. The livelihoods of Acrean *seringueiros*, for example, are inherently more resilient than externally defined alternatives because policies and programs can never replicate the circumstances and experiences from which such livelihoods emerge. The need to focus on regionally specific livelihoods implies, furthermore, that the formulation of policy must have a strong human geographical context and not be based solely on national economic parameters. The experience of rubber tappers in Acre points to four important issues that challenge the formulation of policy concerned with extractivism and sustainability and which to varying degrees have pan-Amazonian significance.

Firstly, for the effect of policy to be felt in a meaningful way there must be the political will and commitment to see its intent realized. Land tenure and access to resources are central issues. In Amazonia this generally implies the need for either agrarian reform or the control of resource use through legislated access as in the case of extractive reserves. The capability to access resources is also a technical and institutional issue. Technical extension and rural credit are frequently lacking with regard to extractivists even though rubber tappers and related *caboclo* groups arguably require less of either than the settlement of colonist farmers.

Secondly, in addition to concerns about access and capability, the economic viability of rubber tapper livelihoods is threatened by low or unstable prices and under valuation of the conservation benefits of extractivist livelihoods by wider society. The rubber tappers' union and other rural workers organizations in Acre have been especially active organizing forest communities in order to promote group interests and overcome some of these obstacles. Cooperative efforts can be quite informal and involve only a few households, such as in the banding together of two or more households to share the costs of transportation or to seek better prices through group buying. Communal organization may also be more formal and involve numerous households. For example, some communities in eastern Acre have recently been experimenting with large country fairs where people come to exchange a large number of products (Kainer and Duryea 1992). Cooperatives have also been created to run small Brazil nut processing operations and to establish *mini usinas* for the more efficient production of rubber (Chapter 7). These provide employment for the community, provide the opportunity for rubber tappers to add value to their products, enable them to take greater control of the marketing process, and potentially provide better returns from their labour. Spontaneous organization of rubber tappers also takes place, usually for the purpose of resistance to the destruction of their forest resource base by aggressively expanding ranching and logging interests. In a broader context, however, there is a need for the

ecological benefits of rubber tapper livelihoods to be recognized as having an economic value. This can only be achieved by more general changes in wider society in how forests and other ecosystems are valued.

Thirdly, market intervention in the form of subsidies and other price support mechanisms has a direct effect on the viability of extractivist livelihoods. Current trends involving the liberalization of trade and globalization of the world economy exerts pressure on national governments to adopt free market principles in all areas of the economy. The early 1990s were a watershed for the rubber economy in Brazil in which the federal government capitulated to this pressure by ending the subsidy for domestic rubber. This openly protectionist measure was originally implemented to appease the interests of the traditional Amazonian elites which controlled the rubber trade. The subsidy entailed a tariff on imported rubber (which makes up the majority of natural rubber consumed by Brazilian industry) equivalent to the difference between the cost of domestically produced wild rubber and that of the imported product. On the *seringais* in eastern Acre the combined effect of this action and the rampant inflation that plagued the Brazilian economy throughout the 1980s and early 1990s has translated into roughly an order of magnitude decline in the real value of rubber over the same period and has seriously threatened the viability of rubber tapper livelihoods (Chapters 8 and 10).

Freer markets and unrestricted competition are not necessarily compatible with all elements of sustainability which must be concerned with social and ecological imperatives as much as with economic imperatives (Robinson and Tinker 1996). There is a need to evaluate the role of subsidies in a broader light than the global market. Propping up the price of Amazonian rubber does more than protect a domestic industry; it also supports a way of life that contributes to, rather than defeats, some of the central objectives of sustainable development. Furthermore, it can be argued that improving economic conditions in the Brazilian economy as a whole, such as the reining in of hyper-inflation, provide an opportunity to revisit the issue of somehow supporting the stability if not the absolute level of domestic rubber prices. A staunchly redistributive stance would argue that the relative wealth of certain sectors of the Brazilian economy and the potential wealth of the nation as a whole have the depth to support the positive social and ecological benefits of rubber and other non-timber forest products. It is ironic that the renewed vitality of the Brazilian economy which may provide the opportunity for such progressive measures is in part a result of the liberalizing trends discussed above.

The fourth critical issue which may be vital to the success and sustainability of extractivist oriented livelihoods concerns attempts to intensify non-timber forest product extraction through silvicultural practices, agroforestry and related resource management interventions. Kainer's doctoral research in western Acre involves a community based initiative to enhance Brazil nut regeneration (and future production) and to compensate for the impact of harvesting and other activities (e.g. hunting) which are effecting Brazil nut ecology (Kainer 1993, pers. com.; Chapter 9). Almeida (1992) cites attempts by rubber tappers in eastern Acre to establish small scale rubber plantations in the forest and silvicultural interventions aimed at increasing the density of rubber trees along existing *estradas*. While the jury is still out on the ultimate success or failure of these attempts, the literature on indigenous land and resource use practices in Amazonia at large is burgeoning with examples of human intervention and manipulation of the forest environment to human ends. The crucial point is that these practices are carried out, not on an industrial scale, but at a scale that is useful and keeping with the lives and livelihoods of rural, forest based Amazonians. What-ever the prescriptions for achieving sustainability in Amazonia, as we accept the notions of social and cultural change, so must we recognize the inevitability of environmental change. The objective of land use policy must, therefore, encourage a flexible and dynamic relationship between rural producers that enhances opportunities to realize economic value from the forest. Environmental impacts are inevitable, even beneficial. It is neither socially nor ecologically desirable to put Amazonia under glass. It is equally undesirable to disrupt Amazonian ecosystems to an extent that precludes alternative land uses and which may limit options in the future.

The concept of extractive reserves does not presuppose an anti-development position. Despite the uniqueness of *caboclo* livelihoods they are, on a certain level, culturally a part of Amazonian society. Rubber tappers desire and depend on a wide range of manufactured goods and urban services. There are three principal concerns that are repeated time and again by rubber tappers who are asked what they see as the most immediate obstacles to a better quality of life. The first (but not necessarily foremost) are weak markets and fluctuating prices for rubber and Brazil nuts. The second is accessible health care and the third is education for their children. In many ways the latter two are the most important issues for rubber tapper families. Sickness or injury to a family member can be very costly, especially if it befalls a working member of the household because of the additional opportunity cost of lost productivity. With regard to education, rubber tappers in Acre have a rather enlightened perspective. It is seen not only as a way to break free from life in the forest, although there is an expectation that literary skills can lead to greater employability in the city and possibly a better

standard of living. The rubber tappers also see the value of culturally appropriate knowledge as a means of empowerment that better equips them for dealing with the market place and the pressures of wider society.

Roads are another aspect of development to which *caboclos* are not strictly opposed. It is widely recognized among forest dwellers that roads provide an advantageous option for transportation and that they improve communications between the forest and town. In the forest community of the Riozinho do Rola there was a lively debate as to the value of highways and logging roads. In general the drawbacks associated with extending roads into rubber tapping areas tend to outweigh the advantages. For one there is the question of maintenance. Roads that are built for logging, in particular, are maintained as long as trees are actively being taken from the immediate area. Once the harvesting operation is pulled out, roadways soon become passable only on foot. Of greater concern, if roads are not enveloped by the forest they may serve as a conduit for in-migration, intensified development, and competition for resources. Even if these two extreme, although still likely, scenarios do not occur there is still the simple fact that roads are ultimately of little use to *seringueiro* households that do not have access to a motor vehicle and for whom fuel is an expensive commodity.

The prospects for the long-term viability of extractivist livelihoods are at least as promising as they are for other landuses. Partial proof of this lies in the historical resilience of the traditional Amazonian peasantries, that is the various forms of *caboclo* society, which have exhibited over time an ability to respond and adapt to changing circumstances combined with an ability to function alongside wider capitalist economies without being subsumed or fundamentally altered. Furthermore, most alternatives to rubber tapper or other *caboclo* livelihoods either inflict a greater impact on the forest and its resources or do not have a comparable range of social uses and do not provide comparable benefits from the forest. In the end extractivist production should not be conceived of as a major component of growth oriented development, nor should it be expected to contribute significantly to the national account. The importance of extractivism is at the local and regional scale where, as a component of complex forest livelihoods it can help to stabilize rural populations in a context of ecologically sustainable landuse.

Appendix A

All photos by the author.

Photo 1. *Varzea* - the flooded forest.
Photo 2. A well established, 2 family *barracão* in the interior.
Photo 3. *Seringueira* with ubiquitous *espingarda.*
Photo 4. The bark becomes thick and knarled after years of cutting. Good technique is essential to long term productivity.
Photo 5. Climbing an *escada* to cut where the bark is fresh and smooth requires balance and courage.
Photo 6. Metal *tigela* with fresh latex. Brazil nut husks are sometimes used instead.
Photo 7. Smoking latex to make rubber. He is not quite half way (4-5 days of production) to a completed *bola* of roughly 50 kgs.
Photo 8. Three *bolas* and one *prancha*, roughly 40-50 kgs. each.
Photo 9. Rubber being prepared for transport to the *Riozinho do Rola.* Buyer and seller are sharing the costs (mules and time).
Photo 10. *Canoa* loaded for journey to Rio Branco. Cargo includes over 400kg of rubber and one hog.
Photo 11. Small vegetable pateches being cultivated on fertile river alluvium. Their size is constrained by household labour.
Photo 12. A small patch of forest has been cleared and left to dry prior to burning in early September. Rice will be planted first.
Photo 13. The diversity of a rubber tapper *roçdo*: bananas, sugar cane, papaya and beans. Manioc and maize are to the right of the frame.
Photo 14. Collecting honey from *urucu boi*, a stingless bee (*Melipona fuginosa*).
Photo 15. Descending from 20 metres with a harvest of *açai.*
Photo 16. Ripe *açai.* This 13 year old carries the full workload of an adult including; hunting alone and tapping rubber.
Photo 17. The *enginioca* is used for pressing sugar cane. Several different species of wood ar used in its construction for their special qualites such as strength, hardness, resistance to rot and workability.
Photo 18. Every other day over two hours of labour is spent preparing rice for cooking.
Photo 19. One of several logging roads that are extending into the Riozinho do Rola basin.
Photo 20. Pasture extends to the horizon, drastically altering social and ecological dynamics in the countryside.

Photo 1.

Photo 2.

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

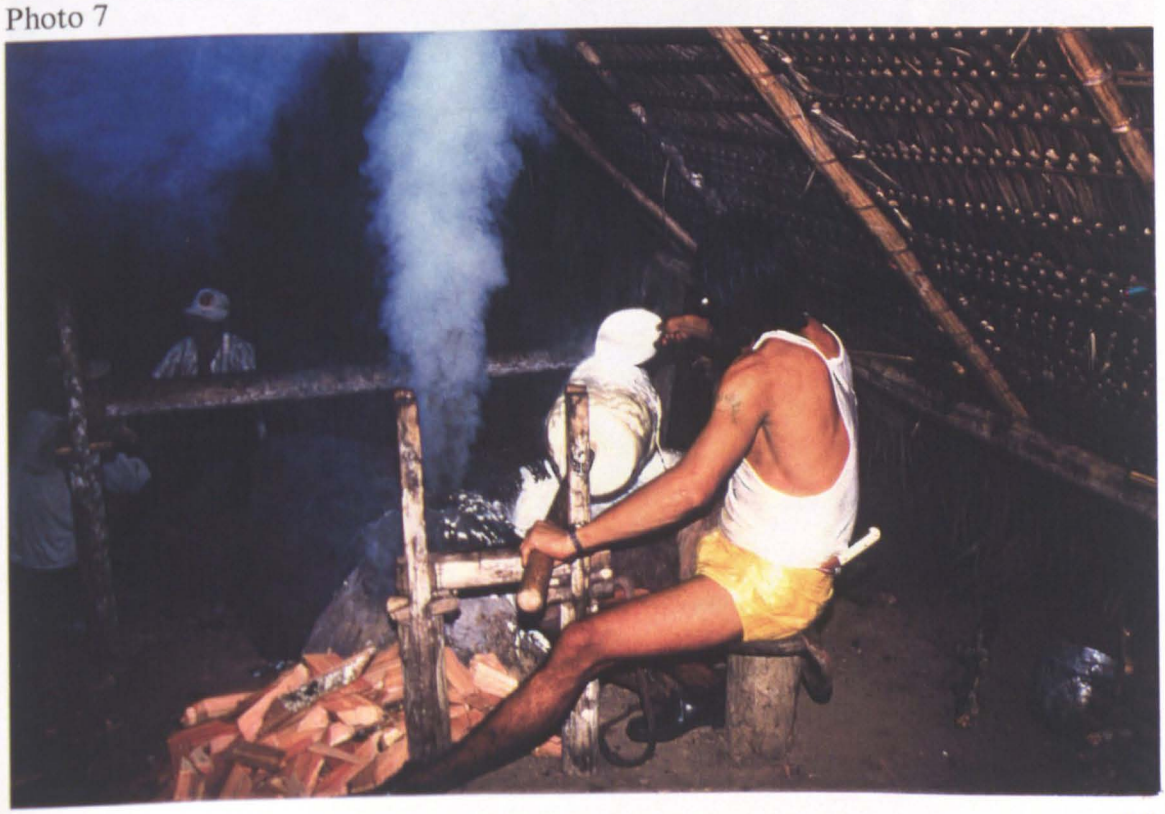

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Photo 13

Photo 14

Photo 15

Photo 16

Photo 17

Photo 18

Photo 19

Photo 20

Appendix B

HOUSEHOLD SURVEY

Date:_____ , 1993 . Questionaire No.

1. Colocação: _____ Seringal:_____.

2. Male head of Household:

   Birthplace: Age:

   Birthplace of father:

   Was he a "Soldado da Borracha? Y/N

   Birthplace of mother:

3. Female head of household:

   Birthplace: Age:

   Birthplace of father:

   Was he a "Soldado da Borracha? Y/N

   Birthplace of mother:

4. Children:

Sons:		Daughters	
1.	yrs.	1.	yrs.
2.		2.	
3.		3.	
4.		4.	
5.		5.	
6.		6.	

5. Do they all live here at this colocação? Y/N (X = NO)

6. Are there other people living at this colocação?

7. Males by relation/ age/ occupation:

8. Females by relation/ age/ occupation: _____

9. How did you obtain this colocação: (bought, traded, marriage, father to son, receivedfrom relative, other form of inheritance, other).

   NB: if bought or traded note whether payment was in money, rubber, or Brazil nuts.

10. For how long have you lived on this colocação?

11. Where did you live before? How long?

    And before that? How long?

12. Why did you move (to your current location)?

13. Are you thinking of moving again? Y/N Where will you go?

    Why?

14. Have you or any other member of this household worked for someone else? Y/N

    If YES, where and what occupation?

15. Do you participate in any rural workers organizations or unions?

e.g. SINPASA, STR, CNS, Co-operatives:

Rubber Production:

16. How many estradas are there on this colocação? How many are being cut?

17. How many rubber trees are there on each estrada?

18. What is the production of each estrada (latas/day)?

19. Who are the primary tappers in the household?

Male head of household: Female head of household: Others:

Comments:

20. How many days (or weeks) did you tap rubber last year (1992)?

21. How many days (or weeks) did you spend preparing your estradas and rubber trees last year(1992)?

22. How many days (or weeks) did you spend preparing your estradas and rubber trees this year (1993)?

23. What type of rubber do you produce? Smoked: Coagulated: Pressed:

Other:

24. Which household members produce rubber from latex? Men: Women:

Children:

25. Where do you usually sell your rubber?

To a river trader on the seringal: To a merchant in Rio Branco:

To a rubber estate owner (patrão): Other:

26. How do you transport your rubber to market (i.e. point of sale)?Who is responsible?

27. How many times have you sold rubber so far this year (1993)?

1.	Kilos:	Price:	Location:
2.	Kilos:	Price:	Location:
3.	Kilos:	Price:	Location:
4.	Kilos:	Price:	Location:
5.	Kilos:	Price:	Location:

28. How many kilos of rubber have you sold in total so far this year (1993)?

29. How many times did you sell rubber last year (1992)?

1.	Kilos:	Price:	Location:
2.	Kilos:	Price:	Location:
3.	Kilos:	Price:	Location:
4.	Kilos:	Price:	Location:
5.	Kilos:	Price:	Location:

30. How many kilos of rubber did you sell in total last year (1992)?

31. How many kilos of rubber did you sell in total the year before (1991)?

32. To whom do you usually sell your rubber?

33. What form of payment do you usually receive (mercadorias, cash etc.)?

Brazil nut production:

34. Do you collect Brazil nuts on this colocação?

35. Who does the collecting?

36. Who does the breaking (i.e processing) of the Brazil nut husk?

37. How many Brazil nut trees do you have access to on this colocação?

38. How many latas of Brazil nuts have you sold and consumed in this household this year (1993)?

39. How many days (weeks) did you collect Brazil nuts this year (1993)?

40. How many times did you sell Brazil nuts this year (1993)?

1.	Latas:	Price:	Location:
2.	Latas:	Price:	Location:
3.	Latas:	Price:	Location:
4.	Latas:	Price:	Location:
5.	Latas:	Price:	Location:

41. How many latas did you collect last year (1992)?

42. How many latas did you collect the year before (1991)?

43. Where do you usually sell your Brazil nuts?

44. To whom do you usually sell your Brazil nuts?

45. How do you transport your Brazil nut harvest to the market (point of sale)?

46. Do you always sell to the same buyer?

47. What for of payment do you usually receive for the sale of Brazil nuts (mercadorias, cash, etc.)?

48. Other forest products:

	Occasional harvest	Regular harvest	Occasional sale	Regular sale
Honey				
Açai				
Copaiba				
Medicinal plants				

49. List other plants frequently or occasionally harvested from the forest:

Agricultural Production:

50. Manioca (*farinha*)

Year	# Seedlings	Area planted	Sales	Consumption	Comments
1991					
1992					
1993					

51. Rice

Year	Seed (litres)	Area planted	Sales	Consumption	Comments
1991					
1992					
1993					

52. Beans

Year	Seed (litres)	Area planted	Sales	Consumption	Comments
1991					
1992					
1993					

53. Maize

Year	Seed (litres)	Seed / area	Sales	Consumption	Comments
1991					
1992					
1993					

54. Sugar cane

Year	# Seedlings	Area planted	Sales	Consumption	Comments
1991					
1992					
1993					

55. Tobacco

Year	# Seedlings	Area planted	Sales	Consumption	Comments
1991					
1992					
1993					

56. List other food plants grown by the household:

1. Pineapple	2.Potato	3.Sweet potato
4.Tomato	5.Cebola	6.Squash
7.Sweet pepper	8.Pipim	9.Garlic
10.Quiabo	11.Water melon	12.Other

57. Who tends to these plants?

58. Do you sell garden produce?

59. What form of payment do you usually receive?

60. How many fruit trees do you have on this colocação?

1. Orange	5. Banana	3. Lemon	4. Mango
5. Avacado	6. Coffee	7. Papaya	8. Tagerine
9. Cashew	10.Graviola	11.Jaca	12.Cupuaçu
13. Lima	14. Guava	15.Other	

61. Do you ever sell produce from your fruit trees?

62. What form of payment do you usually receive?

63. What is the area of pasture on this colocação?

64. What domestic livestock do you own?

1. Chickens	2. Ducks	3. Pigs
4. Cattle	5. Sheep	5. Horses
6. Donkeys	7. Others	

65. How many times per week does a member of the household hunt?

66. How many game animals have been killed by the household in total this year (ie. since Jan.1 1993)?

1. Deer	2. Wild pig	3. Armadilho
4. Tapir	5. Capivara	6. Jacu (fowl)
7. Nambu (fowl)	8. Tortoise	9. Agouti
10.Monkey (all species)	11.Cutia	12.Jacare
13.Other		

67. Is hunting better or worse than in the pass?

68. How many times per week does a member of the household fish?

Health:

70. What are the most common illness or health problems that effect the household?

71. Who generally treats sickness/injury in the household?

72. How many members have had to be taken to the city for treatment this year?

73. Which do you use more in the treatment of ailments; forest and/or domestic plant medicines or commercial medicine from the city?

Education

74. How many members of the household can:
    1. Write their name?
    2. Write
    3. Read
    4. Do arithmetic

75. How many members of the household are currently attending school?

76. How far is it to the nearest school?

Appendix C

Rubber and Brazil Nuts: Some points of ecology*

Hevea brasiliensis:

There are about nine species of *Hevea* rubber trees including *H. brasiliensis, H. guianensis, H. benthamian, H. rigidifolia* and *H. collina* which are widespread in the Amazonian lowland forest (Chapter 7 fn 20). Economically the most important is *Hevea brasiliensis* which is found in the *varzea* or seasonally flooded areas as well in adjacent regions of *terra firme* or upland forest. Rubber trees are fast growing. In the wild the crown of a typical tree may attain a height of almost 40 metres at maturity (compared to a usual maximum of 25 metres in a plantation environment) forming part of the upper canopy of the forest. On older trees the trunk may be bulbous over the bottom ten percent of the stem rather than tapering gradually over its entire length.. The bark is relatively smooth and grayish with small, leathery leaves. *Hevea* is adapted to low fertility soils where the conservation of nutrients is important. As a defense mechanism against herbivorous predators these trees have evolved a white, milky latex that readily oozes from phloem cells in the trunk, branches and leaves. When exposed to the air this latex thickens and becomes sticky making it difficult for leaf eaters to consume the tree's foliage. Eventually the latex turns to rubber.

There are many natural pathogens in the forest that are a threat to *Hevea* trees. The most troublesome from a human standpoint is South American Leaf Blight (*Microcyclus ulei*) which historically has been the primary reason most, if not all, attempts to establish plantations of *Hevea* in the Amazon have failed. Recent experiments looking at building resistance to the leaf blight show some promise for growing *Hevea* in regions with a prolonged dry season where the tree can still survive but where the aridity disrupts the life cycle of the pathogen. Hybrids created with species such as *H. rigidifolia* which show a greater resistance to *Microcyclus ulei* have also shown some promise. As a natural defense against *Microcyclus ulei* rubber trees are thinly distributed in the forest which effectively prevents the spread of the disease. Such distribution is typical of many tree and other plant species in the rainforest.

The seeds of the rubber tree are large (+/- 2 cm) in order to supply a store of energy sufficient to allow a seedling a fighting chance as it struggles to get a toe hold on the dark forest floor. The large seeds make attractive food for several animal species which aid in the dispersal of the seeds by collecting, storing and subsequently forgetting their whereabouts. Additionally it is thought that some seeds may be dropped enroute to storage sites. The end result is the low density of rubber tree distribution observed in the wild.

Bertholettia excelsa:

Brazil nut trees are among the giants of the rainforest. They are often emergent from the main canopy reaching well over 40 metres at maturity. *Bertholletia excelsa* is not found in areas of forest that are regularly inundated with water during the rainy season although distribution tends to be more dense in areas adjacent to riverine environments growing progressively thinner farther in land. *B. excelsa* is in general considerably more limited in its range than *Hevea* species.

Research has recently revealed why *B. excelsa* does not do well in a plantation setting. The reason has to do with the complex relationships between a wild orchid, a species of Euglossine or orchid bees and the reproductive ecology of the Brazil nut tree. *B. excelsa* produces large, hooded yellow flowers from which it is difficult to obtain nectar except by large predators such as the female orchid bee. The male of this particular Euglossine bee is the main pollinator of certain wild orchids. The male bees use the sent of the orchid pollen to attract females for breeding purposes. Given that the species of orchid featured in this relationship only survives in undisturbed rainforest, Brazil nut trees are also dependent on mature, effectively undisturbed forest. In short, without wild orchids male bees are absent, without the male bees reproduction with female bees will not occur, without the female bees pollination of the Brazil nut tree cannot take place.

At the other end of the Brazil nut tree's reproductive cycle a synergistic relationship with other forest species is also vital. In this case reference is to the dispersal of the large, heavily encapsulated brazil nuts that fall from the crown after more than a year of development. The peccary and agouti have powerful jaws with which they can break

open the hard outer shell that encapsulates typically one to two dozen Brazil nuts. In a fashion similar to that of the rubber tree described above these animals facilitate the dispersal of *B. excelsa* seeds. Over hunting of peccary and agouti is, therefore, a potentially serious problem for Brazil nut reproduction (Chapter 9).

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* Sources: Fieldwork; Beazley 1990; Silcock 1989; Balick 1985; Prance 1970; Cruls 1958.

Glossary

Acreano: A native of Acre

Aviamento: Historical trading network in Amazonia based on debt-credit relationships between primary producers, various intermediaries and the wider economy.

Barranqueiro: A small producer living on the bank of a river. A variant of *caboclo*.

Barracão: The rubber tappers' household and surrounding clearing including gardens and various outbuildings.

Beira do rio: The river bank or margin and adjacent area.

Bola: A ball of smoked rubber.

Borracha: Cured rubber

Caboclo: Indigenous rural peasant descended from Amerindians, European settlers and, to a slightly lesser extent, African slaves

Cabrita: Rubber tapping knife

Caixa: A box, specifically one in which rubber is cured through coagulation.

Capoeira: Pioneer or "second growth" forest

Casa de Farinha: Outbuilding where *farinha* is produced and other productive activities are carried out.

Casa de Fumar: Outbuilding where rubber latex is cured by the smoking process.

Castanha: Brazil nut.

Castanhal: Grove of Brazil nut trees.

Castanheiro: Brazil nut collector.

Colocação: The traditional land holding of a rubber tapper household including the b*arracão*, *roçados*, and *estradas*.

Defumador: Alternative name for *Casa de Fumar*.

Empreteiro: Contract worker.

Enginioca: Hand-driven sugarcane press.

Escada: Log "ladder" used for accessing out of reach areas on the rubber tree trunk when the bark lower down becomes to scarred for effective tapping.

Espingarda: Shotgun.

Espigão: Rubber trail that connects an *estrada* or *estradas* with the *barracão*.

Estrada (de seringa): Rubber trail.

Estopa: Special cloth with straps attached and used as a means of carrying game kills, personal gear, rubber, Brazil nuts, garden produce and other items on the back.

Farinha: Manioc flour.

Friagem: Period of cold, windy weather that occurs in Acre during the latter part of the dry season.

Igarapé: Small stream or river, may dry up in the summer.

Leite: Literally milk, but used in reference to rubber tree latex.

Madrugada: The early, pre-dawn hours when the rubber tapper rises to tap rubber.

Manga: To go and return, often refers to a dead end trail with a rubber tree or trees at the end.

Marreteiro: Independent river trader or traveling merchant, elsewhere in

Acre and Amazonia known as a *regatão*.

Mata bruta: Wild or "virgin" forest.

Meeiro: One who produces rubber on another tapper's *colocação* in exchange for half of his or her rubber output.

No centro: Interior forest areas, as opposed to the *beira do rio*.

Nordestino: Someone from the Northeast of Brazil

Pano: The combination of cuts in a rubber tree associated with a single *tigela*, usually a semi-herring bone pattern.

Patrão: Owner of the *seringal* and more recently a town based merchant with whom a rubber tapper frequently trades. There is often more than simply economic ties between forest households and their *patrão*. These days they are much less significant in the socio-economy of rubber in eastern Acre.

Pèla: Same as *bola*.

Prancha: A block of coagulated rubber. Also *caixa prancha*.

Regatão: A river trader, essentially the same as *marreteiro*.

Risco: The vertical "backbone" cut of *pano*.

Roçado: Annual clearing made in the forest to raise crops.

Seringa: Similar to *borracha* but more inclusive.

Seringa real: High quality rubber latex often associated with *varzea* areas.

Seringa vermelha: Low quality latex most often encountered in *terre firme* forests.

Seringal: A traditional rubber tapping area or estate formerly owned by a *patrão*. This appears to a purely historical delineation of territory, but one that remains central to the cultural geography of rubber tappers.

Seringueira: A female rubber tapper or the rubber tree; *Hevea*.

Seringueiro: A male rubber tapper.

Terçado: Regionalism for the ubiquitous machete.

Terre firme: Upland forest that is not flooded during the rainy season.

Tigela: Small tin cup used to collect latex.

Varzea: Forest that is flooded during the rainy season.

Vizinhar: The custom of sharing food and other items, gift giving.

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