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Evolving participatory institutions for tropical forest management:
Adaptations and change in the context of extractive reserves in
Brazilian Amazonia

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**EVOLVING PARTICIPATORY INSTITUTIONS
FOR TROPICAL FOREST MANAGEMENT:
ADAPTATIONS AND CHANGE IN THE CONTEXT OF
EXTRACTIVE RESERVES IN BRAZILIAN AMAZONIA**

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IN BRAZILIAN AMAZONIA**

by

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Abstract:

This paper discusses the way in which local populations have transformed and adapted natural resource management institutions created through external interventions to fit their own goals. Drawing on the case of associations set up to manage extractive reserves in Rondônia, Brazilian Amazonia, it examines the outcomes of this process. The paper shows that institutions aimed at engaging the participation of local users in the management and protection of forests and other ecosystems, despite often being promoted from the top-down through external interventions, inevitably become entangled with existing social relationships, norms and customary ways of doing things. They are modified by participants so that the outcomes must be understood as resulting from an ebb and flow of actions from 'above' and from 'below'. The paper contests emerging critiques of participatory approaches and institutions that tend to argue for a focus on informal institutions as the key to understanding natural resource management processes and outcomes. The paper argues for an alternative approach that focuses on the interface between formal institutions and informal processes and interactions, which is sensitive to social context.

Key words: institutions; participation; local organisations; extractive reserves; Brazilian Amazonia

List of acronyms:

AGUAPE: Vale do Guaporé Rubber Tappers' Association

ASAEX: Association of Rubber Tappers of the Lower Rio Ouro Preto

ASM: Machadinho Rubber Tappers' Association

ASMUCUN: Association of Residents of the Lago do Cuniã Extractive Reserve

ASRJP: Association of Rubber Tappers and Riverines of Jaci Paraná

ASRMT: Association of Rubber Tappers, Riverines Residents of Tabajara

ASROP: Association of Rubber Tappers of the Rio Ouro Preto Extractive Reserve

ECOPORE: Ecological Action Guaporé

OSR: Organisation of Rubber Tappers of Rondônia

PLANAFLORO: Rondônia Natural Resources Management Project

POLONOROESTE: Integrated Development Programme for the Northwest of Brazil

PRIMAVERA: Association of Rubber Tappers of the Rio Pacáas Novos Reserve

WWF: World Wildlife Fund for Nature

1. Introduction

Growing emphasis on participation has generated much interest for establishing institutions and institutional arrangements to facilitate the involvement of users in the management of natural resources. Associations, committees and co-operatives are examples of the kinds of institutions promoted by participatory approaches. Institutional building has become a common objective of strategies for the management of forests, fishing grounds, water and other resources and resource systems. Recent publications, however, have begun to critically analyse participatory approaches and their impacts, including the emphasis on building institutions as a means to enable or empower local people to co-operate in the management of natural resources (Cooke and Kothari, 2001). Institutional models of participation have been criticised primarily for focusing on formal institutions, especially on organisations, and assuming that these structures are an effective way of institutionalising co-operative interactions. According to Cleaver (2001), there is evidence that management often occurs largely outside those institutions established with the specific purpose of managing resources.

Participatory approaches and institutions have also been criticised on other grounds, namely for being pursued as a means of achieving better project outcomes rather than as a process aimed at empowerment or enhancing the capacity of people to improve their lives and facilitating social change to the advantage of marginalised groups (Cleaver, 1999; Nelson and Wright, 1995). Emerging critiques seem to suggest that institutions for participation are often implemented from above, by NGOs, governments and donors, to improve the effectiveness of natural resource management interventions rather than to provide the means and adaptations for local people to self-govern the resources upon which their livelihoods depend. Critics suggest that informal or socially embedded institutions often play a far greater role in how people negotiate access to shared resources than new participatory institutions established within the context of specific projects (Cleaver, 1999). Their response to the conventional focus of natural resource management policy, practice and research on formal institutions is to give more attention to the informal as a key to understanding the dynamics of inclusion and exclusion from natural resources and decision-making (Cleaver, 2001; Leach *et al.*, 1999; Mearns *et al.*, 1998).

Clearly, analyses focusing on either informal or formal institutions would each reveal a particular set of processes. Examining informal institutions would need to look at the diversity of everyday interactions and socially embedded arrangements that take place outside organisations, to reveal how they influence access to resources and power. Analysing formal institutions would require studying organisational capacity and leadership as well as planning and decision-making procedures to determine how these affect the outcomes of

these institutions, including their equity and legitimacy. The bottom line is that building participatory institutions remains a key feature of many natural resource management projects, especially given the growing emphasis on decentralisation, co-management and partnerships with local populations. However, there are many gaps in our understanding of the dynamics of these institutions, especially their interaction and interface with customary norms and rules, everyday social relationships and individual actions.

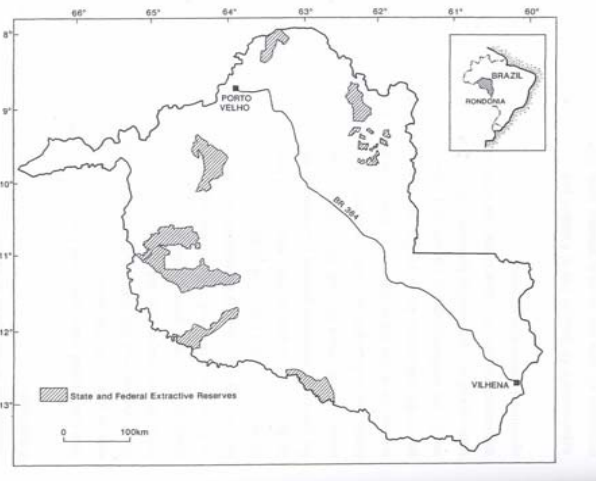
Although participatory institutions are a common feature of many projects and other externally supported initiatives promoting the conservation and sustainable use of natural resources, their functioning and outcomes often depart from project objectives. While it can be said that these institutions are often promoted from the top-down to meet the objectives of specific projects or interventions, they can also be modified by local people 'from below' to fit their own goals. There is bound to be much variation in their evolution and outcomes. Each situation is different depending on its social context. Natural resources policy analysis, therefore, must consider the ways in which political, cultural and economic dimensions of social context impact on institutional arrangements for natural resources governance. The importance of taking into account contextual factors in institutional analysis has been recognised by researchers interested in common pool resource systems (Edwards and Steins, 1999a and 1999b), and environmental governance more generally (Adger *et al.*, 2003). Context includes both formal and informal aspects and has the potential to generate findings that are driven by empirical evidence rather than by pre-assumptions regarding the relative importance of formal and informal institutions.

The paper argues for an alternative approach that focuses on the interface between formal institutions and informal processes and interactions, which is sensitive to social context. Drawing on research examining the institutional dynamics of extractive reserves, a participatory approach to natural resources management in Brazilian Amazonia, the paper shows that local populations often transform and adapt natural resource management institutions created through external interventions to fit their own goals. It demonstrates that changes and adaptations occur as these institutions become entangled with, and are permeated by, existing social relationships, norms and customary ways of doing things. The paper seeks to overcome the dichotomy between institutional analysis focusing on either formal or informal institutions. Formal and informal realms are in practice difficult to separate, which means that understanding natural resource management processes and outcomes necessitates looking at the interface, linkages and interactions between the two.

Extractive reserves are a well-known approach to integrate tropical forest conservation and local development. They are protected areas established by the

government that guarantee the rights of rubber tappers and other traditional populations to use natural resources for livelihoods (Allegretti, 1990; Ruiz and Pinzón, 1995; Schwartzman, 1989). The paper examines associations established for the management of these areas. It is based on ethnographic research undertaken over a total period of 14 months, from 1999 to 2001. Data were collected using a number of techniques including semi-structured interviews, process documentation¹ and participant observation. Figure 1 shows Rondônia and the location of extractive reserves. The paper proceeds as follows. Section 2 contextualises the establishment of extractive reserves in Rondônia and the efforts by NGOs to establish associations to manage them. Section 3 discusses the main principles behind the concept of extractive reserves and the institutional arrangements designed to create, implement and manage these areas. The analysis of the rubber tappers' associations is presented in Section 4 and focuses on three distinct areas: resource management, marketing of forest products and claims-making. Examining their implementation and outcomes reveals the ebb and flow between interventions to establish participatory institutions 'from above' and local strategies 'from below'.

Figure 1: Extractive reserves in Rondônia



¹ Process documentation is based on ethnographic methods such as participant observation. This research method was developed specifically to monitor and document the implementation of projects. It can equally be used to study processes within institutions involved in the implementation of particular initiatives and the interactions between them (see Lewis, 1998; Mosse, 1998).

2: Building Management Institutions

Extractive reserves are a distinctive category of protected area in Brazil aiming to conserve tropical forests and other ecosystems through sustainable use of natural resources by local populations. The concept of extractive reserves originated in the struggles of the rubber tappers (or *seringueiros*) to gain legal rights to the lands they traditionally occupied (Keck, 1995). The *seringueiros* are forest dwellers that descend from migrants brought to Amazonia in the late nineteenth century and during the Second World War to extract rubber from trees growing naturally in the Amazonian forest. In the 1970s, the expansion of the agricultural frontier in Amazonia began encroaching on the forests inhabited by the rubber tappers. Although they had been living in their lands for generations, the rubber tappers did not have legal titles to these lands, most of which belonged to former rubber estates under the control of rubber barons. These estates were acquired by cattle ranchers who started to evict the rubber tappers and their families to give way to clearing the forest for pasture. In an effort to resist this process, the rubber tappers organised peaceful confrontations called *empates* to stop the clearings. This attracted the attention of researchers and environmentalists and assisted the rubber tappers to develop a proposal that could simultaneously address their claims for land rights and protect the forests (Hecht and Cockburn, 1989). These goals became the conceptual basis for extractive reserves.

Although extractive reserves can be said to be a grassroots approach to sustainable development, their establishment has come to form part of the goals of internationally-funded environmental management projects by powerful players in global environmental governance such as the World Bank and large international conservation NGOs such as WWF. As a result, the creation of extractive reserves has become driven by these actors in collaboration with Brazilian NGOs and organisations representing the rubber tappers. In Brazilian Amazonia there are two significant environmental management initiatives funded by the World Bank and international donors that have components aimed at extractive reserves. One is ongoing, the Pilot Programme for the Conservation of the Brazilian Rain Forest (PP-G7), which includes funding to support the implementation of four reserves established by the Federal Government in the early 1990s (MMA, 2003). The other is the World Bank funded Rondônia Natural Resources Management Project (PLANA-FLORO), which was initiated in 1992 and recently completed. PLANAFLORO supported the creation of extractive reserves by the Government of Rondônia, a State in Western Amazonia severely affected by deforestation, which was partially caused by an earlier initiative funded by the World Bank, the Integrated Development Programme for the Northwest of Brazil (POLONO-ROESTE) (Redwood, 2002). This paper is concerned with the extractive reserves

established under PLANAFLORO. Creating these areas and setting up workable institutional arrangements for their management resulted from projects initiated by NGOs. This process is an example of efforts to build institutions in the context of the implementation of internationally-funded participatory natural resource management approaches.

The emphasis of PLANAFLORO on environmental conservation and land use zoning represented a strategic opportunity for the protection of large areas of forest in a region highly threatened by deforestation by loggers, cattle ranchers and land squatters². NGOs were quick to recognize this opportunity and began efforts to monitor the implementation of PLANAFLORO in order to ensure that its environmental objectives were met. They also realised the strategic value of supporting the populations more directly affected by PLANAFLORO, which included indigenous groups, rubber tappers and small farmers. In the late 1980s, NGOs began working with the rubber tappers in community development projects and, at the same time, started laying the ground for the creation of extractive reserves. This included explaining to the rubber tappers what these areas were and how they could benefit them in terms of securing their rights to land and government support for community development activities. It also involved promoting their organisation, a process which resulted in a three-tier system of representation formed by the Organisation of Rubber Tappers of Rondônia (OSR), associations of rubber tappers and community groups in the areas proposed for the establishment of extractive reserves.

The NGOs promoting the organisation of the rubber tappers were small organisations set up by Brazilian professionals such as agronomists, anthropologists, sociologists and biologists, many of whom came to Rondônia to work in government or as consultants in international projects. Their work in Rondônia was funded by international NGOs interested in environmental conservation and community development. These included the Ford Foundation, OXFAM and WWF. The latter played a key role in the implementation of extractive reserves by supporting NGOs and the OSR in their efforts to promote the creation of extractive reserves. WWF continues to support the OSR and one NGO, the Ecological Action Guaporé (ECOPORE), to enable these actors to develop and implement actions aimed at improving the social, economic and environmental viability of the reserves. The outcome of this process was the creation of 21 extractive reserves covering over one million hectares of tropical

² Land Zoning (LZ) is a planning instrument that maps the state into different macro-zones according to their suitability for agriculture, forestry, extractivism or total environmental conservation (Mahar, 2000). PLANAFLORO established the inclusion of LZ in Rondônia's legislation. The LZ became a law that was approved by the State Legislative Assembly in 1991 (Millikan 1997). The zoning law reinforced claims for the establishment of extractive reserves in areas designated for the extraction of forest products.

forest. Table 1 lists these reserves and the associations responsible for their management.

Table 1: Extractive reserves in Rondônia

Association	Reserve	Location	Area (ha)	Number of Families
AGUAPE ³	Rio Cautário (S)	Costa Marques	146,400	60
	Rio Cautário II (F)	Costa Marques	73,817	n/a
	Curralinho (S)	Costa Marques	1,758	6
	Pedras Negras (S)	São Francisco	124,409	19
ASM	Aquariquara (S)	Vale do Anari	18,100	51
	Seringueiras (S)	Vale do Anari	537	1
	Itaúba (S)	Vale do Anari	1,758	2
	Maracatiara (S)	Machadinho d'Oeste	9,503	19
	Ipê (S)	Machadinho d'Oeste	815	4
	Jatobá (S)	Machadinho d'Oeste	1,135	2
	Massaranduba (S)	Machadinho d'Oeste	5,556	4
	Angelim (S)	Machadinho d'Oeste	8,923	3
	Sucupira (S)	Machadinho d'Oeste	3,188	n/a
	Mogno (S)	Machadinho d'Oeste	2,450	8
	Freijó (S)	Machadinho d'Oeste	600	1
	Roxinho (S)	Machadinho d'Oeste	882	3
	Piquiá (S)	Machadinho d'Oeste	1,448	6
	Castanheira (S)	Machadinho d'Oeste	10,200	6
Garrote (S)	Machadinho d'Oeste	802	3	
PRIMAVERA	Rio Pacáas Novos (S)	Guajará Mirim	342,903	55
ASROP and ASAEX	Rio Ouro Preto (F)	Guajará Mirim	204,583	107
ASRJP	Rio Jaci-Paraná (S)	Nova Mamoré	191,324	23
ASRMT	Rio Preto Jacundá (S)	Machadinho	115,278	50
ASMUCUN	Cuniã (F)	Porto Velho	95,000	45

Note: (S) State Extractive Reserve;
(F) Federal Extractive Reserve.

³ See list of Acronyms for full name of the association.

3. Principles and Institutions for Extractive Reserve Management

In Brazil, participation has been adopted in mainstream conservation policy by formally recognising that local populations must be involved in protected areas. One of the main directives of the protected areas legislation is ‘securing the effective participation of local populations in the creation, implementation and management of conservation units⁴’ (GoB, 2000, 2, my translation). Recent government statements recognise important links between environmental quality and human well-being and consider conservation and poverty alleviation as goals that should be pursued simultaneously (Sato, 2003). This suggests that initiatives seeking to alleviate poverty in forests and other natural ecosystems inhabited by traditional and newly established populations are likely to be increasingly supported by the Brazilian government.

The important role that local populations play in conservation through traditional resource use practices is widely recognised (Borrini-Feyerabend, 1997; Western and Wright, 1994). In Brazilian Amazonia there are many examples of non-indigenous groups that have managed resources for generations in reasonably sustainable ways during the course of their long settlement in the region (Redford and Padoch, 1992). These include rubber tappers (*seringueiros*), river dwellers (*ribeirinhos*) and fishers (*pescadores*). Recognising the rights of these populations to use natural resources is currently a central objective of participatory approaches to conservation in Brazil. Modelled on the concept of indigenous reserves, extractive reserves were the first approach to guarantee the rights of local populations with a long history on the land to the areas they have traditionally inhabited. Other approaches followed, such as sustainable development reserves, which also recognise the rights of traditional populations to natural resources (Gillingham, 2001; GoB, 2000).

Participatory approaches often introduce major changes to the way local users have made decisions over resource management. They typically promote the legalisation of property rights and the establishment of formal management institutions. Extractive reserves involved the legalisation of a traditional natural resource management system that already existed in Amazonia (Begossi, 1998). However, this was accompanied by the creation of new institutions to manage the reserves based on collective action, which contrasted with more individualistic ways rubber tappers habitually made decisions over the use of resources. Reserve management institutions requires them to participate and make collective decisions, a behaviour which was not originally prevalent among a group where families live isolated and distant from each other and

were historically dependent on paternalistic relationships with estate owners and traders to sell their produce and acquire market goods (Hall, 1997).

The institutional arrangements developed to manage extractive reserves include specific institutions, as well as rules and instruments to ensure the sustainable use of natural resources. An organisation representing reserve residents, usually an association, becomes responsible for the overall management of the reserve. Property rights are transferred from the government to the association under the form of a long-term lease. The association then issues individual leases to each household for its landholding, which come with certain conditions attached, namely compliance with a management plan (called Utilisation Plan) establishing the norms of resource use, including what families may and may not do in their landholdings. This plan is specific to each reserve to reflect its social and environmental characteristics. It also should be prepared with the involvement of and approved by reserve residents before it acquires legal validity. It then becomes the responsibility of the association to oversee the implementation of the management plan.

The management of extractive reserves falls largely under the responsibility of the associations. Management in this context means both decisions over natural resource use and activities aimed at improving the social and economic welfare of reserve inhabitants. In Rondônia, associations are engaged in marketing forest products, and in lobbying local governments and politicians for the improvement of education, health care, transport and other services that are important for extractive reserve inhabitants. Management by the rubber tappers’ associations, therefore, must be understood as a broad set of roles. These institutions resemble producer associations, the formation of which is often encouraged by Brazilian NGOs working in rural development as a means to promote the political and economic empowerment of marginalised populations (Hoefle, 2000). The dynamics of the associations of rubber tappers are examined in Section 4.

⁴ ‘Conservation units’ is the name given to protected areas in Brazil.

4. Examining the Rubber Tappers' Associations

Cleaver (1999:601) argues that there is a 'tendency to recognise the importance of social and 'informal' institutions but nevertheless to concentrate on the analysis and building of formal institutions'. Recent emphasis on decentralisation and co-management means that building and strengthening formal natural resource management institutions is likely to remain in the policy agenda for years to come. There is evidence that institutions built deliberately for the implementation of a specific participatory approach may have a variety of outcomes, from promoting empowerment to undermining and conflicting with informal institutions and practices that people have used successfully to make decisions over natural resources. For example, some local groups have realised the advantage of institutional inclusion as a means to render them more 'legible' to policy makers, to use Scott's (1998) terminology. In some cases, organisation into formal structures has enabled marginalised groups to have their claims to natural resources and state provided services addressed by governments (Bebbington & Batterbury, 2001; Perreault, 2001). The establishment of formal institutions may in practice imply trade-offs, having both advantages and disadvantages. It also does not always imply the complete displacement of the informal ways in which people have been accustomed to doing things. Formal institutions are often permeated by informal practices and, as a result, they come to function in ways markedly different from original project plans.

While informal institutions have a profound influence on natural resource management, patterns of conflict and co-operation, and of inclusion and exclusion in decision-making, we should be careful not to merely recognise the importance of formal institutions but nevertheless concentrate the analysis on the informal. If we want to understand the outcomes of participatory approaches and institutions better, we must give greater attention to the interface between the formal and the informal. It is at this interface that the evolution and outcomes of participatory approaches and institutions are defined. The associations of rubber tappers established to manage extractive reserves demonstrate the dynamics through which institutions, established as part of participatory approaches, are assimilated into local strategies so that the results are outcomes that must be understood as resulting from both formalising and informalising initiatives, respectively from 'above' and from 'below'. These dynamics are analysed in relation to natural resource management, marketing of forest products and claims making, which are key activities undertaken by the associations.

4.1 Resource management

Utilisation Plans are the main institutional arrangement for natural resource management in extractive reserves. The aim of the Plan is to ensure that reserve residents use resources sustainably and that extractive reserves fulfil their environmental conservation goals. Each reserve is required to establish a Reserve Protection Commission, which aims to assist the association in monitoring the compliance of reserve residents with the norms and regulations of the Utilisation Plan. Commission members should be individuals respected by their communities to be able to undertake the sensitive task of giving warnings to those who break the rules of the Utilisation Plan and applying sanctions. Although Reserve Protection Commissions have been established in all reserves, to date practically none operates effectively. This means that in practice there are no means to implement the Utilisation Plans.

Each household has continued to make decisions over the use of natural resources in their landholdings as before the reserves were created. Households make decisions according to economic pressures and opportunities, labour availability and capital (Assies, 1997). Some are close to exceeding the legal deforestation limit of 10% per landholding stipulated in the Utilisation Plan. If current trends continue, many families will exceed this limit in a few years. These estimates are based on interviews and observations undertaken by the author since no comprehensive studies of deforestation trends in Rondônia's extractive reserves have been carried out. Families have cleared the forest mainly to plant coffee and to establish pasture. In Rondônia cattle ranching is still a rare activity in extractive reserves. However, when asked about future plans many families say they will buy cattle as soon as their economic situation improves. Deforestation is partially a response of families to the critically decline of rubber prices during the 1990s and, more seriously, the closure of all factories that engaged in the primary processing of rubber in Rondônia. This led the rubber tappers to switch to other activities to replace the income earned from the sale of rubber. The existence on paper of Utilisation Plans is doing little to avoid families clearing more forest for agriculture. There are also cases of rubber tappers selling timber to loggers, which is an illegal activity.

Lack of information about the Plan is noticeable in some reserves. In interviews, most reserve residents said they know about the existence of the Utilisation Plan but many are unsure of what exactly it allows and forbids. Efforts were made to involve reserve residents in the preparation of Utilisation Plans through meetings in the reserves facilitated by experts. Various explanations were put forward by interviewees for the lack of awareness regarding the rules of the Plan. According to one consultant that facilitated the preparation of Utilisation Plans, at the time when meetings took place in the reserves, the level of participation was high but there were still some families that failed to attend

them. The Plan also did not involve families that settled in some reserves in recent years. Interviews in the reserves hinted at another important factor. The Utilisation Plan is a written document, printed copies of which were distributed to all families. However, illiteracy rates among rubber tappers are high, which means that many cannot read the booklet distributed to them. There are, however, much more fundamental pressures that lead households to pay little attention to Utilisation Plans. In their responses, many rubber tappers talked about the economic difficulties they experienced. They seemed to imply that the economic survival of their families was their most important concern and that the existence of a set of formal written rules of resource use would not prevent them from clearing forest beyond stipulated limits.

On the ground, the rubber tappers also say that, if the associations, OSR, government, NGOs and international organisations want them to respect the Utilisation Plan, then they should provide them with other economically viable alternatives. Important questions however, remain unanswered. There is no certainty that families will prefer the alternatives proposed by NGOs and other actors to their own spontaneous innovations, such as agriculture and cattle ranching. Another pertinent question refers to the potential unwanted impacts of alternatives with a low impact on forest cover. If these alternatives prove successful at improving household incomes, could higher incomes also enable families to move into other activities with higher impacts such as cattle ranching? Cattle has come to be perceived as a good investment and cattle ownership is often associated with status, in the sense of indicating someone who is successful economically. Clearly, these are complex questions that require in-depth research into the economic and cultural factors that influence the decisions that households make about the use of natural resources.

It is perhaps the case that rubber tappers see extractive reserves mainly as a means to gain rights to their lands. Difficulties to implement the Utilisation Plan come mainly from the fact that it imposes restrictions on the use of resources in individual landholdings, which the rubber tappers consider to be their private property and to have the right to manage without interference. This sense of individual ownership emerged frequently in field interviews and runs against the collective management and ownership principles in which the concept of extractive reserves and the institutions created for their management are based. As protected areas, extractive reserves come with a series of conditions attached including participation, institutional inclusion, collective management and strict restrictions over the use of resources. This conditionality is accepted but not always complied with as the examples above show. Community logging has been promoted by NGOs as a means to improve the incomes of reserve dwellers. This initiative has introduced the need to make collective decisions over the use of resources. In this case participation has been more successful

because there is a tangible economic incentive. Motivations to participate in collective natural resource management vary according to individual circumstances and considerations over the costs and benefits of participating.

The case of community logging also shows the dynamics of participatory projects brought in from the outside and implemented in local communities. This initiative was largely the response of environmental NGOs to the illegal activities of loggers in extractive reserves, often with the connivance of the rubber tappers' themselves. Families experiencing economic hardship often sold trees from their landholding to loggers. Although logging in extractive reserves is a controversial issue and banned in extractive reserves established by the Federal Government, it is allowed in extractive reserves set up by the Government of Rondônia. Where community logging has been implemented, invasions by loggers have diminished substantially and even completely eliminated because the rubber tappers refuse to sell them timber and denounce illegal logging to the associations, which in turn alert the relevant authorities or confront the loggers directly. The fact that participatory projects and institutions are often initiated from above, by NGOs, donors or government agencies does not necessarily mean they will be less likely to serve the needs of the grassroots. There is much room for modifications and adaptations - people comply with certain aspects and resist others to suit their objectives and as circumstances evolve.

4.2 Marketing of forest products

The marketing of forest products by the associations was supported by projects funded by WWF which, in addition to enabling the creation of extractive reserves, also aimed to improve household incomes to maintain the reserves inhabited and prevent families from switching to unsustainable patterns of land use. WWF provided funds to enable associations to set up marketing arrangements to buy rubber and sell cooking oil, sugar, coffee, ammunition, soap, candles, batteries and other provisions to families. Their objective was to cut intermediaries and secure better prices for forest products and provisions and worked on the assumption that families would recognise the benefits of the schemes and participate in them. These initiatives provide important insights into the dynamics of approaches based on participatory institutions and arrangements. They show that externally induced institutions and participatory arrangements for natural resources management can be assimilated by local populations. However, local people also modify them to fit their own forms of social organisation and interests.

Historically, the production and commerce of rubber in Amazonia was controlled by rubber barons or *seringalistas*. From the 1960s onwards the profitability of the rubber trade began to decline rapidly and many rubber

barons moved into more lucrative activities. Rubber was no longer economically attractive to large capitalised *seringalistas* but, when combined with the sale of provisions and other commodities to the rubber tappers, it was still a viable small business. This created a niche for two distinct classes of entrepreneurs, the *patrões* (rubber bosses) and the *marreteiros* (itinerant traders), who became vital for the rubber tappers, enabling them to continue living and working in isolated areas faraway from markets⁵. However, it also meant that the rubber tappers had no alternative but to accept the prices practiced by these individuals. They paid rubber at below the minimum fixed by the government and sold provisions at inflated prices.

The rubber bosses and the traders advanced provisions to the *seringueiros* against their seasonal production of rubber or brazil nuts. Some families also bought shotguns, boat engines, tools and other more valuable items, which they paid back in several instalments. This practice was reminiscent of the *aviamento* or debt-peonage system through which rubber extraction and marketing was historically organised in Amazonia. Debt peonage meant that the rubber tappers lived under a condition of semi-servitude as a result of persisting debts with the rubber barons. Sometimes threats and violence were used in order to prevent the rubber tappers from leaving without paying their debts. The *aviamento* disappeared but some of its elements survived in the relationship between the rubber tappers and the rubber bosses and traders.⁶

Despite unfavourable terms of trade, the rubber bosses and the traders were important for the rubber tappers. They provided a reliable market for forest products and a convenient means of acquiring provisions without costly and time consuming journeys to local towns. They also represented a sort of safety net upon which the rubber tappers could rely upon in difficult times. It was not uncommon for rubber tappers to borrow money from these entrepreneurs to buy medicines for a sick family member. They were also a means of acquiring commodities that required large investments that had to be paid for in several instalments. For example, outboard engines were often bought through this way. The bosses and the traders were generally not perceived by the rubber tappers as unscrupulous opportunists. In many cases these individuals formed part of their social networks as a result of systematic contact over many years and the custom of 'god-parenting' whereby families invited individuals (normally of greater wealth and influence than their own) to be godparents of their children.

⁵ Many *patrões* in fact did not own the estates where the rubber tappers lived, which are called *seringais*. Some leased lands from former *seringalistas* or their descendents or simply took over unclaimed rubber estates.

⁶ The *aviamento* may have ceased to exist in Rondônia but is still prevalent nowadays in other parts of Brazilian Amazonia.

Environmental NGOs, in contrast, viewed bosses and traders as exploitative intermediaries. These NGOs began working with the rubber tappers at a time when the extraction of non-timber forest products emerged as a popular means to integrate conservation and development. A number of studies demonstrated that an important part of the profits generated by forest products was captured by intermediaries and concluded that more effective and equitable marketing systems were needed (Afsah, 1992; Browder, 1992a, Browder, 1992b; Butler, 1992). This influenced environmental NGOs into supporting marketing projects for forest products that eliminated intermediaries. In Rondônia, WWF provided funds to help the rubber tappers' associations to set up marketing schemes that aimed to offer better prices for forest products and cut down the costs of provisions. These schemes were also expected to become self-sustaining and even to generate sufficient profits to maintain the administration costs of the associations.

When the associations initiated the marketing schemes (early 1990s) the economic viability of the rubber bosses and traders businesses' was already threatened by collapsing prices for rubber prompted by the removal of government measures protecting nationally produced rubber from cheaper international imports (see Menezes, 1993). In only a few years most *patrões* and *marreteiros* stopped operating in the reserves⁷. In remote areas, the associations became the only means available for rubber tappers to sell rubber and acquire provisions. The improvement of roads and transport linking rural and forest frontier areas to small towns opened up more marketing possibilities for families living in more accessible localities. In effect, some rubber bosses and traders set up shops in small towns and for some time continued buying rubber and selling provisions to the rubber tappers.

NGO staff assisted the associations to draw up regulations for the operation of the marketing schemes. There was much pressure from the rubber tappers for associations to advance provisions under similar conditions as practiced by the rubber bosses and the traders. However, problems emerged with the repayment of debts. Some families failed to pay back the provisions advanced by the association. The associations refused selling further provisions to rubber tappers that did not repay their debts but in many cases this measure was unsuccessful. Those living in more accessible reserves could easily sell rubber and buy provisions at shops in nearby towns. The problem of mounting debts was less common in remote areas where families did not have easy access to the market.

⁷ Efforts to displace the rubber bosses in Rondônia began in the late 1980s when NGOs, the CNS and the Catholic Church encouraged the rubber tappers to stop paying rent for the right to exploit a landholding in the estates.

Yet the profit margins of the marketing schemes were so low that even a small number of debts threatened their financial sustainability.

All the associations engaged in marketing activities ran into financial difficulties of a greater or lesser extent. Debts undermined the capital available to purchase rubber and replenish the stock of provisions. Marketing became irregular and its operation dependent upon the injection of outside funds provided by NGOs and government programmes that after some time also evaporated. In addition to unpaid debts, capital disappeared as a result of loss-making onward sales of rubber and use of funds to pay for the administrative costs of associations. The success and financial sustainability of the marketing schemes depended on grassroots participation on a sufficiently large scale. Effective norms and rules as well as means to implement them were also necessary to avoid the problems of free riding. These conditions were difficult to meet.

The marketing schemes emerged and evolved at a time when rubber was not the profitable business of the past leading families to take advantage of all opportunities available to them to guarantee everyday survival. This included not repaying their debts with the association and dealing with shops in town. Changing economic conditions, including adverse markets for rubber, meant that the arrangements that were viable for rubber bosses and traders ceased to be so with the associations. In addition, the relationship between the bosses and the traders were underpinned by mutual social obligations that were lacking in the interaction with associations. According to some leaders and NGO workers, the *seringueiros* did not feel a strong obligation towards the associations partly because these organisations were funded by international NGOs and could subsist financially without their contribution. International NGOs were viewed by many as an infinite source of funding and, in effect, when marketing schemes collapsed funds were mobilised to rescue them. This reinforced the disengagement of the rubber tappers from the financial sustainability of their associations.

Although not entirely sustainable from an economic point of view and needing periodical re-injections of outside capital, the association remains the only option for families living in remote areas to sell their produce and acquire provisions. In extractive reserves far from towns, there was greater commitment and collective effort to make the schemes work. In the Rio Cautário reserve, community shops selling provisions continue to function in spite of occasional shortages of supplies and funds to buy rubber. The group of users served by these shops is small making the enforcement of rules of operation easier. Frequent face-to-face interaction makes evading the payment of debts more difficult. In addition, the lack of other alternatives is a powerful incentive for

families in this reserve to make a greater effort to keep the shops up and running. Importantly, the shops are managed by the community without much interference from the association. Marketing schemes centralised in the associations and aiming to serve several communities and reserves have been more susceptible to economic failure.

4.3 Claims-making

Before being organised the rubber tappers were ignored by local government and were frequently excluded from public services such as education and health care. The lack of primary schools, for example, contributed to families abandoning the reserves and moving to rural or urban areas where it was possible to give an education to their children. Access to health care was equally precarious and even national campaigns of vaccination and malaria control, for example, rarely reached areas inhabited by the rubber tappers. The associations have secured important improvements in access to primary education and health care by putting pressure on municipal governments to open schools in extractive reserves and to include them in national programmes of preventive health care, including a programme of community health officers.

The associations have also begun to participate in municipal policy and decision making arenas that are open to the involvement of organised civil society. The association responsible for the management of the reserves in the Machadinho d'Oeste region, for example, sits in the municipal councils for health and education. It also participates in the Municipal Development Forum, an initiative that brings together representatives from the different civil society groups, the government and the business sectors. Municipal governments in Brazil are gradually opening up to the participation of civil society in policy making such as the elaboration of budgets and development plans (Tendler, 1997). Participation in these processes often requires groups to be organised into representative organisations capable of defending their interests. Although created with the objective of managing extractive reserves in mind, the associations of rubber tappers have become less concerned with management and more with defending collective interests and making claims.

5. Conclusion

The emphasis of natural resources policy and practice on participation and formal institutions has been criticised for failing to empower local communities and to overlook the range of everyday informal interactions through which people gain access to natural and political resources (Cleaver, 2001). Community involvement and the establishment of formal institutions to manage natural resources on behalf of local communities is regarded as often being imposed on local populations, regardless of being appropriate to circumstances, to meet the needs and doctrines of NGOs and donors. Examining the evolution and outcomes of the rubber tappers' associations in Rondônia demonstrated that generalisations cannot be made regarding the impacts of participatory approaches and organisations for the management of natural resources. The analysis shows that social context has a profound influence on the way participatory projects and institutions evolve.

Participatory approaches place much emphasis on the potential of local communities to manage natural resources as common property systems. This has partially been informed by studies showing that common property regimes can provide advantages to rural populations in terms of equitable access to and sustainable use of natural resources. The possibility of creating and maintaining successful community institutions for natural resources management is suggested in the literature (Ostrom, 1992). Ostrom (1990) proposes eight design principles that characterise long-enduring, successful common property institutions. One study suggests that most of the design principles highlighted in common property resource theory as leading to robust regimes can be discerned in the Chico Mendes extractive reserve, in Acre (Cardoso, 2002). However, the study also observes that reserve residents did not implement and show little interest for formal institutional arrangements for the management of extractive reserves. A similar pattern is observable in Rondônia.

In Rondônia, mobilising the rubber tappers to establish the associations was relatively easy since these institutions were the means to create extractive reserves, which were seen by many as the only option to gain rights to land. Although the rubber tappers adopted the approaches and institutions designed to manage extractive reserves, they did not implement them. This was largely because they are accustomed to manage their landholdings as private rather than common lands. Within this context, externally designed rules, monitoring arrangements and sanctions are likely to flounder. The reserve Utilisation Plans, for example, have little impact on the way families use resources on their landholdings. Voluntary rather than coercive approaches will probably be more successful such as the use of economic and other types of incentives to conserve the forest. These sorts of mechanisms have been experimented in some regions

of the world and include, for example, 'conservation concessions' (Ferraro and Kiss, 2002; Ferraro, 2001).

The fact that institutions created as part of environmental management interventions become entangled with existing social relationships and processes and are modified by their participants in ways that depart significantly from project objectives, has implications for the design and implementation of natural resource management policies. It implies the need for management approaches to be flexible and adaptive in order to deal with the evolving needs and interests of local populations and wider social, economic, political and environmental changes. 'Adaptive management' is an approach that has recently begun to gain popularity in natural resources management policy and practice. It acknowledges that policies and projects must satisfy social objectives, but must also be continually modified and flexible for adaptation to changes (Gunderson, 1999). In the case of extractive reserves, adaptive management would imply revising and re-negotiating management principles and institutions to fit the specificities of each reserve and respond adaptively to local and wider socio-economic changes.

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