INTRODUCTION

For many centuries rural Amazon populations have used forest resources, but only on a relatively small scale. It was only in 1998 that community forest management was regulated in Brazil, enabling these rural and small-scale producers to manage their resources legally through a formal category of “simplified management plans” (Annex 1). Amaral and Amaral Neto (2000) have estimated that in the year 2000 about 1,530,000 hectares of forest was managed through these “simplified management plans” in the Brazilian Amazon, which represented less than 1% of the region’s total area. Most of these initiatives were made viable starting in the 1990’s with support from the government and civil society organizations; the Mamirauá Sustainable Development Reserve (MSDR) was among them.

This case study presents the MSDR community forest management experience, which was implemented with the support of the Mamirauá Institute for Sustainable Development, the Brazilian Federal Ministry of Science and Technology and the Amazon State Government. This project integrates a group of initiatives implemented by local communities, supported by the ProManejo program since 2000.

COMMUNITY FOREST MANAGEMENT IN THE BRAZILIAN AMAZON

The Amazon Forest is the largest tropical rainforest in the world, totaling 5.5 million square kilometers of area, 60% of which are located inside Brazilian territory (Porto, 2001). This richness makes Brazil a ‘forest’ country, with approximately 60% of its territory covered by forests that are in most part tropical (Sobral et al., 2002). Veríssimo (1998) estimates that around 70% of the Brazilian Amazon rainforest has great potential for timber production.

In Brazil, like in other parts of the tropics, rainforests have been threatened by predatory timber extraction, forest fires and by the expansion of agriculture and cattle ranching. In the past three decades, the Amazon lost almost 600 thousand km² (Sobral et al., 2002). By 2001, this represented a total loss of 13.31% of the original forested area due to through expansion of the
agricultural frontiers and predatory economic extraction by logging companies (Porto, 2001).

Throughout the world, rural communities have survived by exploiting their natural resources. More than 350 million people living in and around forested areas depend strongly on forest for subsistence and generation of income (Mayers & Vermeulen, 2002). In the last few years, the debate about local people’s participation in the management and conservations of forest resources has increased.

In the Amazon, the concept of community natural resource management emerged with greater intensity in the early 80’s, when natural and social scientists identified a correlation between environmental degradation and issues like social justice, rural impoverishment and indigenous peoples rights. Since the end of the last century, many groups of Amazon small family producers have become involved in forest management initiatives in response to the different pressures on common natural resources they were dependent on, and to which they applied traditional participatory management practices. These initiatives used different strategies depending upon the specific characteristics of each natural resource (Oliveira, 2002), with the support of the church, NGOs and financial agencies. These traditional initiatives became a fertile field for the implementation of community forest management programmes, whose underlying premise was that these communities had much greater interest in the sustainability of the natural resources than the government or institutions distant from the forests. Furthermore, these communities had ample knowledge about the ecological processes and applied traditional practices of natural resources management (Bennati et al, 2003). Under this new perspective, the traditional inhabitants and small proprietors were made the ones officially responsible for the success of the forest management in the region (Amaral & Amaral Neto, 2000).

There are many success stories in other countries that may be used as sound pilot experiences to illustrate Community Forest Management (CFM) (Vedeld, 2002). In the Amazon, it was only in 1993 that the first CFM project undertook logging in local people’s colonio areas, in the state of Para. In April 1998, the first CFM workshop in the Amazon took place, with the participation of the main community-based pilot experiences that exploited or were preparing to exploit forest resources, among them the Mamirauá Community Forest Management Project. One of the most important conclusions of the meeting was that, although recently initiated, CFM could be regarded as a firm step toward sustainable forest management in the Amazon (Amaral & Amaral Neto, 2000).

CFM was formally regulated in Brazil in 1998, as a result of the combined efforts of NGOs, labour syndicates, communities and the government, that raised awareness for the importance of supporting CFM actions as a strategy of use and conservation of forests, through the elaboration of a simplified legal framework (Amaral & Amaral Neto, 2000).
The number of forest management initiatives, planned or in place, involving local communities has grown. These initiatives represent a great diversity of experiences considering the differences in types of organizations (worker syndicates, associations), access to forest resources (Extractive Reserves, individual proprietors area), forest and non-forest products, types of forest, culture and the extent of project’s existence (Amaral & Amaral Neto, 2000). Amaral (2001) cites as the main characteristics common to all these experiences: the environmental degradation pressure they are under, the State’s attempt to control forest resources, insecurity regarding land tenure, the long process for the elaboration of legislation and forest public policies, and bilateral cooperation among governments, communities and NGOs.

The most recent report made available by the Brazilian Environmental Agency - IBAMA, reveals that the area covered by CFM plans in the Legal Amazon totals 605,605.23 hectares in 2001 (Table 1). Among these management plans, 10,413.00 hectares were managed by communities and 599,011.23 hectares by individual small-scale producer. (IBAMA, 2001).

<table>
<thead>
<tr>
<th>State</th>
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<tr>
<td>Acre</td>
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<tr>
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<tr>
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<td>Tocantins</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>605,605.23</strong></td>
</tr>
</tbody>
</table>

Source: IBAMA

Table 1: Total area covered by CFM plans in the Legal Amazon

1. Mamirauá Sustainable Development Reserve – General Characteristics

The Mamirauá Sustainable Development Reserve (MSDR) is located in the Middle Solimões Basin, at the confluence of Solimões, Japurá e Auati-Paraná Rivers, in the Amazon state in Brazil. It is the largest protected area of flooded forest, with 1,124,000 hectares (figure 1), and the only protected area composed totally of várzea forests. It was created by the Amazonas state government in 1990 as an Ecological Station, and transformed into a SDR in 1996. This category of protected area ensures the population’s rights to reside inside the area as well as use its natural resources, as long as this use is carried out in consonance to the rules of the management plan (SCM, 1996). Together with the local population, the Mamirauá Institute for Sustainable Development (MISD) manages the area in a co-management system.

1 Forest flooded by white water.
In its first phase of development from 1992 to 1995, the MISD carried out a number of studies in order to prepare a management plan for the sustainable use of natural resources in the Reserve. These studies used ample community participation and the scientific results were discussed with the local population, and with government and NGOs active in the area, proposing a new model of integrated natural resource management. The model included a zoning system, with totally preserved and sustainable use areas; rules and recommendations for the use of the most important natural resources; a surveillance system; a reduction of the demand for natural resources through the creation of economic alternatives; as well as extension, research and monitoring activities (SCM, 1996).

2. SOCIAL AND DEMOGRAPHIC ASPECTS IN MAMIRAUÁ SDR

From the point of view of the original people, the Mamirauá region has been inhabited by Amerindian descendents, who despite the processes of acculturation, miscegenation, and even extermination are descendant from the early native groups (Reis, 2003). This new population - the caboclo – emerged from indians, portuguese and mammelucos of varied origins (Oliveira, 1999).

Source: MISD

Figure 1: Localization of Mamirauá SDR

The focal area, a 260,000 ha zone given priority for the implementation of the management plan, has 21 settlements with a total of 1585 inhabitants. In its buffer zone, there are 42 settlements with 4,401 inhabitants who have traditionally used the natural resources of the area. Most people are concentrated in villages; only 560 live in isolated houses.

Settlements vary in size, and relations of kin typically integrate the domestic units in these areas. Families are mostly nuclear, using the extended family as a phase of development, when the young couples reside with their parents until they become economically independent. Subsistence is mainly maintained by family labour. The population of the Reserve is fairly young,
with an average age of 13 years old, and 56% are younger than 15 years old (SCM, 1996).

Socio-economic studies have confirmed the extreme instability of várzea settlements, and the factors that contribute to this situation are political, social as well as geomorphologic and seasonal (Reis, 2003).

Although inhabitants and traditional users had their right to stay in the area ensured by the protected area Decree, the land tenure situation is still unresolved - many people claim to be proprietors of some community areas. Considering the Amazon context, however, where these issues are the main causes of conflict, Mamiraua’s situation still grants a sort of stability to the inhabitants, ensuring the legal documentation necessary to license the community forest management plans.

3. BRIEF HISTORY OF THE ECONOMIC FORMATION OF FLOODED FOREST IN THE MAMIRAUÁ REGION

In order to understand the Mamirauá Community Forest Management experience it is necessary to comprehend the dynamics of várzea regions, since these dynamics determine natural conditions and affect management activities.

The várzea is one of the richest ecosystems of the Amazonian Basin, as much in terms of biological productivity, biodiversity and natural resources. Constituting a way of life for more than 1.5 million people, the várzea occupies 300 thousand km² along of the Amazon River valley and its main tributaries, corresponding to 6% of the legal Amazon area (SCM, 1996).

The Middle Solimões river region, where Mamirauá is located, is historically a very high-value area due to the wealth of its natural resources. In the beginning of the 19th century a number of expeditions from Tefé left to collect natural products abundant in the region, which was characterized as the main source of supplies to the neighboring counties (Oliveira & Cunha, 2001).

The extractive system was always a very strong component of the regional economy. In the middle of the 19th century the Amazonian economy grew with the rubber-boom cycle, and other economic cycles that succeeded, always with the predominance of the extraction system (Oliveira & Cunha, 2001). In the seventies, fisheries became the basis of the várzea economy, but the intensification of the activity resulted in the drastic reduction of the stocks, instigating commercial conflicts between várzea inhabitants and commercial fishermen.

It is in this current context that forest management must be analyzed. A secondary economic activity during most of the year, during flooded periods extraction of timber assumes a key role in the várzea economy, when agriculture becomes impracticable with the land flooded with the white water rivers, and fisheries become scarce when fish spread into the flooded forest.
It is in the rising water period, from January to April, that forest producers start to cut timber, which remains in the forest until the lowering of the water level that generally occurs in July, when the timber congregated in rafts can be removed from the forest through the rivers.

Before the implementation of Mamirauá SDR, the extraction of timber was the main economic activity of the populations of the várzea during the period of the flood, when the families’ income diminishes in about 75% (MISD database, 1995). Previously, this extraction was carried out in unsustainable ways, damaging the maintenance of the forest stocks. In the first years after the creation of the reserve, the estimated number of forest producers in the area was about 300 (Ayres et al., 1997).

Timber production in the várzea was always important to the economy of the Amazon State, due mainly to two factors - it is an extremely productive ecosystem and it was the first environment occupied by human settlements in the Amazon (Serra & Fernandez, 2004).

Most timber extraction in the state is predatory and unsustainable (Hummel, 2001), and some companies are heavily dependent on timber obtained from these unsustainable sources (Gonçalves, 2001). From 1965 to 1988, Tefé had the greatest timber production in the state, that is about 15% of the total (Jansen & Alencar 1991). The Mamirauá várzea forests represent an important production area for the State of Amazon and for Tefé town. In this part of the state, where there are no roads, practically all the produced timber derives from várzea (Albernaz, 1996). The várzea still is a source of raw material, but as resources are depleted in the areas closer to the regional consuming centers, the main supply micro-regions for the lumber industry are displaced toward more distant areas upstream (Gonçalves, 2001).

There has been an oscillation in the number of logging companies in the State of Amazon along the years. In 1994, 106 of these companies were functioning; in 2000, this number fell to 48. In 2000, the production in the State of Amazon was of 323,400 m³ (Lima et al, 2005). Most of the timber that supplies the companies proceeds from third parties, which in 2000 corresponded to 70.60% of the declared total volume to IBAMA (Gonçalves, 2001). Middlemen negotiate the timber production with local extractors, most times through the aviação system (debt-bondage) system. Due to this system, the traditional lumber production did not contribute significantly to the improvement of the standards of living of the producing families, since the purchasing price of timber that does not originate from management areas is extremely low, while that the manufactured products bartered are priced much higher than the market. As a result, most of the illegal timber producers remain indebted to their patron, with the commitment of liquidating their debt in subsequent years, characterizing this patron-client relation as one of extreme dependence.
4. FAVORABLE ELEMENTS TO THE CFM IN MAMIRAUÁ SDR

Along Mamirauá’s recent history, some factors have converged in favor of the establishment of the community forest management project in the region.

The social movement in favor of the preservation of the natural resources in the Mamirauá region has been growing since the sixties, with the support of the Catholic Church. The Church has acted to build community leaderships in the Middle Solimões region, giving educational support to the population, structuring the administrative and political system and contributing to the sociopolitical organization of the communities around the lake preservation movement (Reis, 2003). This movement was more related to the defense of the lakes against external fishermen and their conservation through a lake categorization system – preservation, commercialization and maintenance (SCM, 1996). This system was strengthened and expanded with the creation of the Mamirauá Reserve, integrating a broader movement of natural resources conservation.

Since 1992, when activities for establishing the reserve began, communities have been encouraged to reflect upon the availability of the natural resources of the reserve and their use, and define some protective measures, like minimum diameter for extraction of trees and species to be preserved. This indicates the interest of the communities in the conservation and management of forest resources.

Thus, in the process of implementation of the Reserve, the governing structure and the protection of the natural resources were based on a model of strengthened co-management of the reserve, whereby the communities in partnership with the MISD developed an instrument defining the norms and regulations for natural resources use and determining the Reserve’s zoning system.

The community system of natural resources protection became a more organized structure of community oversight, employing Voluntary Environmental Agents, who were taught and given credentials by IBAMA, and received support from MISD to protect the area.

The political context was an important element that favored community forest management in Mamirauá, in a global context as well as at national and regional scales.

Globally, due to changes during the final two decades of the 20th century, awareness about global environmental issues grew considerably. In the Brazilian context, biodiversity issues became particularly important, resulting in a greater availability of financial resources from bilateral and multilateral cooperation agencies and international NGOs. Parallel to that, Mamirauá established itself institutionally as a Sustainable Development Reserve, that is, a new category of protected area that was incorporated into the Protected Area National System (SNUC). Moreover, Sociedade Civil Mamirauá – the NGO responsible for the co-management of the area, was qualified as an
In this institutional context, since 1993 the forest issue in Mamirauá was the responsibility of a timber sub-programme, which conducted the research that served as basis for the preparation of the Reserve’s management plan. In 1996, this sub-programme was converted into a Community Forest Management Program, and a structure for community forest management technical support was created, through the establishment and training of a team of forest engineers and technicians, and the definition of principles, methodologies and processes to be applied. The long-term support of agencies - ProManejo, MCT and DFID – was essential, not only in terms of funding for hiring a team of technicians and establishing the necessary infrastructure, but also because of the contribution of consultants and a monitoring system which contributed to the evolution of the project. With the institutional framework in place and the regulation of the community forest management in Brazil in 1998, through the elaboration of a simplified legal landmark, it was possible to implement the community forest management in Mamirauá.

5. COMMUNITY FOREST MANAGEMENT IMPLEMENTATION PHASES

The first research phase that was basis for the management plan’s forest component was carried out between 1993 and 1995. In this phase annual monitoring of all focal area’s traditional extraction was carried out, approaching mainly the biological characteristics (number of trees extracted, species, diameters, extraction sites) and socioeconomic characteristics (origin of producers and buyers, prices, payment systems); stocks surveys were carried out in order to investigate population structure and distribution of species. Moreover, there was a participatory mapping of the forest cover. Other relevant studies were: fenology, mammal, bird and fish interactions with plants and their role in the dispersion of seeds (Pires, 2004).

A second phase, which began in 1997, reorganised the Program, raised funds, increased and trained the team, discussed and defined methodology with communities. According to the Program’s plan, the community forest management was supposed to start in one sector of the Reserve, composed of five communities, in order to refine the methodology and only then expand the program to other areas. Thus, from 1998 onwards, efforts were concentrated in the Tijuaca sector, and the activities of forest extension were directed to stimulating the development of forest management, technical assistance and community training as part of the introduction of sustainable forest management. The forest management system was built from traditional knowledge about timber extraction in várzea, where new techniques were included to mitigate impacts to the forest and improve producers’ safety.

6. THE MODEL OF COMMUNITY FOREST MANAGEMENT
6.1. Basic principles:
The process of implementation of the community forest management in the Mamirauá SDR followed the same principles of community participation and scientific basis that characterize the management of the reserve, with a strong component of incentive and training.

An important aspect relates to the MISD role as an institution of support, training and participatory research, whereas decisions relating to the management of the area are under the responsibility of the communities, as long as norms of use, the zoning of the reserve and legislation are respected. This situation places producers as central role in the management of the area, as much in relation to the use as to the protection of the forest resources.

Due to the fact that Mamirauá is a protected area and due to its location in a fragile ecosystem like the várzea, the need for biodiversity conservation is a factor that contributes so that the management system has a more conservative character, the criteria for election of trees to be extracted are more selective and the measures of impact reduction are more demanding.

6.2. Phases:
The Community Forest Management implementation plan was to initiate the project in one sector, composed of five communities and then expand gradually to other sectors following the phases below.

6.2.1. Community Forest Management motivation

Throughout each of the forest management implementation phases, communities were stimulated and forest management aspects were elucidated (technical, legal, social, environmental and economic). The incentive takes place in a continuous process, focusing mainly on community forest management issues and on conflict resolution. The stimulation toward the participation of communities takes place during sector or community meetings, or in informal conversations carried through in monthly excursions. In the meetings, Participatory Rural Appraisal (PRA) techniques are used in order to extend the community participation.

6.2.2. Continuous training in sustainable forest management

A model of continuous training was defined, where learning is consolidated mainly during the stocks surveys themselves, so that villagers learn to carry out surveys independently. As the locals comprehend the methodology, the technical accompaniment level diminishes gradually. This strategy of training in communities where the illiteracy level is high demanded the adequacy of the educational material and the training of the technicians and community promoters of the program. Although a pre-defined model exists, the training has been modified along the years, incorporating evaluations and suggestions of the community, along with field experiences.

6.2.3. Creation and management of community associations
Forest management is being implemented at the community level, because of local people’s own choice. This variety of forest management at the community level is similar to the traditional utilization system, and therefore has better acceptance among the communities. Nevertheless, due to legislation requirements, the local traditional sociopolitical system of organization needs to be legally recognized. The MISD gives assistance to communities interested in creating and managing community associations.

6.2.4. Participatory mapping of forest resources

The use of areas for traditional timber extraction usually takes place at the community level, with an informal arrangement defining the limits of each community area. But since these areas have never been negotiated officially, there were still conflicts among communities for the use of the forest. During the definition of the management system to be adopted, the communities chose the traditional model, that is, each community using a specific area in the forest.

Participatory mapping, one of the Participatory Rural Appraisal (PRA) techniques, is used mainly as an instrument to define community forest management areas. This methodology is used in community meetings so that participants may express their knowledge and perspectives and may raise and resolve conflicts of land property and use of the forest resources. Each community’s proposals are negotiated in a sector meeting. The end product is the elaboration of the Sector’s Forest Resources Sustainable Use Official Map, where each community area of forest management is found.

6.2.5. Licensing of Forest Management Plans (Simple FMP)

MISD gives support to the associations elaborating the management plans for the licensing of the forest management.

6.2.6. Reduced impact extraction

The MISD has developed in partnership with the Forest Tropical Foundation - FFT, a model of extraction training for reduced impact in várzea areas, since training usually focuses only on extraction of timber in terra firme forest. In the management areas, techniques of directed felling are used in order to diminish waste, the risks of accident and the impact of the extraction.

6.2.7. Commercialization of managed timber

Before the implementation of the community forest management, the timber used to be commercialized through the *aviamento*\(^2\) system, direct family relations with purchasers, where the unequal commercial relations generated

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\( ^2 \) An economic system that consisted of a patron who bartered manufactured goods in exchange for natural products like timber and fish. The patron always bartered the goods before the harvest so that clients would be indebted to him. The *aviamento* system was one of dependency and debt bondage.
indebtedness for the subsequent years, and where timber was rarely paid for with currency, but rather with over-valued manufactured products.

Currently commercialization of managed timber is carried out through business rounds, when the best forms of commercialization are discussed and there are negotiations with interested buyers. The associations select the purchaser whose price and conditions of work - like materials with which to build rafts, transport, and financing and more advantageous modes of payment – become the best offer. The commercialization is made with written contracts, which confers security for the producer as well as for the purchaser. The business rounds are also an important space for the information exchange among community associations that manage forest resources in the Mamirauá Reserve.

The managed timber in Mamirauá has been commercialized almost exclusively in logs – both hardwood and softwood. However there is a potential for wooden commercialization in boards. This year (2005) a project of timber processing began, but consistent data will only be available from 2006.

The MISD’S role in relation to commercialization is to identify the best markets and to assist the associations in the negotiation with the interested purchasers. In 2001, the Institute carried out a survey of the regional timber market, identifying regional channels of commercialization for the managed timber, estimating the regional demand for legally-managed timber, and in order to establish partnerships with interested purchasers, to identify demand of potential lumber products and to promote community forest management in Mamirauá as a promising experience. The main barriers for direct commercialization to saw-mills in Manaus refer to availability, scale and species variety. An additional limitation is the unpredictability of volume to be extracted each year, which invariably depends on the magnitude of the flood. Albeit the limitations, eight between nine industries contacted in Manaus have revealed interest in negotiating with the associations of the Mamirauá Reserve.

6.2.8. Financing

Traditional timber extractors received credit from patrons through the aviamento system. Financing is essential for families during the extraction period, a time when there are no other productive activities that may generate income to guarantee the family’s maintenance survival.

With the implementation of the reserve and the intensification of the protection system, many loggers were fined and had their rafts apprehended, provoking considerable financial damages. These facts, added to the unreliability that the aviamento system imposed due to its informality, made purchasers end loan concessions to extractors.
Currently the purchaser credit continues to be essential to timber extraction in the MSDR. The associations, which still do not have available capital, need external resources, mainly for acquisition of equipment, consumption, fuel, food and partial payment of services.

In order to create another alternative for producers and to diminish the dependence on the buyers, the Mamirauá Institute created a pilot experience of credit in the Tijuaca sector in 2001. The experience was successful and was extended to the other sectors of the reserve. This system of small loans allows associations to carry out forest management activities, but it weakens the relation of bilateral commitment between the producers and the buyers. When purchasers finance the extraction, they tend to charge more interest because they share the risks; this is why currently the financing of production is divided between purchasers' loans and the Institute’s small loans system.

7. THE MANAGEMENT SYSTEM ADOPTED IN MAMIRAUÁ

The model for use of areas under the community forest management was defined by the producers. Local people have chosen the traditionally used model, in which each community uses an area of forest and the management areas are of common use (Figure 2).

The management system adopted is polycyclic, with a 25 year felling cycle. Felling and dragging the trees inflict the heaviest impact, and in order to minimize them, techniques of reduced impact extraction are used. The planning and control of selection of trees to be removed are crucial for forest management, and are based on the data registered during the stocks surveys during dry season of the previous year and the during the year of felling.
The stocks survey accounts for trees that are larger than 25cm, in 100% of the area to be managed. A base line is cut at a reference point at the beginning of the plot, the spot is registered, and a stick with a colorful strip is placed at every 25 meters, and the distance from the beginning of the base line is registered. Every 50 meters a lateral transect is drawn in a straight angle to the base line. These transects, and the distances from the base line, are identified with props at every 25 meters using colorful strips.

The trees of economic interest are identified in 50 m bands (25m in each side of the transects) and some measurements and classifications are made: sequential number of the tree (branded with an aluminum plate); common name; diameter; commercial height; last flood level; localization of the tree; evaluations of the form of the shaft, form and light of the canopy, and also falling inclination. The lianas are cut while the trees are measured, so that they die and they rot before the trees are knocked down.

The following criteria are used in the selection of the trees to be felled: in demarcated annual plots, in a 25 years cycle. With the adoption of these criteria, ecological and production sustainability is aimed at, through the control of the distribution of the future and seeds holder trees and the reduction of the impacts in the forest.

Criteria for the election of trees:

A) Commercial trees:

Criteria for commercial trees are based on the community interest in extracting them. During the stocks surveys, the following data are collected: species, volume, shape of the trunk, production, diameter class, etc.

B) Limit of individual trees to be felled in one hectare:

Maximum of 5 trees per hectare may be felled, including the float trees, used as rafts.

C) Criteria for election of the 5 trees to be felled per hectare:

- Selected trees should not be trees that are used as animals shelters or important sources of food;
- Volume and shape of trunk;
- Ample distribution of remaining trees of each species to be extracted;
- Not more than 2 trees selected with a 10m space from one another;
- Tree felling direction;
- Water level;
- Accessibility.

D) Criteria for election of the species to be preserved:

- Species that are protected by Brazilian legislation;
- Species to be preserved in accordance to the norms approved in Mamirauá residents Annual General Assemblies; lesser
- Diameter lower than 45 cm;
- Well-known seed carrier species;
- 10% of the trees that have a diameter higher than 45cm for each species must be preserved as seeds carrier.

All the trees to be felled are selected in accordance to the criteria described above. The trees are numbered with identification plates placed above flood level. The timber extraction uses traditional methods, without heavy machinery. Axes are used to fell the trees and logs are carried through the water during the flood, with the use of canoes.

The community carries through directional cut. Felling takes place a little before the floods of high levees. Logs are dragged by the tracks of orientation made during stocks survey until dragging trails. They are then towed through the trails until the river channel is reached. At the margins, rafts are built using lianas, ropes or chains. The heavier logs float with the help of timber that are used as floats, selected with the commercial trees.

8. THE ENTERPRISE MANAGEMENT

The management of the forest enterprise is carried out by community associations, civil society organizations conducted by an internal statute and regulation and composed of a board of directors and a group of associates, members of the communities. The association’s board of directors is not remunerated for this function, and is composed by eight people in average, elected by the associates, with a mandate that varies from one to two years. The Mamirauá associations have an ample character, not restricted to forest producers, and all members of the community older than 16 years are able to become associates. The objectives of the associations are varied, but the natural resource management interests predominate, its commercialization, and the rendering of services to the associates.

The community associations are not the traditional form of political association for these communities, but rather a requirement of the forest legislation for the licensing of community management plans. The communities had an informal political organization system, generally coordinated only by a president and a vice-president, but that withheld a number of rules and penalties. This set of rules, in its most part, composed the associations’ statute and internal regulation.

In the rules regarding rights of access to natural resources of the reserve, restrictions for the external population predominate, especially for those residents of neighboring cities, even if they are relatives of the associates. Norms for the entrance of new associates exist, in the associations and in local communities. The set of penalties for non-compliance to the rules of the association has a gradient that varies from a warning to the exclusion of the associate from the community.
The formalization through creation of associations has imposed a disadvantage for the communities, since these organizations need to pay tax and other duties. Moreover, there is an administrative routine that needs to be fulfilled, so that association’s records are maintained up to date. In this aspect, the women have a crucial role in the activities where writing skills are needed, as the registering of the surveys and books of the association. Although the activities of extraction are almost exclusively executed by men, women participate in some management activities.

The financial results of legally managed timber commercialization are divided among the producers, individually. Each association has its own rules for the allotment of the resources, generally based on the work undertaken by each participant in each activity. There has not been an instituted benefit to be shared at community level, although some associations plan to invest in community funds.

There still are a lot of difficulties in associative management, due to its high degree of formality. The associations still demand Institute accompaniment, especially in accountancy.

The Mamirauá community associations were created in 1999. Currently, there are 24 community associations managing forest resources in Mamirauá, totaling around 500 associates, who include men, women and young people, with about 70% men and 30% women. Each year, only some of the associates dedicate themselves effectively to the community forest management, participating in timber extraction.

Forest management decision-making takes place especially at the community associations level, during meetings in the communities. Another forum for discussions is the Business Round, which occurs annually in order to negotiate managed timber with interested purchasers. The Business Round congregates all the involved forest management associations in the reserve. Besides these forums aimed at forest management discussions, there are bimonthly sector meetings and the annual general assemblies that are part of the spheres of decision-making about the reserve in general terms, but that are also occasionally used to discuss forest management.

9. THE ENTERPRISE ECONOMY

The Mamirauá zoning system defined permanent preservation areas (26%) and sustainable use areas (74%), in which resources may be used in accordance with norms defined in the integrated management plan. About 45% of the sustainable use area has timber potential, in várzea forests inside high levee areas. Restingas (high levees) have been described by Marcio Ayres (1993) as forest formations whose average time of annual flooding is from 3 to 5 months, where the largest diversity of arboreal plants is found in Mamirauá.

In 2005, 24 associations were involved in community forest management. The average total area of these management plans is of 4291 ha, with 1780 ha
corresponding to the average area of actual management, where the average size of the plots is of 17 ha. Thus, these are small areas that, along with the kind of employed technology make forest management in Mamirauá a low impact activity initially. Forest extraction does not use heavy machinery to drag logs, but uses the flooding of the forest to pull logs using trunks of other species as floats when necessary, with no need to open roads or patios like in terra firme extraction.

Since the transport of timber in Mamirauá is made by water, the cycle of floods has a strong influence on the timber final production. Due to unpredictability of the magnitude of annual floods, much planning is necessary so that production is not wasteful. According to Albernaz (1996), the waste produced due to the variations of water level has three direct causes: (1) trees felled in areas that are not reached by the rising water; (2) delay in the removal of the timber; and (3) chopping of trees above water level. The timber must be removed from the forest in the beginning of the lowering of waters period, but the unpredictability of the cycle makes it difficult to estimate the time that producers have until this period.

This system of lumber extraction with a lesser degree of technology also characterizes the producers of Mamirauá, predominantly primary producers, producers of timber in logs, with little experience with processed timber. The processing of timber, when it occurs, is made with chainsaws, for the production of timber in planks.

The timber extracted Mamirauá is destined to two types of uses: hardwood, used in saw-mills and softwood, used as construction parts and in the plywood industry (Albernaz, 1996). There are 27 species extracted (table 2).

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abiorana</td>
<td>Franchatella sp. (anibifolia)</td>
<td>Sapotaceae</td>
</tr>
<tr>
<td></td>
<td>Pouteria sp. (glomerata / caimito)</td>
<td></td>
</tr>
<tr>
<td>Acapu</td>
<td>Minquaria guianensis</td>
<td>Euphorbiaceae</td>
</tr>
<tr>
<td>Arapari</td>
<td>Macrolobium sp.</td>
<td>Caesalpinaceae</td>
</tr>
<tr>
<td>Assacu</td>
<td>Hura crepitans</td>
<td>Euphorbiaceae</td>
</tr>
<tr>
<td>Biribarana</td>
<td>Annona ambotaya?</td>
<td>Annonaceae</td>
</tr>
<tr>
<td>Boieira</td>
<td>Apeiba sp.</td>
<td>Annonaceae</td>
</tr>
<tr>
<td>Bolacheira</td>
<td>Apeiba sp.</td>
<td>Tiliaceae</td>
</tr>
<tr>
<td>Capitari</td>
<td>Tabebuia barbara</td>
<td>Tiliaceae</td>
</tr>
<tr>
<td>Caxinguba</td>
<td>Helicostyles scabra</td>
<td>Moraceae</td>
</tr>
<tr>
<td>Cedrinho / Arararirana</td>
<td>Macrolubium bifolium</td>
<td>Caesalpinaceae</td>
</tr>
<tr>
<td>Copaiba</td>
<td>Copaifera sp.</td>
<td>Caesalpinaceae</td>
</tr>
<tr>
<td>Jitó</td>
<td>Guarea sp. (cf. subsessimiflora)</td>
<td>Meliaceae</td>
</tr>
<tr>
<td>Louro- abacate</td>
<td>Aniba sp. (guianensis)</td>
<td>Lauraceae</td>
</tr>
<tr>
<td>Louro- amarelo</td>
<td>Nectandra cf. marmellensis</td>
<td>Lauraceae</td>
</tr>
<tr>
<td>Louro- Inamuí</td>
<td>Ocotea cymbarum</td>
<td>Lauraceae</td>
</tr>
<tr>
<td>Louro- preto</td>
<td>Nectandra sp.</td>
<td>Lauraceae</td>
</tr>
<tr>
<td>Macacaricua</td>
<td>Couroupita guianensis</td>
<td>Lecythidaceae</td>
</tr>
<tr>
<td>Muiratinga</td>
<td>Maquira coriacea</td>
<td>Moraceae</td>
</tr>
<tr>
<td>Mulateiro</td>
<td>Calycophyllum spruceaum</td>
<td>Rubiaceae</td>
</tr>
<tr>
<td>Mungubarana</td>
<td>Pachira sp.</td>
<td>Bombacaceae</td>
</tr>
<tr>
<td>Murupita</td>
<td>Sapium hippomane</td>
<td>Euphorbiaceae</td>
</tr>
<tr>
<td>Mututi</td>
<td>Paramachaerium ormosiodes</td>
<td>Papilionaceae</td>
</tr>
</tbody>
</table>
The price of managed timber in Mamirauá is influenced particularly by price paid by timber industries in Manaus, the Amazonas State Capital, which is the final destination of most part of this timber. This is why producers have used a survey of prices in Manaus as argument during negotiations at the business rounds. With the rise of surveillance and protection over the illegal extraction of timber, carried out by communities, MISD and IBAMA, the search for legally managed timber has increased. Due to these factors, prices of softwood and hardwood have increased since the year 2000 (Table 3). Prices of light and hard wood are different; the former has a lower market price. Between these two types of timber, prices vary according to groups of species.

<table>
<thead>
<tr>
<th>Species</th>
<th>Price (US$/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>Assacu (Hura crepitans)</td>
<td>5.40</td>
</tr>
<tr>
<td>Macacaricuia (Couroupita guianensis)</td>
<td></td>
</tr>
<tr>
<td>Mututi (Paramachaerium ornosiodes)</td>
<td></td>
</tr>
<tr>
<td>Mungubaranana (Pachira sp.)</td>
<td>-</td>
</tr>
<tr>
<td>Caxinguba (Helicostylis scabra)</td>
<td>-</td>
</tr>
<tr>
<td>Abiorana (Poteria sp.)</td>
<td></td>
</tr>
<tr>
<td>Arapari (Macrolobium sp.)</td>
<td></td>
</tr>
<tr>
<td>Araparirana/Cedrinho</td>
<td></td>
</tr>
<tr>
<td>Castanharana (Eschweilera sp.)</td>
<td></td>
</tr>
<tr>
<td>Copaiba (Copaifera sp.)</td>
<td></td>
</tr>
<tr>
<td>Faveira (Albizia sp.)</td>
<td></td>
</tr>
<tr>
<td>Muiratinga (Maquira coriacea)</td>
<td></td>
</tr>
<tr>
<td>Paricarana (Albizia corimbosum)</td>
<td></td>
</tr>
<tr>
<td>Tacacaizeiro (Sterculia elata)</td>
<td></td>
</tr>
<tr>
<td>Ucuúa (Iryanthera olacoides)</td>
<td></td>
</tr>
<tr>
<td>Acapu (Minquartia guianensis)</td>
<td></td>
</tr>
<tr>
<td>Coraçao de negro (Swartzia sp.)</td>
<td></td>
</tr>
<tr>
<td>Gító (Guarea sp.)</td>
<td></td>
</tr>
<tr>
<td>Louro abacate (Aniba sp.)</td>
<td></td>
</tr>
<tr>
<td>Louro amarelo (Nectandra marcellensis)</td>
<td></td>
</tr>
<tr>
<td>Louro caroba (Ocotea sp.)</td>
<td></td>
</tr>
<tr>
<td>Louro chumbo (Licaria sp.)</td>
<td></td>
</tr>
<tr>
<td>Louro inamui (Ocotea cymbarum)</td>
<td></td>
</tr>
<tr>
<td>Louro preto (Ocotea sp.)</td>
<td></td>
</tr>
<tr>
<td>Maparajuba (Neoxytche sp.)</td>
<td></td>
</tr>
<tr>
<td>Mulateiro (Calycophyllum spruceum)</td>
<td></td>
</tr>
<tr>
<td>Pipinho (Albizia sp.)</td>
<td></td>
</tr>
<tr>
<td>Piranheira (Piranhea trifoliata)</td>
<td></td>
</tr>
<tr>
<td>Sucupira (Andira sp.)</td>
<td></td>
</tr>
<tr>
<td>Tanimbuca (Terminalia sp.)</td>
<td></td>
</tr>
</tbody>
</table>

Fonte: IDSM
Table 3: Evolution of legally-managed timber prices in Mamirauá from 2000 to 2005.

The main markets for Mamirauá’s managed timber are regional - especially Manaus, Manacapuru and Beruri; and local - Tefé, Uarini and Alvarães, which are the Reserve’s neighboring towns. The main purchasers are small and medium sized sawmills, and also middlemen that have worked for many years in the regional and local markets.

The market also has influence on which species are extracted. Extraction has been concentrated in a small percentage of species. An analysis carried out in 2003 identified the four most exploited species - assacu (Hura crepitans), mulateiro (Calycophyllum spruceamum), macacaricuia (Couroupita guianensis) and parrot inamui (Ocotea cymbarum), represent 84.9% of the total extracted volume, and assacu (Hura crepitans), that it is the most extracted species, represents 70% of the total volume.

In Table 5 the evolution of the extracted timber volume Mamirauá since its implementation in 2000, until 2004 is observed. In 2000, due to the delay in licensing, only 8 families of one community were able to extract timber, producing a total volume of 445.58 m$^3$. That year's production was commercialized through an experimental action carried out by MISD, which used the timber in building research infrastructure and an ecotourism lodge.

In 2001, the number of families who managed timber grew to 58 in eight communities. That year the extracted volume grew to 2,087.88m$^3$. In 2002 forest management continued to be expanded, reaching a total of 11 communities, with 90 families directly involved in the activity, producing 5,946.56m$^3$ of timber. The growth of the managed timber production in the reserve continued in 2003, when the largest number of participant communities was reached – a total of 13 villages and 98 families of producers that extracted 8,508.44m$^3$ of timber. A decrease in the production of managed timber is visible in the year 2004, due to a small rise in water level, which meant that the waters did not rise enough in order to enable producers to remove the logs out of the forest management areas. As a result, only six associations extracted timber that year, those whose forest management areas where low enough to be reached by the flood. This caused both a reduction in the number of producing families, down to 38, and also in the total volume of extracted timber - 904.72m$^3$.

It is difficult to estimate the importance of Mamirauá’s managed timber production for the lumber market of the Amazonas State. Available data on timber consumption in the state for the year 2000 allow some estimations. In 2000, the estimated timber consumption in logs in saw-mills of the State was of 162.822,17m$^3$, while plywood and laminated timber industries consumed 160.555m$^3$ (Lima et al., 2005). Total timber production in the state in the year 2000 was of 323.377,17m$^3$, adding saw-mills and plywood and laminated timber industries consumption. This consumption is equivalent to 2.63% of...
managed timber production in logs in Mamirauá in 2003, when the production reached its maximum.

There are still no consistent data on the costs of timber production in Mamirauá. Since forest management activities are carried out throughout a long period of time during the year, registering the costs of all activities has not been an easy task. The main costs are spent on food; a basic equipment kit that includes safety equipment and some low cost materials for surveys and timber extraction; and fuel for the transport of the producers to forest management areas and fuel for the chainsaw. A non-published GT-MFC study carried out by Marcos Vinicius Neves de Oliveira shows that among the main community forest management initiatives in the Brazilian Amazon, Mamirauá presents the lowest costs. This is due to both the low levels of technology employed in forest management in várzea areas, and to the use of alternative materials adopted by the producers, especially in the stocks surveys.

Despite the lack of direct data on the costs, it is possible to estimate most of these costs through an analysis of the financing data (table 4), since the loans are used to make the production viable. Loans are accessed through two sources: a small-loan system implemented by MISD and through credits granted by the purchasers, which is in fact an advance payment deducted from the final production payment.

<table>
<thead>
<tr>
<th>Finance Source</th>
<th>Loans amount (R$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>Small-loan scheme</td>
<td>-</td>
</tr>
<tr>
<td>Buyers</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>10598.70</td>
</tr>
</tbody>
</table>

Source: MISD

Table 4: Loans obtained by forest managers in Mamirauá between 2000 and 2004.

The income obtained with managed timber has grown from 2001 to 2003, in terms of total income as well as average income (Table 5). In 2004, due to the small levels of flooding, there was a fall in income.

<table>
<thead>
<tr>
<th>Ano</th>
<th>Número de Associações comunitárias</th>
<th>Nº de Famílias</th>
<th>Volume explorado (m³)</th>
<th>Renda Total (US$)</th>
<th>Renda Média por Família (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1</td>
<td>8</td>
<td>445.58</td>
<td>3918.91</td>
<td>489.86</td>
</tr>
<tr>
<td>2001</td>
<td>8</td>
<td>58</td>
<td>2087.88</td>
<td>6420.86</td>
<td>110.70</td>
</tr>
<tr>
<td>2002</td>
<td>11</td>
<td>90</td>
<td>5946.56</td>
<td>16858.20</td>
<td>187.31</td>
</tr>
<tr>
<td>2003</td>
<td>13</td>
<td>98</td>
<td>8508.44</td>
<td>35851.64</td>
<td>365.83</td>
</tr>
<tr>
<td>2004</td>
<td>6</td>
<td>38</td>
<td>904.72</td>
<td>5717.63</td>
<td>150.46</td>
</tr>
</tbody>
</table>

Source: MISD

Table 5: Evolution of participation, production and income from managed timber in Mamirauá, from 2000 to 2004.

10. MAIN BENEFITS
10.1. Social:

**Land tenure rights guaranteed**
The decree that created the Mamirauá Reserve ensures land use rights to local population, guaranteeing the long-term permanence of producers in the area, fortifying the concept of the forest as these families’ endowment. The decree was legal assurance that the reserve’s population would be legitimate beneficiaries, and restricted the use of the forest resources to the inhabitants and traditional users of the area. The Plan of Management banned the use of forest resources by non-residents, a long-desired wish of the communities.

**Reduction of the conflicts for the use of the land**
Participatory mapping, based on the knowledge that the communities have about the forests, allowed the communities to delimit their areas, negotiating their limits with neighboring communities, and reducing land conflicts. The delimitation of each community’s forest area makes producers understand this dimension of the forest as a natural resource that may be depleted, what increases the communities’ effort to improve management of their areas. Through stocks surveys, each community starts to have enough information on the supply of timber in their own area.

**Getting out of illegality**
Through forest management, communities have been able to finally legalize extraction activity, after decades of illegal timber extraction. With the legalization, timber extraction started to be carried out without fear of surveillance, and with the valorization of the producers and the activity itself. Moreover, the licenses granted to forest management associations are used as land documents to prevent invasions.

**Improvement of family income**
With the commercialization of managed timber, there was an increase in family income, since timber is sold at a higher price and the transaction is made with money, and no longer with the exchange of goods, like before. This enabled the families to acquire equipment and consumption goods in town markets, under prices lower than those practiced by the *aviamento* system.

**Political capital strengthened**
With the creation of the community associations, communities’ rules were legalized, and the roles of community members were better defined, which strengthened community organization. The diversity of management activities, from mapping to commercialization, enabled ample participation of the community. The institutionalization of the community political organization system through civil associations facilitated their access in public agencies to demand rights.

**More security in the workplace**
Timber extraction in the várzea has always been a risky activity, especially when the felling of trees is carried out during the flood. During this time of year producers have to balance themselves in small canoes to chop down the trees, a true juggle that requires much experience and attention of the
producer. Cases of fatal accidents were common; this situation changed with the adoption of safety equipment and management techniques.

10.2. Environmental:

Conservation of the forest

The conservation of the forests in Mamirauá has been assured with the reduction of non-managed extraction and with the adoption of community forest management in the areas of sustainable use in the reserve. Since 2002 the trend of decline of illegal timber extraction has been maintained, as the number of communities involved in forest management increases (figure 4). The adoption of ecological criteria in the selection of trees to be extracted is also an essential part of the management system adopted in Mamirauá, what probably will contribute to the conservation of the fauna and the maintenance of forest functions.

The forest conservation of Mamirauá is also due to the reduction of the conversion of forests by human pressure. The opening rate of new areas for family agriculture has been stationary for some years due to adoption of new agricultural practices introduced by MISD along the last decade, this has reduced the ratio of primary forest deforestation for agricultural use since families are planting more in previously used areas, with consecutive use or planting in brushwood (capoeira) areas.

![Figure 4. Evolution of illegal timber extraction in the focal area of Mamirauá from 1993 to 2003.](image)

Source: MISD

More production and less waste

The monitoring of the impacts of managed timber extraction indicates that the adoption of reduced impact management techniques have improved production. An important indicator is the slash level, that was in 2003 1.41m in average, but has been 0.25m in some cases. In addition to that, waste in the
level of slashing (that was in average 3.37m), decreased by 1m in some measured trees.

10.3. Political Benefits:

**Contribution to public policy**

The community forest management experience in Mamirauá has contributed to the national discussions on forest public policies, because it is one of the pioneering initiatives in forest management in the Amazon, and for representing the conditions for management in protected areas that are composed of *várzea* forests.

The contributions of the Mamirauá forest management experience for the elaboration of public policies are taken by the Community Forest Management Program in MISD to the Community Forest Management workgroup-GT/MFC, a group that leads the discussions on the community forest management in the Amazon, especially about the forest management legal framework, one of the main obstacles to forest management in the Amazon.

The main obstacles to licensing originate from the legal framework problems with community forest management, which limits the total management plan area to 500 hectares. Since the average size of the associations’ areas in Mamirauá is of 2000 hectares, they exceed the limits stated in legislation. This is a problem faced mainly by communities in Sustainable Development Reserves and Extractive Reserves, which use large common areas, but whose annual extraction plots are small. These difficulties made the GT-MFC to formulate a proposal to re-elaborate the legislation that regulates small-scale community forest management.

**Replication**

The community forest management plans in Mamirauá Reserve have been the first ones to be allowed in the Amazon State, opening the path for other communities. The success of the management system implemented created an increasing demand for replication of the model in other areas, especially for other protected areas in Amazon State.

11. MAIN RISKS AND DIFFICULTIES

Currently, the main risk of forest management in Mamirauá is the pressure on a small group of species, due to the type selection in extraction. Although this risk is attenuated by the fact that the most extracted species - the *assacu* (*Hura crepitans*) – is a fast growing species, this issue must be considered so that the adopted system of management is perfected.

When Albernaz (1996) monitored the illegal extraction in Mamirauá between 1993 and 1995, she pointed out possible effects of high selectivity, which is a characteristic of extraction in *várzea* forests. According to Albernaz, the selectivity of the extraction occurs on species and individuals, which in the long run inflict a risk of a negative selection of economically important species.
The difficulties faced along the adoption of community forest management in Mamirauá are both internal and external.

Among internal difficulties are those related to the absence of the state in the region, especially in relation to education and strengthening of populations’ political organization. The high indices of illiteracy and the lack of personal documentation in these communities are a consequence of the absence of the state’s basic actions and the isolation of these families. According to the last demographic census carried out in Mamirauá, 55% of the total of the population older than 10 reads with difficulty, and 31% of adult men and women are illiterate (MISD, 2002). The consequences are evident in the administrative difficulties of the community associations, in the records of the stock surveys, in training events and the discussions about the management plans. The absence of the state and the discontinuity of its action have created an environment of hesitancy and incredulity that have complicated the beginning of the implementation of the reserve and the activities of management of the natural resources.

The traditional use of forest resources, which became illegal after the recent forest legislation, was always permeated by informality, which is still very intrinsic to these populations way of life. The innovations represented by the formalization of community associations and licensed management activities require a capacity for community management that has been acquired gradually. These difficulties are still more challenging in relation to the restriction of use of natural resources and imposition of penalties for infringement of community norms, since inhabitants are allied by relations of kinship.

Forest management also requires the compatibility of the many economic activities executed along the year, like fishing and agriculture that are determined by the cycle of waters. The difficulty lays in dividing the time between the various activities required by forest management, and an extensive calendar of subsistence activities that are indispensable to the families. The survival of the várzea population in this environment requires dominance over nature and knowledge of flood cycles to evaluate the right moment of dedication to each activity. But many times nature surprises with sharp droughts, like last year, or high floods that make forest extraction practically impracticable, as it occurred in 2004.

Due to these unpredictable characteristics of várzea, producers face many difficulties in licensing forest management, since legislation and normalization follows the standards of terra firme forests. Apart from these problems, there are also problems relating to licensing - excessive requirements of documentation and the long and unpredictable processes of analysis.

12. STRATEGIES AND TRENDS

The strategies adopted in the implementation of community forest management in Mamirauá were guided by cautiousness. The adopted
management system is very similar to the traditional one, trying to implement forest management according to the communities’ perspectives, without venturing in operations that demand great investments or long periods of dedication, considering that the forest activity is only one among various economic activities in a family-based economy. One seeks to consolidate each stage before moving to a next more enterprising one.

Community forest management is approached as a social process, through which local participation and the institutional strengthening are built gradually along a period of time. One of the observed characteristics is flexibility, which enabled adaptation and adjustment to the reality of the communities, without removing crucial forest conservation objectives and promotion of the improvement of the standards of living in the communities. This adaptation capacity of the adopted management was fundamental since neither the communities nor the areas of forest use in each community are homogeneous.

This understanding of community management as a social process led to a more global approach in its implementation, considering environmental, social and economic aspects as interrelated factors. All these aspects have been strengthened in management training, but the greater facility to apprehend technical aspects than community management aspects were evident.

Due to the limitation in management capacity and cautious attitudes of associations seeking to reduce risks, the local and regional markets have been prioritized during commercialization of timber. Therefore, there is no plan for forest certification in the short-term. According to Ferreira Neto (2003), prioritizing local markets was a correct approach, since the success of the commercialization depends on the control that the people involved have in relation to markets, and since this is a development process, it is better that it occurs gradually, built on less complex structures that allow better control, and later extending toward more distant markets.

According to Vermeulen (2001), the participants need to get enough benefits from the management system in order to justify the costs. The continuity of the interest of forest managers and the demand for the implementation of forest management in other communities of Mamirauá are evidence that the benefits are attractive, and certainly extend beyond merely economic benefit.

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3 Community forest management as a social process was a consensus among the participants of the “Community Management and Forest Certification Latin American Meeting”, carried out in Para in 2003.
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DECRETO Nº 2.788. DE 28 DE SETEMBRO DE 1998

Altera dispositivos do Decreto nº 1.282, de 19 de outubro de 1994, e dá outras providências.

O PRESIDENTE DA REPÚBLICA, no uso da atribuição que lhe confere o art. 84, inciso IV, da Constituição, o tendo em vista o disposto na Lei nº 4.771, de 15 de setembro de 1965,

DECRETA:

Art. 1º Os arts. 1º, 2º, 3º 5º e 6º do Decreto 1.282 de 19 de outubro de 1994, passam a vigorar com a seguinte redação:

"Art. 1º A exploração das florestas primárias da bacia amazônica de que trata o art. 15 da Lei nº 4.771, de 15 de setembro de 1965 (Código Florestal), e das demais formas de vegetação arbórea natural somente será permitida sob a forma de manejo florestal sustentável de uso múltiplo, que deverá obedecer aos princípios de conservação dos recursos naturais, de preservação da estrutura da floresta e de suas funções, de manutenção da diversidade biológica, de desenvolvimento sócio-econômico da região e aos demais fundamentos técnicos estabelecidos neste Decreto.

§ 1º Para efeito deste Decreto, considera-se bacia amazônica a área abrangida pelos Estados do Acre, Pará, Roraima, Rondônia, Amazonas, Amapá e Mato Grosso, além das regiões situadas ao norte do paralelo de 13º S, nos Estados de Tocantins e Goiás, e a oeste do meridiano de 44º W, no Estado do Maranhão.

§ 2º Entende-se por manejo florestal sustentável de uso múltiplo a administração da floresta para a obtenção de benefícios econômicos, sociais e ambientais, respeitando-se os mecanismos de sustentação do ecossistema objeto do manejo, e considerando-se, cumulativa ou alternativamente, a utilização de múltiplas espécies madeireiras, de múltiplos produtos e subprodutos não madeireiros bem como a utilização de outros bens e serviços de natureza florestal." (NR)

"Art. 2º O manejo florestal de uso múltiplo a que se refere o artigo anterior atenderá aos seguintes princípios gerais e fundamentos técnicos:

I - princípios gerais:

a) conservação dos recursos naturais;

b) preservação da estrutura da floresta e de suas funções;

c) manutenção da diversidade biológica;

d) desenvolvimento sócio-econômico da região;

II - fundamentos técnicos:

a) caracterização do meio físico e biológico;

b) determinação do estoque existente;

c) intensidade de exploração compatível com a capacidade do sítio;

d) promoção da regeneração natural da floresta;

e) adoção de sistema silvicultural adequado;

f) adoção de sistema de exploração adequado;

g) monitoramento do desenvolvimento da floresta remanescente;

h) garantia da viabilidade técnico-econômica e dos benefícios sociais;

i) garantia de medidas mitigadoras dos impactos ambientais.


"Art. 3º A exploração de recursos florestais na bacia amazônica por proprietários ou legitimados possuidores de glebas rurais com área acima de quinhentos hectares somente será admitida mediante a apresentação de plano de manejo florestal sustentável, observadas as exigências, as condições e os prazos estabelecidos pelo IBAMA.

§ 1º A exploração dos recursos florestais na bacia amazônica, por proprietários ou legitimados possuidores de glebas rurais com área de até quinhentos hectares será admitida mediante a apresentação de plano de manejo florestal sustentável simplificado, observadas as exigências, as condições e os prazos estabelecidos pelo IBAMA.
§ 2º A exploração de que trata o Parágrafo anterior, quando efetuada de forma comunitária, por intermédio de associações ou cooperativas, poderá ser realizada mediante um único plano de manejo florestal sustentável simplificado, que aglutine glebas individuais, respeitado o limite máximo de quinhentos hectares, segundo critérios e parâmetros a serem fixados pelo IBAMA." (NR)

"Art. 5º O IBAMA, em articulação com os órgãos estaduais competentes, definirá áreas destinadas à produção econômica sustentável de madeira e de outros produtos vegetais." (NR)

"Art. 6º O legítimo possuidor de terras Públicas que explore recursos florestais está sujeito ao disciplinamento previsto neste Decreto e às condições estabelecidas pelo IBAMA, com vistas à emissão do respectivo documento de exploração." (NR)

Art. 2º Este Decreto entra em vigor na data de sua publicação.

Brasília, 28 de setembro de 1998; 177ª da Independência e 100 da República

FERNANDO HENRIQUE CARDOSO