

CO-MANAGEMENT OF FISHERY RESOURCES IN THE FLOODPLAIN COMMUNITIES OF THE MIDDLE AND LOWER AMAZON RIVER, BRAZIL

CO-MANEJO DOS RECURSOS PESQUEIROS EM COMUNIDADES DE VÁRZEA DO MÉDIO E BAIXO AMAZONAS, BRASIL

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KEYWORDS:

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ABSTRACT

This study analyzes the results, impacts and lessons learned from the support provided by ProVárzea to two fishery management projects developed in Manacapuru, Amazonas State, and Gurupá, Pará State, between 2004 and 2006. During that period, said projects promoted institutional strengthening, emergence of leadership and improvements to the fishing management system, which was oriented to four species of characiformes and two species of siluriformes, with biomass values and gross revenues that have shown a tendency to increase, but with oscillation of the price per kilogram between the years evaluated only for the region of Gurupá. The fishery resources management model adopted by the institutions and communities supported by ProVárzea represents a new way to integrate the actions of the State with the organized civil society, thus contributing to the social, economic and environmental sustainability of fishing practices in the Amazon.

PALAVRAS-CHAVES:

Produção pesqueira;
Economia familiar;
Manacapuru, Tefé (AM);
Gurupá, Tefé (AM).

RESUMO

O presente estudo analisa os resultados, impactos e lições do apoio do ProVárzea a dois projetos de manejo dos recursos pesqueiros desenvolvidos em Manacapuru (AM) e Gurupá (PA), entre os anos 2004 e 2006. Nesse período, os projetos promoveram o fortalecimento institucional, o surgimento de lideranças e melhorias no sistema de manejo de pesca, direcionada a quatro espécies de caracíformes e duas de siluriformes, cujos valores de biomassa e receita bruta mostram tendência a aumentar, porém com oscilação de preço por quilograma entre os anos avaliados unicamente para a região de Gurupá. O modelo de gestão dos recursos pesqueiros praticado pelas instituições e comunidades apoiadas pelo ProVárzea representa uma nova forma de integrar as ações do Estado com a sociedade civil organizada, contribuindo com a sustentabilidade social, econômica e ambiental da pesca na Amazônia.

INTRODUCTION

Records of fishing activity in the lowlands of the Amazon and Solimões rivers date back to the pre-Columbian period (SMITH, 1979; FURTADO, 1993; RUFFINO, 1996). As of the European colonization of that region, the locals, called “caboclos”, did fishing as a complementary activity to their family income, along with planting, hunting and animal husbandry. Several methods of harvesting and marketing of fish are observed in the 19th century (VERISSIMO, 1985), and in the 20th century, fishing became a permanent professional activity for many riverside dwellers, who had their own methods to control the exploitation of fishery resources (FURTADO, 1988).

Late in the twentieth century, the fishing industry and its production grew dramatically in the Amazon region with the introduction of diesel engines, nylon fibers for nets, coolers and refrigerators (BATISTA; FABRE; RUFFINO, 2005; PETRERE JR.; M., BATISTA, V. S.; FREITAS, C. E. C.; ALMEIDA, O. T.; SURGIK, A. C. S., 2007). At the same time, the increase of riverside dwelling populations, deforestation and ecosystem degradation have demanded public policies aimed at the sustainable management of fishery resources. As far back as the 1980s, there was no integrated planning model focused on inland fishing. Instead, what existed was isolated actions aimed only at the solution of specific problems resulting thereof.

The most significant experiences on community management of fisheries in the Amazon, acknowledged by the public authority, emerged

in the past decade through the actions prompted by the Várzea and Iara projects developed in the region of Santarém, Pará State, and Mamirauá, in Tefé, Amazonas State. These projects introduced new intervention strategies based on participatory work involving civil society organizations and public and private institutions (IBAMA, 2002; SANTOS, 2005).

In 2000, the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) began implementing the Lowland Natural Resources Management Project (ProVárzea) to promote the conservation and sustainable development of lowlands, considered one of the most vulnerable regions in the Amazon, and to encourage the participation of local traditional communities (IBAMA, 2002; VIDAL, 2008).

The ProVárzea was linked to the Pilot Program for the Protection of Brazilian Tropical Forests - PPG7 - and aimed to establish the technical, scientific and political basis for the conservation and sustainable management of the natural resources of the floodplains in the central Amazon basin, with an emphasis on the fishing resources (IBAMA, 2002). One of the actions to achieve the goals thereof was to support, through the Promising Initiatives Component, those natural resource management projects which were sustainable in the social, economic and environmental standpoint and that could be multiplied not only in other areas of the Amazon lowlands but also in other regions nationwide (VIDAL; THOMÉ-SOUZA, 2008).

Between 2002 and 2007, the Promising Initiatives Component provided the technical and financial

support to 25 projects that developed innovative systems of natural resource management in four themes: fisheries management, forest resource management, institutional strengthening and farming and animal husbandry (VIDAL; THOMÉ-SOUZA, 2008).

Thus, the objective hereof is to make an analysis of the main outcomes, impacts and lessons from both projects, "Consortium for the Use of the Natural Resources of the Lowlands through Sustainability and Co-management Principles" and "Support to Community Initiatives for the Integrated Management of the Natural Resources of the Lowlands", which are supported by the Promising Initiatives Component of the ProVárzea project under the theme line of fishing resources, so as to support the implementation of future projects and more efficient fishing-related public policies.

MATERIAL AND METHODS

The project "Consortium for the Use of the Natural Resources of the Lowlands through Sustainability and Co-management Principles" was developed by Piscipesca Assessoria e Comércio Ltda., in Manacapuru, Amazonas State (Figure 1), and the project "Support to Community Initiatives for the Integrated Management of the Natural Resources of the Lowlands" was developed by Association of São Salvador Island Harvesters (ATAISS), in Gurupá, Pará State (Figure 2).

In the first project, the managed wetland area involved ten communities (São Francisco do Paroá, São Francisco do Cururu, São Francisco de Assis, São Francisco do Canindé, Pentecostal

do Brasil, Divino Espírito Santo, Nova Esperança, Cristo Ressuscitado, Cristo Rei and Nossa Senhora da Conceição) located on Costa do Marrecão and around the Cururu lake system, on the right bank of the Solimões River. In the second project, the managed wetland area involved seven communities (São Raimundo do Gurupá, Nossa Senhora do Livramento, Curai, Santa Maria do Aracutêua, Santo Antônio do Uruaí, São Francisco do Murupucu and Nossa Senhora de Nazaré do Jenipau) of the São Salvador island, located on the estuary of the Amazon River.

The collection of field data was conducted between 2004 and 2007. During that time, each project was visited at least twice by at least one of the authors of the study, and the length of each visit ranged from two to five days. In each of these periods, there was participation in meetings with the beneficiaries, technicians and coordinators of each project.

To analyze the progress, difficulties and social, economic and environmental implications concerning the supported projects, reports from ground-zero workshops, activity implementation reports and independent assessment reports, drawn up since the beginning of the ProVárzea support to management experiments.

Through 44 interviews using specific, standardized forms further information was gathered as to the species that support the fish trade in the regions of Manacapuru and Gurupá as well as the annual statistics of biomass (in tons) and gross revenue (R\$) generated by fish trade in 2004, 2005 and 2006.

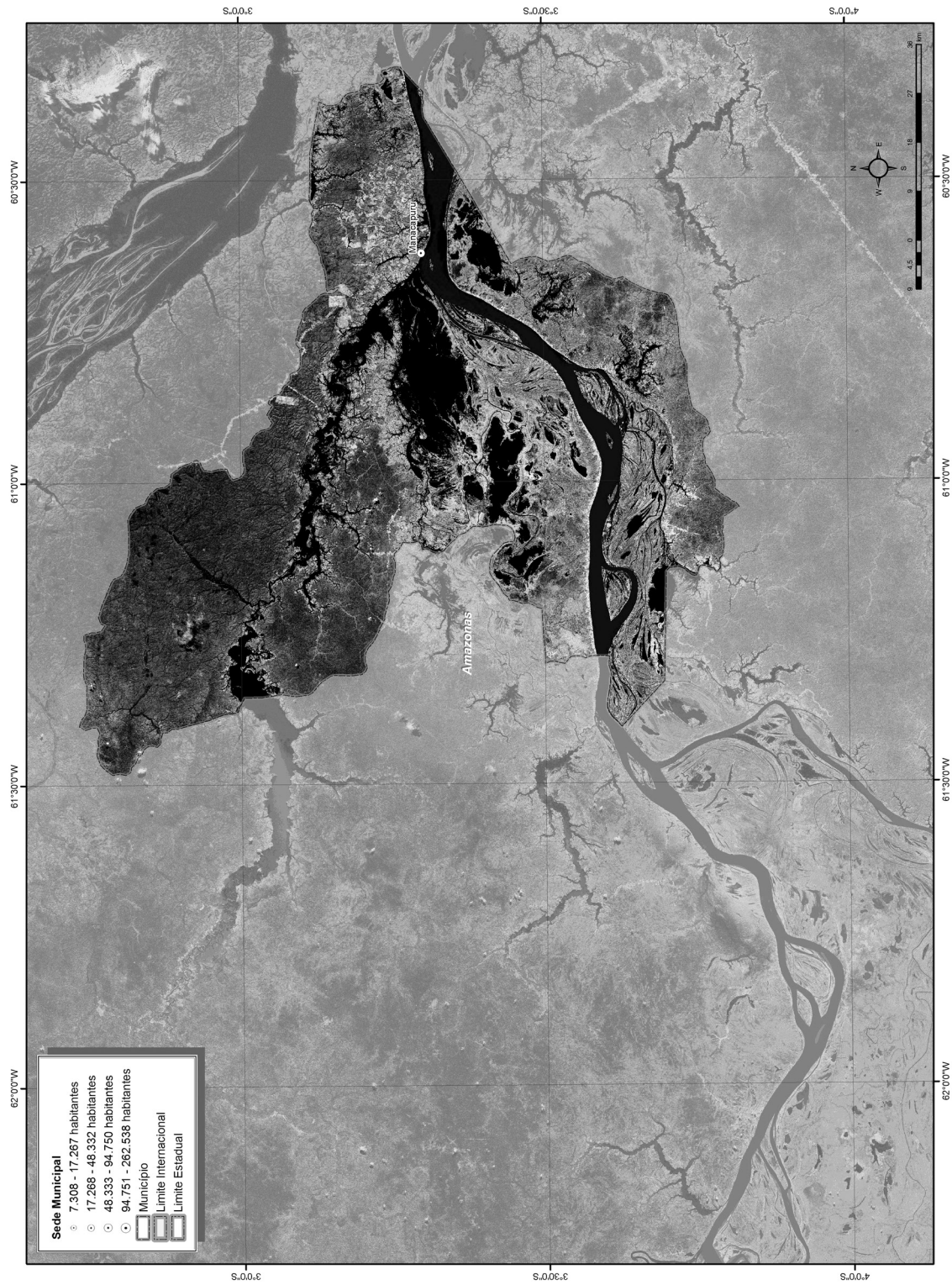


Figure 1 - The city where the project "Consortium for the Use of the Natural Resources of the Lowlands through Sustainability and Co-management Principles" was implemented.

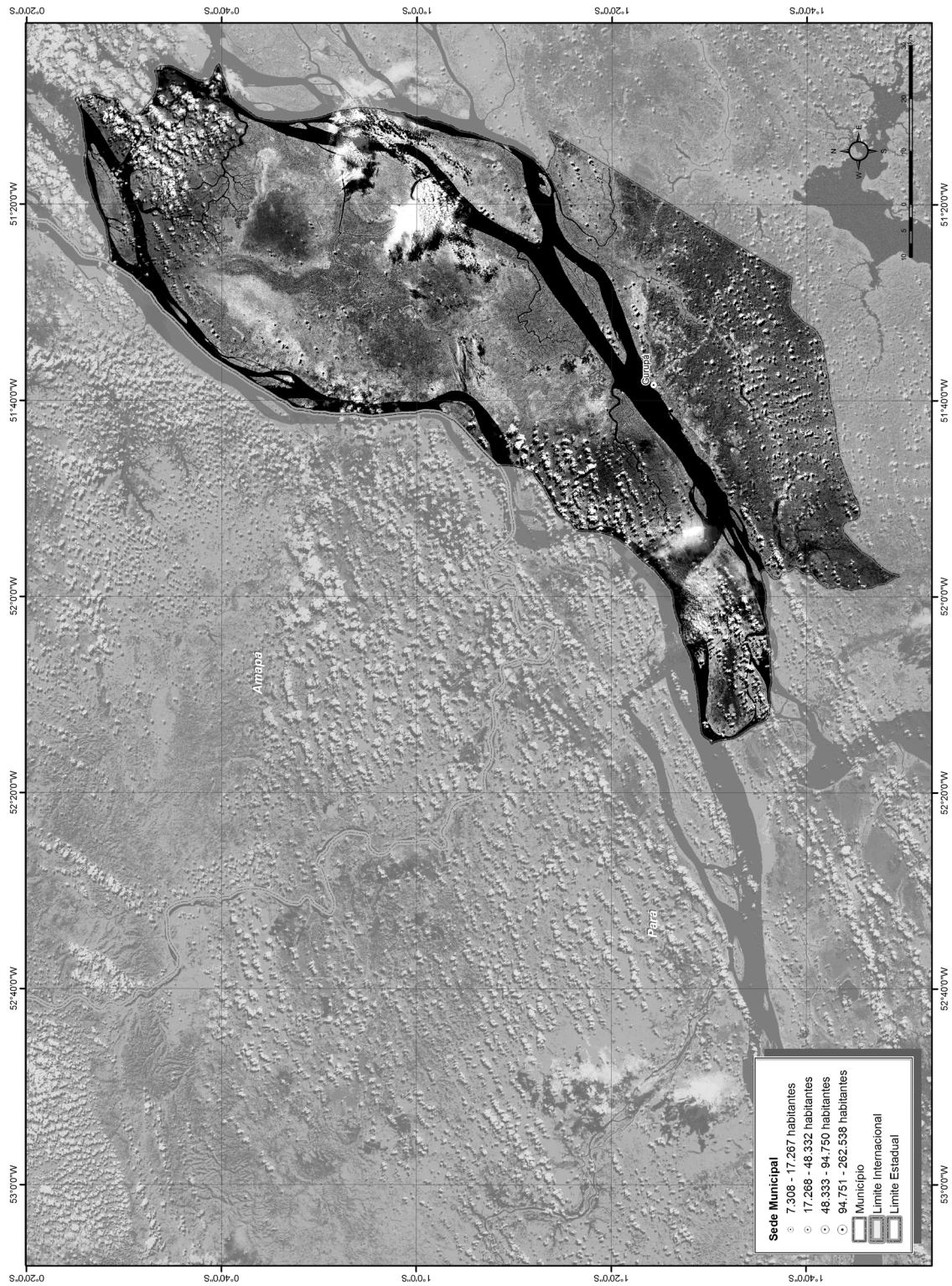


Figure 2 - The city where the project “Support to Community Initiatives for the Integrated Management of the Natural Resources of the Lowlands” was implemented

RESULTS

In the region of Manacapuru, the project developed by Piscipesca provided 35 family training courses, including: count of 'pirarucu' nests, fishmeal (piracuí) production; citizenship and the environment; rural economy basics; agroecology and production of biofertilizers. Altogether, 576 people, including teenagers and adults, improved their skills or acquired new knowledge related to environmental matters.

As for the management of fisheries, the actions were compromised. Strengthening of the Cururu lake fishing agreement, which was in place prior to the commencement of the project, did not happen. The idea was that the greater compliance with the agreement would result in an increase in the fish productivity of the lake, thus benefiting local families with a greater quantity and quality of fish and also enabling the sale of the surplus thereof. But, in fact, the few enforcement actions by the competent environmental agencies and the declining productivity of the managed aquatic system in recent years discouraged the participating families, thus jeopardizing the agreement.

Funding provided by the ProVárzea for the project allowed for buying a river boat with a capacity of 14 tons of cargo, which has been used for production outflow. However, low productivity in certain seasons, imposed by seasonal variation in water levels and the absence of differential pricing for managed products, still makes transporting the production to the large consumer centers such as Manaus become unfeasible.

On the island of São Salvador the project involved about 180 families from riverside communities. Women empowerment and gender-related discussions promoted a 25% increase in the number of women participating in the work groups of the communities involved. This was also reflected in the number of women occupying leadership positions in Ataiss, which reached 41.3% of all positions held.

The project's actions resulted in the approval of six plans oriented to the use of natural resources (Ilha de São Salvador and the communities of Santa Maria do Aracuteua, São Francisco do Murupucu, Santo Antonio do rio Uruai, Nossa Senhora da Conceição do Mariony and São Sebastião do Icaripuca). It should be stressed out that some rules of the use plans refer to the managed fishing of large migratory catfish, piramutaba and dourada in the canal of the Amazon River.

Implementation of two fish receiving and control hubs, where the fishermen themselves weigh their products and make the records required to control production, allowed for a change in the relationship between fishermen and middlemen. Previously, when the fishermen returned from the workday, they went straight to the boats of the middlemen to delivered their product and had no control or information on weighing made by those buyers, who often have their biometry equipment tampered (VIDAL; THOMÉ-SOUZA, 2008). With the support of ProVárzea, a 13-meter, 18-hp engine, 8-ton payload boat was purchased. The vessel has dual purpose, i.e., it can be used for transporting passengers and as a means of production outflow,

and it is also used by project coordination team in the community mobilization process.

Through the training activities, 67 families were able to acquire knowledge on topics related to their daily lives. The project provided courses in fish processing (filleting, waste recovery), making of fishing utensils and devices (shrimp traps, fishing nets), handicraft production (crochet, baskets, vases and flowers made from plastic bottles), and management of açai palm groves.

In Manacapuru region, the main fish species obtained included the characiformes jaraqui (*Semaprochilodus* spp), pacu (*Mylossoma* spp), curimatá (*Prochilodus nigricans*) and matrinxã (*Brycon amazonicus*). On the São Salvador island, in the municipality of Gurupá, the siluriformes

dourada (*Brachyplatistoma rosseauixii*) and piramutaba (*Brachyplatistoma vaillantii*) were the main target species to be harvested.

The amounts of biomass (tonnage) and gross revenue (R\$) for the fish production in the two projects showed an increasing trend from 2004 to 2006 (Figure 3). However, the rate between biomass and gross revenue from selling the production indicates that the average price per kg increased from R\$0,88 to R\$0,92 ± 0,16 and with a variation coefficient percentage of 20.2 between 2004 and 2006 in the area of Gurupá, while in the Manacapuru region there was no change in the price per kg, as fish was sold to an average of R\$0,67 ± 0,001 and a variation coefficient percentage of 0.2.

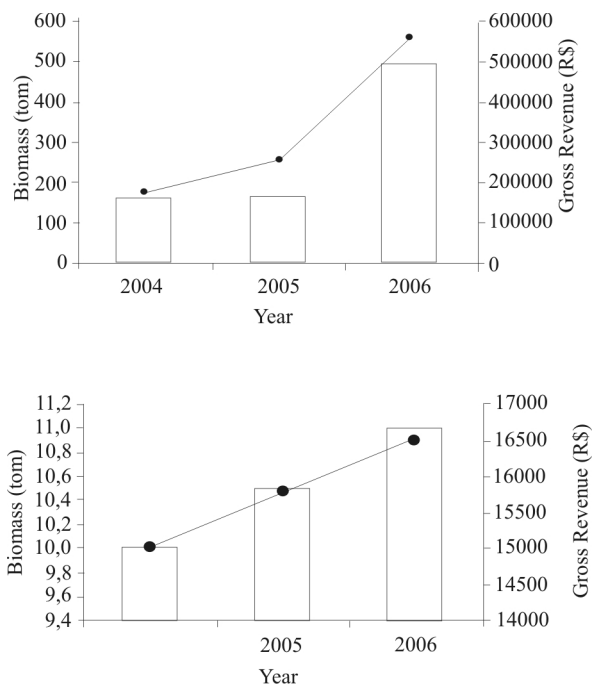


Figura 3 - Biomass variation (bars) and gross revenue (line) for the fish production obtained in the projects developed in the regions of Gurupá (A) and Manacapuru (B) from 2004 through 2006.

DISCUSSION

Most of the actions promoted by the Component Promising Initiatives, aimed mainly at training community members, improving income and implementing mechanisms that promote sustainability of fish stocks, were successfully achieved by the communities that were evaluated (Sánchez-Botero, 2007). In the region of Gurupá, the activities performed contributed to improvements in fish production and in the price of fish sold. Using adequate weighing scales that belong to the communities allowed for fishermen to start monitor the weight of the fish, in addition to achieving progress in negotiating a price to be received by production. Likewise, the work of institutions representing the civil society, including the Association of São Salvador Island Harvesters (Ataiss), in Gurupá, and the Cururu Sustainable Development Association (Associação de Desenvolvimento Sustentável de Cururu - Adesc), in Manacapuru, benefited the communities, mainly through the acquisition of permanent assets such as their own headquarters, ships, weighing scales, computers and GPS (Global Positioning System). Such goods facilitated the development of management activities and the bargaining power of their production, in addition to have stimulated community organization.

In the region of Manacapuru, the gross revenue from the sale of fish followed proportionally the increase in the biomass that was obtained. The price per kilogram remained constant over the years of assessment of these indicators. This was due possibly to the historical and constant

presence of middlemen in the location (GARCEZ, 2000; BATISTA; CHAVES; FARIA JUNIOR; OLIVEIRA; INHAMUNS DA SILVA; BANDEIRA, 2007. Caracterização socioeconômica da atividade , 2007), who regulate the amount to be paid per kilo of fish. It was also due to the growth and consistency over the year in the supply of fish species such as tambaqui (*Colossoma macropomum*) and matrinxã from fisheries in the region (ROLIM, 1995; BALDISSEROTTO; GOMEZ, 2005). Currently, a multidisciplinary team made up of professionals from the Federal University of Amazonas, local institutions and community members of the Manacapuru region work together on alternatives for the management of fishing resources, seeking improvements in income and profits of the riverside dwelling fishermen of the region (FABRÉ; RIBEIRO; BATISTA; PARENTE; WAICHMAN; INHAMUS; BARROS; ROSENAE; MORAES, 2003).

Technical, social and economic aspects developed in both projects were essential to the administration of fishing resources and to the success of such projects as promising initiatives during the development period (SÁNCHEZ-BOTERO, 2007). However, the lack of information on the maximum sustainable yield and productivity of harvested species regionally, both in periods prior to those that were evaluated and in the current harvesting potential, raises questions about the sustainability of these resources and how they will be maintained over the subsequent years. This relation between productivity and exploitation of fishing resources is essential to determine what should be exploited and/or co-managed, in what amount, period and environment. Therefore,

evaluating the potential of fishing resources to be exploited and/or co-managed in terms of number of individuals per species per unit area and over time is recommended. This way, measures aimed at proper management of fishing resources may outline the exploitation thereof in sustainable way in the long term, thus ensuring the economic livelihood of future generations located in these areas, since many children remain in their places of origin and follow the same professional activities as their parents (GARCEZ; SÁNCHEZ-BOTERO, 2006).

The integrated management of natural resources in wetlands, whether aquatic or terrestrial, should be prioritized. Especially because deforestation, construction of dams, agro-industrial and mining activities, developed for decades in the areas of the Amazon floodplain, affect either directly or indirectly the regions where the projects are implemented, thus generating negative consequences for the availability, survival of aquatic wildlife and exploitation of fishing resources (LEONEL, 1998).

Thus, technical and financial investments in other activities oriented for the management of natural resource must be rendered feasible in order to promote the diversification of income generating activities; otherwise, the chances of failure to comply with underlying premises of sustainable management will be high.

Another important factor to be considered in the implementation of management projects in the Amazon is the climatic and hydrological

characteristics. The characteristic seasonality in lowland areas, represented by a natural cycle of flood-draught of the river, affects the biological characteristics of aquatic and terrestrial species, which have their migration, breeding and feeding patterns closely related to the different water levels of the river. Therefore, any activities in natural resource management in such areas need to take this into account in their corresponding implementation schedules.

Thus, the actual time of execution of the projects indicates that the establishment of natural resource management initiatives in the Amazon requires more time than that in which most donors are willing to invest (MCGRATH; CROSSA; CARDOSO; GAMA; ALMEIDA, 2006).

It is still necessary to monitor the sustainability of said actions after completion of the financial incentives and technical support provided initially by ProVárzea/IBAMA over the years of development and implementation of the management and resource management activities, so that it is possible to know whether these communities will be prepared to carry on with the projects and activities without the presence of an outside manager/funder.

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