

Analysis of Human Resources at A Sustainable Use Conservation Unit: Application of the "Human Resource Module" of the RAPPAM method - Rio Ouro Preto Extractive Reserve

Luciana Fabiano¹, Fernanda Kelly Vieira Lopes²

¹Bachelor of Environmental Management, Professor at the Federal University of Rondônia - UNITE (Brazil); Master's Professional Master's Program in Public Administration - PROFAP / ANDIFES; Specialist in Human Resources Management; Specialist in Higher Education; Specialist Language and Education; Specialist in Public Administration; Researcher of the Research Group "Sustainable Renewable Energy" Research Groups Directory in Brazil - Lattes. E-mail: lucianafabiano@outlook.com

²Bachelor of Environmental Management, Federal University of Rondônia - UNITE (Brazil).

Email: fernandakellyvieiralopes@hotmail.com

Abstract— This study sought to answer the following questioning: "What does the management plan (guiding document on conservation unit management) indicate about human resources in a sustainable use CU, according to the indicators from 'Module 09 - Human Resources' of the RAPPAM method - global benchmark for evaluating the effectiveness of protected area management?" **Methodology:** The study is characterized as descriptive, based on its subject matter; documentary, since institutional documents were used for its development, and qualitative, since it interprets a phenomenon. **Objective:** To assess what the ROP EXRES "Management Plan - 2014" indicates about human resources in a sustainable use CU, according to the indicators of "Module 09 - Human Resources" of the RAPPAM method. **Conclusion:** The study obtained the following results: a) the indicator "human resources" in the CU pointed to a gap due to the lack of professionals in sufficient numbers to meet the demands of the unit; b) in relation to "appropriate skills" of employees to carry out the work, the only EXRES employee was evaluated as having the appropriate qualifications; c) the indicator "management team training and development" revealed that the management plan has programs aimed at ongoing training of employees in order to meet the demands of the protected area; d) regarding the indicator "periodic review" of employees, it was observed that the plan does not cover or does mention this item; finally, with regard to the indicator "working conditions" available, the team shows few significant results, in view of the inadequate infrastructure in the management plan. This means that investments are needed to develop the structuration of the CU. The study advocates the importance of obtaining a broad picture regarding Brazilian protected areas due to the abundance of natural resources in such areas. The issue of human resources in protected areas is essential to their effective management, surveillance, service to community, and the study especially emphasizes community participation as a way to directly contribute to the management of protected areas. As a suggestion to contribute to the solution of the problem researched, this study points to the possibility of shared management being implemented in ROP EXRES, as is seen in other protected areas.

Keywords— Human Resources. RAPPAM Method. Management Plan.

I. INTRODUCTION

Human resources are essential in all segments of society be they in health, education, business or projects having to do with the environment. Given this, the current study seeks to carry out an analysis of human resources in a sustainable use conservation unit: the Rio Ouro Preto Extractive Reserve (ROP EXRES), located in the Amazon, in the state of Rondônia, northern Brazil.

The study seeks to answer five (5) questions on "human resources" of PAs:

- Is the level of staffing sufficient to effectively manage the CU?
- Do staff members have adequate skills to conduct critical management activities?
- Are the staff training and development opportunities appropriate to the needs of the PA?

- d) Are staff performance and progress on targets periodically reviewed?
- e) Are staff employment conditions sufficient to retain high-quality staff?

The questions mentioned above have been proposed through the method known worldwide as "Rapid Assessment and Prioritization of Protected Area Management" (RAPPAM); the method has been applied in Asia, Latin America, the Caribbean and other places. The guiding document to address the issues mentioned above is the so-called "Rio Ouro Preto Extractive Reserve management plan/RO - 2014", considered the basic management document for ROP EXRES. The RAPPAM method is a tool that has helped to assess the effectiveness of protected area management.

The study researches the following question:

"What does the management plan (guiding document on protected area management) indicate about human resources in a sustainable use CU, according to the indicators in 'Module 09 - Human Resources' of the RAPPAM method - world reference for evaluating the effectiveness of protected area management?"

The ROP EXRES management plan was designated as sample object of study to represent the problem. Since then, the problem studied has presented the following question: "What does the ROP EXRES "Management Plan - 2014" indicate about the human resources of this unit, according to the indicators in the "Human Resources Module" of the RAPPAM method?"

The relevance of this study should be noted since it can contribute in the following ways: I - improving the ROP EXRES management plan and serving as a reference for other protected areas across the country or around the world; II - serving as a guideline for the implementation of public policies for the promotion of human resources in protected areas of sustainable use; and finally III - contributing to the improvement of the quality of life of communities in protected areas, which benefit from them directly, as well as of society as a whole which indirectly utilizes environmental services made possible by PAs.

The study may also help in future updates of the ROP EXRES Management Plan, since the plan can be updated every 5 years. The plan herein studied and analyzed was published in 2014 and may incur updates as soon as 2019, with modifications or enhancements aiming towards achieving the unit's objectives.

The study is based on the need to care for and preserve the environment, which largely affects not only the global population, but also the physical environment of the entire planet Earth. Thus, the information herein

contained applies to the survival of life on the planet and preservation of the earth itself.

II. THE IMPORTANCE OF PROTECTED AREAS

Protected areas provide many benefits to humans, especially environmental conservation; however, the advantages of these protected areas go beyond this, since the creation of Conservation Units (CUs) also involves regional growth, maintenance of wildlife, better air and water quality, protection of historical and cultural sites, and also the conservation of water resources and scenic beauty, among other benefits.

In regards to the economic objectives that revolve around a CU:

Protected areas also have economic objectives embedded in their creation. Some practical initiatives have already shown an increase in job opportunities and income through the creation of new protected areas, which must be well managed, maintaining principles of orderly use and respect for the carrying capacity of the environment. Perhaps the most typical example of economic exploitation is tourism, adopted particularly by national parks which receive a large number of tourists every year (HASSLER, 2005, p. 87).

As mentioned above, protected areas account for various contributions: both to the environment and to people who use environmental resources and are benefited directly or indirectly by the preservation and conservation of protected areas. It is worth highlighting the main benefits of protected areas.

2.1 Main contributions of protected areas:

- a) Adjusting the quantity and quality of water for consumption;
- b) Soil fertility and stability of slopes (relief);
- c) Climate balance and maintenance of air quality;
- d) Healthy and diverse foods;
- e) Basis for the production of drugs for current and future illnesses;
- f) Green areas for recreation, education, culture and religion;
- g) Providing raw materials for various utilities.

Another good thing about CUs that should be noted is the generation of income, and the fact that they awaken regional and local development, including sustainable tourism programs, creation of eco-product cooperatives, among others, stimulating scientific research activities and instructional processes.

The categories of protected areas or protected spaces are created for a specific function, based on features that prove its protection. They can be used in two different ways:

- a) with regard to protecting natural or artificial beauty, thus maintaining the vegetation or animal life, or even human culture;
- b) use for leisure and entertainment, scientific knowledge and research.

The government has a fundamental role in environmental conservation, because through it one can create monitoring mechanisms and punishments for those involved in environmental crimes in protected areas. Currently, many of the public agencies and also much of society have realized the need for preservation and conservation of the environment to ensure the quality of life of the current population and future generations.

On the importance of municipal governments as a protective base for environmental resources, Tachizawa (2011) states that they have an indispensable role because they are closer to the people and more fragile ecological processes. They should understand environmental problems and consider them of utmost importance, taking some immediate management steps in the sector, for example: associating with environmental groups and environmental segments of companies to create an environmental monitoring system, while also working on environmental education programs in state and municipal schools. Another measure is to invest in the training of human resources that are involved in environment-related careers.

In short, PAs provide benefits beyond their borders. Therefore, the need for awareness on the part of public officials as to the importance of protected areas is evident so that ecosystems remain healthy; aiming to benefit the population through the creation of sustainable businesses, by providing sound economies and ultimately by resulting in the desired sustainable development.

III. TYPES OF CONSERVATION UNITS

Law No. 9,985 from July 18, 2000 created the National System of Nature Conservation Units (SNUC). According to this law, conservation units refer to natural areas passable for protection based on special features. In regards to the concept of CUs as defined by SNUC:

They are territorial spaces and their environmental resources, including jurisdictional waters, have relevant natural characteristics, legally instituted by the Government, with conservation objectives and defined limits, under special arrangements by public

officials, which is subject to appropriate guarantees of protection by law (BRAZIL, 2000, p. 01).

The division of conservation units established by SNUC falls into two categories, according to each unit's goals and usage type, namely:

- a) full protection;
- b) sustainable use.

a) Full protection conservation units: The full protection group has as its main purpose the preservation of nature. The use of natural resources is indirect; it is one that does not allow consumption, collection or damage to natural resources. Some examples of prohibited activities herein include: any activities in contact with nature, ecological tourism, scientific research, environmental education and interpretation, among other activities.

b) Sustainable use conservation units: Units of the sustainable use group aim to reconcile nature conservation with sustainable use of environmental resources, associating human presence in protected areas. Unlike the previous group, activities involving the collection and use of natural resources are accepted, done in such a way that renewable environmental resources and ecological processes are maintained.

3.1 The group of full protection CUs is divided into:

- a) Ecological Station (ESEC);
- b) Biological Reserve (REBIO);
- c) National Park (PARNA);
- d) Natural Monument (MONA);
- e) Wildlife Haven (REVIS).

With regards to the objectives related to conservation units of the full protection group:

- a) Ecological Station (ESEC):

Its purpose is the preservation of nature and the conduct of scientific research;

- b) Biological Reserve (REBIO):

Its objective is the preservation and restoration of a natural balance, biological diversity and natural ecological processes without direct human interference or environmental changes;

- c) National Park (PARNA):

It seeks to preserve natural ecosystems and their scenery. It provides an area for scientific research, environmental education and eco-tourism;

- d) Natural Monument (MONA):

It has the function of preserving rare natural sites or those of great scenic beauty;

- e) Wildlife Refuge (REVIS):

It is responsible for protecting natural habitats for flora and the reproduction of resident or migratory fauna.

3.2 Sustainable use CUs are divided into:

- a) Environmental Protection Area (APA);
- b) Relevant Ecological Interest Area (ARIES);
- c) National Forest (FLONA);
- d) Extractive Reserve (EXRES);
- e) Wildlife Reserve (REFAU);
- f) Sustainable Development Reserve (RDS);
- g) Private Natural Heritage Reserve (RPPN).

With regards to the objectives related to sustainable use protected areas:

- a) Environmental Protection Area (APA):

It has the function of protecting biological diversity, regulating the process of human occupation and ensuring the sustainable use of natural resources;

- b) Relevant Ecological Interest Area (ARIE):

It is responsible for maintaining ecosystems and regulating the use of these areas with extraordinary natural characteristics or those containing rare specimen of regional biota;

- c) National Forest (FLONA):

Its function is to promote sustainable multiple use of forest resources, scientific research and public visitation, with a special focus on methods for sustainable exploitation of native forests;

- d) Extractive Reserve (EXRES):

It aims to protect the livelihoods and culture of traditional populations and ensure sustainable use of natural resources;

- e) Wildlife Reserve (REFAU):

It is responsible for promoting studies on the sustainable management of wildlife resources;

- f) Sustainable Development Reserve (RDS):

Its objective is the preservation of nature improving the quality of life of traditional populations;

- e) Private Natural Heritage Reserve (RPPN):

It seeks to preserve biological diversity in private areas.

IV. HISTORY OF THE RIO OURO PRETO EXTRACTIVE

The Rio Ouro Preto Extractive Reserve (ROP EXRES) is among the first conservation units of the sustainable use group created in Brazil. Its location is in the municipalities of Guajará Mirim and Nova Mamore in the state of Rondônia, and it is part of the state's largest block of protected areas.

In Guajará Mirim, one arrives at the Reserve by Mamore and Ouro Preto rivers or by road, through an

extension of 40 km leading to "Lake Pompey" on the Rio Ouro Preto. ROP EXRES has an approximate area of 204,583 (two hundred and four thousand, five hundred eighty-three) hectares, bordered on the North by indigenous land and the Guajará Mirim State Park; on the east by the indigenous land Uru-eu-wau-wau; the South and West by the Rio Ouro Preto State Biological Reserve and the new Pacaás State Forest Extractive.

The first meeting of rubber tappers from Guajará Mirim in February 1989 was a highlight for the creation of the extractive reserve; the purpose of the meeting was to discuss the problems related to the city's rubber tappers and choose representatives for the second national meeting of rubber tappers. At that time there was no form of political organization for rubber tappers in the city.

According to Wawzyniak (1989), 278 (two hundred seventy-eight) rubber workers attended the meeting, of whom 167 (one hundred sixty-seven) were from Rio Ouro Preto, and representatives of governmental and non-governmental organizations were also included. The rubber tappers' meeting meant an opportunity to discuss the main problems faced by the population, as follows:

- a) lack of assurance regarding placement;
- b) low price of rubber and high commodity prices;
- c) payment of income and lack of health care and education;
- d) deforestation.

Among all the claims mentioned by the rubber tappers, the main ones were: a better price for rubber, ensuring permanence in placements, end of income payment, and creation of a cooperative health care and education system.

During the meeting a Municipal Commission was established with the task of extending the organization and sending claims.

At the end of 1989, the State Forestry Institute (IEF) suggested the creation of a protected area with 54,000 (fifty-four thousand) hectares. However, through a map displayed, it was found that it represented a small strip located on the river banks and did not cover areas of land, the few existing nut trees and streams occupied by rubber tappers. Upon analysis, the IEF extended the area to 204,583 (two hundred and four thousand, five hundred eighty-three) hectares.

The spread of the idea of an EXRES addresses the security of the remaining subjects discussed at the first rubber tapper meeting in Guajará Mirim (RO). It is evident that EXRES benefits a project of autonomy; this can be seen through the life changes of the rubber tappers

who are now independent, i.e. do not need to be subjected to an employer.

Note that extraction work was not always the focus of the local economy, or a base to generate income. It appears that since the creation of the EXRES in 1990, until today, latex extraction has declined as the main source of survival. Thus, extraction activity took second place as a source of income in the unit; agricultural work moved to the lead, and additionally, hunting and subsistence fishing, in a diverse utilization of resources. The activities take place concurrently or alternately throughout the year, subject to environmental or socioeconomic factors.

V. METHODOLOGY

The ROP EXRES management plan was created in 2014, i.e. it is a legal framework considered to be recent. As a very important document for CU management, this study analyzed what the plan addresses with regard to the issue of human resources. Analysis was performed in order to answer the questions contained in "Module 9 - Human Resources" of the RAPPAM method. The document used is the "Rio Ouro Preto Extractive Reserve Management Plan/RO 2014"; upon analysis of the aforementioned document, it was possible to answer the questions of the RAPPAM method, in view of the fact that the document includes points of CU management statutory standards.

This study analyzed one of the most important protected areas in the Brazilian Amazon region: ROP EXRES. It is worth noting that this CU was one of the first of its type created in Brazil (03/13/1990). The first EXRES created in Brazil was Alto Juruá (Acre - on 01/23/1990); the second, also located in Acre, was the Chico Mendes EXRES (03/12/1990) and the third was established in Amapá - Rio Cajari EXRES (03/12/1990). ROP EXRES is located in a border area between Brazil and Bolivia; thus, the body responsible for management should take caution because of threats to which the area is exposed, including, for example, exploitation and plundering of the environment, as well as invasion pressures.

The study was conducted in order to examine the following question: What does the ROP EXRES "Management Plan - 2014" indicate regarding the characterization of human resources of a sustainable use CU, based on the indicators of "Module 9 - Human Resources" from the RAPPAM method?

The methodology used to provide the data gains its theoretical basis, in the foundations of Gonçalves (2007). The author classifies a study based on the segments that structure it, namely:

- a) its objectives;
- b) its data collection procedures;
- c) its sources;
- d) the nature of the data collected.

Thus, this study is embodied in the following classifications:

5.1 According to its objective this is a - Descriptive Study

This study is classified as descriptive based on its objectives because its subject matter is analyzed by descriptions. Therefore, it is an analysis of an objective, i.e. a descriptive approach to focus on the object of study.

It is noteworthy that this type of study is of great importance in view of the meager existence of studies on the subject matter. The theme features the description and provides data that can be used as a contribution to further analysis of the object of study.

The object to be described in this study are the human resources from the ROP EXRES Management Plan (2014), in order to answer the questions in the RAPPAM method questionnaire, containing five (5) questions from the section entitled " module 9 - Human Resources ".

5.2 According to its data collection procedures this is a – Documentary Study

The procedures used to produce data in this study were based on the following steps:

Step 1 - Study of Document 1 (one) entitled "Rio Ouro Preto Extractive Reserve Management plan /RO - 2014" to identify all the parts of the plan that address human resources in ROP EXRES;

Step 2 - further studies on documents two (2) and three (3) entitled:

- b.1) Document 2: "Effectiveness of Federal Protected Area Management - comparative evaluation of the applied RAPPAM method in federal conservation units in cycles from 2005-2006 and in 2010 - Full version report - February 2012;
- b.2) Document 3: Evaluation of Protected Area Management: RAPPAM (2015) and SAMGE (2016) methods.

Step 3 - application of "Module 9 - Human Resources" from the RAPPAM method questionnaire: search for answers in document 1 above, the management plan,

guided by the 5 indicators found in the RAPPAM method's survey questions:

- a) *Are there human resources in sufficient numbers for the effective management of the CU?*
- b) *Do staff have appropriate skills to carry out management actions?*
- c) *Are there opportunities for training and staff development, appropriate to the needs of the PA?*
- d) *Is there periodic assessment of the performance and progress of employees?*
- e) *Are the working conditions sufficient to maintain adequate staff for the goals of CU?*

Step 4 - description of the solutions found in the PA management plan regarding ROP EXRES objectives;

Step 5 - record, along with the description in the previous step, external theoretical contributions to the Management Plan (books, papers, theses, dissertations) in order to compare the data obtained.

Note that the 4 steps mentioned above were based on the use of institutional documents, known as primary sources, meaning documents prepared by organizations or government agencies; therefore, this study is classified as documentary research.

5.3 According to the sources of information this is a – Documentary Study

The study is characterized as being of the documentary type based on the source from which the information was obtained, i.e., with the same reasoning laid out in the previous paragraph, original publications from institutional bodies were used. Using the information obtained from the ROP EXRES management plan, the data were processed and analyzed.

5.4 According to the nature of the data this is a - Qualitative Study

In summary, the data presented can be classified in two ways based on their nature: qualitative data or quantitative data.

Quantitative data are those that point to numerical characteristics, statistics or percentages in the experiments; through these data, values are assigned, giving them a numerical order. Another feature of quantitative data that is worth mentioning is deduction in analyzing the cause of the phenomena. Therefore, the use of experiments is carried out in a controlled manner, so

that the analyst can check and validate the results obtained even if numerous tests of the hypothesis and its variants are needed. This study is of qualitative nature, as opposed to a quantitative study.

Qualitative data are those that make an analysis based on interpretation of the phenomenon, i.e., the data seek to establish a connection with the environment to which they belong; moreover, analysis establishes relations with the perception that individuals have of the phenomenon and the context in which it is inserted.

Note that for the reasons stated in the previous paragraph, this study is defined as qualitative research, since interpretations were made about content and principles in legal compositions, in particular the guiding document of this study: "Rio Ouro Preto Extractive Reserve Management Plan/RO 2014 ". For the above reasons, the study took the form of a hermeneutic approach.

The community's contribution to the wording of the text in the ROP EXRES management plan occurred from their practices, their relation with the CU, that is, the knowledge and experience of the reality in which they live. This is a point similar to qualitative research.

5.5 About the RAPPAM method:

The World Commission on Protected Areas - WCPA in 1995 established a meeting with researchers from different specialties in order to discuss and develop methods related to environmental protection. Based on this meeting and the information obtained a framework was established that became the model for developing methods to assess protected area management, based on three pillars: a) planning; b) implementation c) evaluation.

The RAPPAM method was based on the model set out in the preceding paragraph; the World Wide Fund for Nature (WWF) developed the Rapid Assessment and Prioritization of Protected Area Management (RAPPAM), a device that aims to help managers of protected areas. The RAPPAM method allows for quick and efficient evaluation of PAs, and is able to identify positive and negative points that deserve attention by managers, i.e. it contributes to the analysis of these points and also provides the basis for the development of public policies consistent with protection of natural resources in each unit.

WWF-Brazil is a non-governmental Brazilian organization dedicated to nature conservation; its purpose is to minimize negative impacts of human activities acting this way in order to protect Brazilian biodiversity. Environmental protection in protected areas is a challenge

for managers; however, the importance that these areas have is not only a concern for those who are directly responsible for the management, but the areas also deserve attention from institutions around the world, like for example, WWF. This subject of preservation of protected areas is so important that it is a topic discussed recurrently in conferences and scientific studies worldwide.

The importance of WWF-Brazil since its creation in 1996 should be noted; together with NGOs and other institutions, several projects dedicated to the cause of environmental protection have been carried out. The institution includes studies on environmental degradation and the development of research projects to solve the problem (WWF, 2012).

The RAPPAM method is an important tool for evaluating the effectiveness of management in protected areas; since its creation in 2002, RAPPAM has already been applied in many countries due to the good results it has obtained. In Brazil the method was first applied in 2004; the goal was to evaluate the following protected areas: protected areas of the Paraíba Valley, Ribeira Valley, Serra da Mantiqueira, Upper Paranapanema and the metropolitan area of the capital, in São Paulo. Implementation of the method in federal units located in the Amazon began in the year 2005.

The partnership between WWF-Brazil and IBAMA made the application of the RAPPAM method possible in 2005 and 2006 in federal conservation units, more specifically those located in the Amazon region. In the application cycles of the years 2005, 2010 and 2015 ROP EXRES was evaluated using the above method.

In summary, evaluation of the effectiveness of management through the RAPPAM method examines whether the activities developed are compatible with the needs of protected areas, in order to ensure that their objectives are achieved. For this purpose, RAPPAM lists a structure of its questionnaire consisting of five elements of the management planning, and evaluation cycle (input, context, planning, process and output); each element mentioned addresses a different topic that is evaluated with its own thematic module.

RAPPAM is an instrument recognized worldwide for containing a framework for evaluating protected area management quickly and efficiently; the method also has a mathematical formula responsible for obtaining a management effectiveness index. However, this study addressed the Human Resources thematic module. Thus, the study focused on answering the questions addressed in the above-mentioned module contained in the RAPPAM questionnaire.

The following image shows the classification of each thematic module based on its exposed elements:

Table 1 - Structure of the RAPPAM questionnaire

Elemento	Módulo temático
Contexto	1. Perfil
	2. Pressões e ameaças
	3. Importância biológica
	4. Importância socioeconômica
	5. Vulnerabilidade
Planejamento	6. Objetivos
	7. Amparo legal
	8. Desenho e planejamento da área
Insumos	9. Recursos humanos
	10. Comunicação e informação
	11. Infraestrutura
	12. Recursos financeiros
Processos	13. Planejamento
	14. Processo de tomada de decisão
	15. Pesquisa, avaliação e monitoramento
Resultados	16. Resultados

Source: WWF-Brazil, 2012, p. 12.

Through the RAPPAM method questionnaire, divided into the five (5) elements described above, factors that are relevant to protected area management can be analyzed. One interesting fact is that the questions in the questionnaire are applied directly to employees and the community, which assigns a degree of reliability, given that they are the people who experience the reality of these areas daily, and know their problems and aspirations.

In the structure of the RAPPAM questionnaire, the element "Inputs" contains four thematic modules, namely:

- a) Module 9 - Human Resources;
- b) Module 10 - Communication and information;
- c) Module 11 - Infrastructure and
- d) Module 12 - Financial resources.

Module 9 - "Human Resources" was chosen as the central focus of this study; this module addresses the following questions:

- a) Are there human resources in sufficient numbers for the effective management of CU?
- b) Do the staff have appropriate skills to carry out management actions?
- c) Are there opportunities for staff training and development that are appropriate to the needs of the PA?

- d) Are there periodic assessments of employee performance and progress?
- e) Are the working conditions sufficient to maintain adequate staff for the goals of the CU?

Section 6 below will address each of the questions in "Module 9 - Human Resources" with the results found in the ROP EXRES management plan in the form of answers to the questions proposed. Each question was transformed into a subheading in section 6.

VI ANALYSIS OF "MODULE 9 - HUMAN RESOURCES" FROM THE RAPPAM METHOD

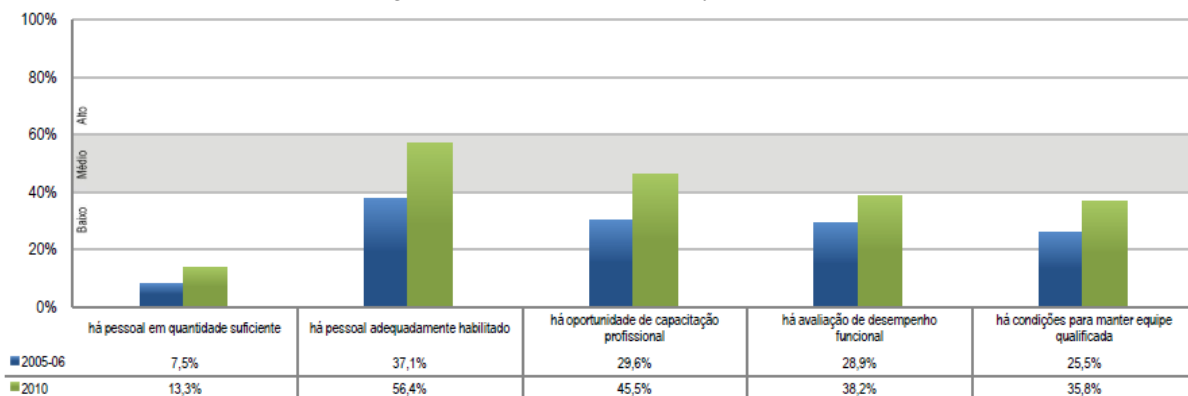
Three charts were considered as part of this analysis: the first referring to federal conservation units, the second referring to federal sustainable use protected areas and the third and last referring to extractive reserves. All are located in Brazil. Data were extracted from WWF, IBAMA and ICMBio reports on the assessment of the effectiveness of protected area management, performed

via the RAPPAM method in the 2005/2006 and 2010 cycles.

The graphics from the 2015 RAPPAM cycle were not available. The report underwent a change that altered its presentation; the Brazilian government's own method for assessing management effectiveness was issued as well: the Management Analysis and Monitoring System (SANGe). This partnership ended by suppressing the detailed graphics displayed previously in the reports from the 2005/2006 and 2010 cycles. In addition, the RAPPAM method was applied in 2015, SANGe in 2016 and the disclosure of both reports were not published nor made available by the Brazilian government until November 2017.

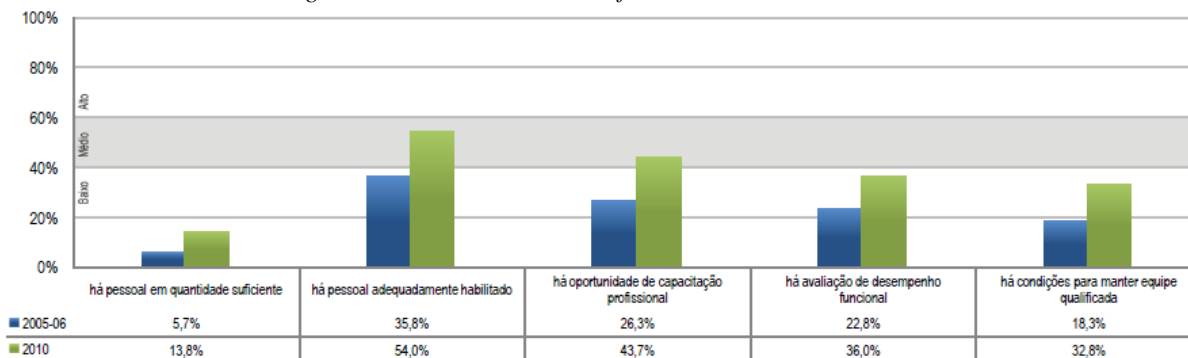
The three (03) following charts were used to analyze "Module 9 - Human Resources" from the RAPPAM method applied to ROP EXRES. 06 (questions) submitted by the RAPPAM method will herein be discussed as this study seeks to reference and contextualize the reality of a federal extractive reserve conservation unit for sustainable use.

Figure 1 - Human resources in federal CUs



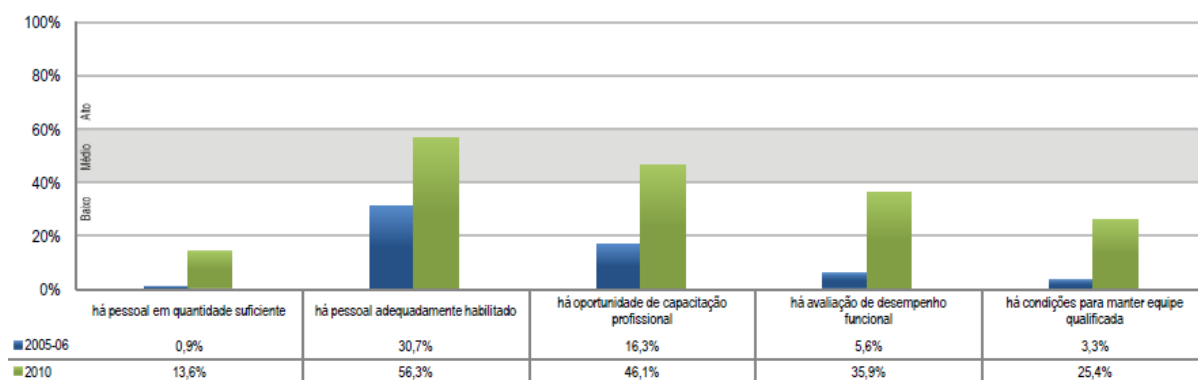
Source: RAPPAM Report 2005/2010 Cycle

Figure 2 - Human resources in federal sustainable use PAs



Source: RAPPAM Report 2005/2010Cycle

Chart 3 - Human resources in extractive reserves



Source: RAPPAM Report 2005/2010 Cycle

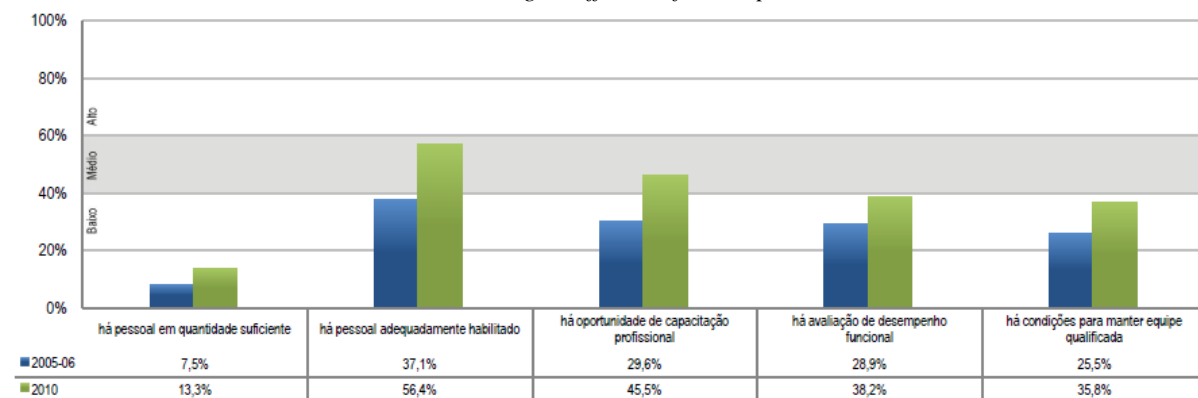
6.1 QUESTION "A" FROM "MODULE 9 - HUMAN RESOURCES" THE METHOD RAPPAM: ARE THERE HUMAN RESOURCES IN SUFFICIENT NUMBERS FOR EFFECTIVE MANAGEMENT OF THE CU

According to analyses of the 2014 ROP EXRES management plan, the number of human resources available for the unit's management is scarce: one (1) employee to maintain the entire EXRES. However, the document contains the strategic map of the CU, where future goals are listed, especially those for the next five (5) year period. One of the presented goals is to expand the number of collaborators and employees. Therefore, the amount of human resources for management of the area is not enough; however, the diagnosis made resulted in strategic objectives identified by the management plan. Given the year the management plan was prepared (2014), it's important to consider which results have been achieved and what still needs to be improved.

The Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) method applied

in the years 2005/2006/2010 addressed important questions about the evaluation of the effectiveness of management in federal and state conservation units. From a comparative analysis we note that in relation to other evaluated modules from the RAPPAM method, human resources did present progress between application cycles; however, the results are still not satisfactory.

Chart 1 - Is there enough staff in the federal protected areas?

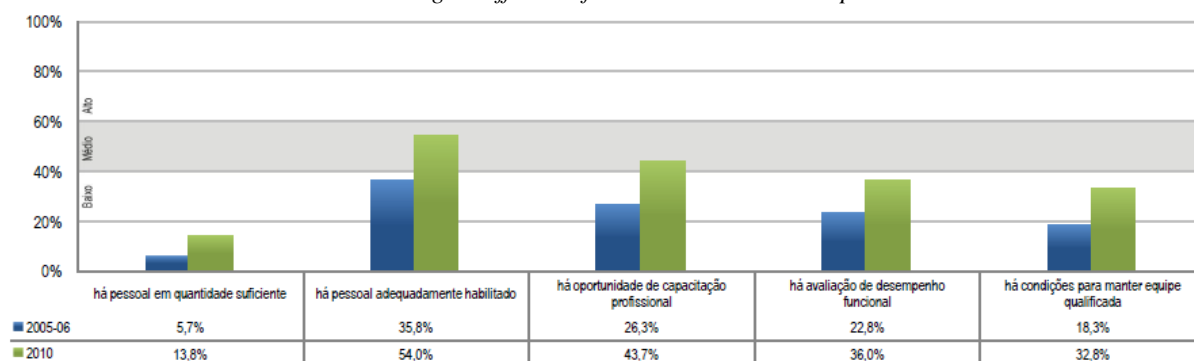


Source: RAPPAM Report 2005/2010 Cycle

Figure 1 refers to human resources in the federal protected areas as a whole; it is clear that the 2005/2006 RAPPAM cycles with regards to the item "There are people in sufficient quantity", shows 7.5% in 2010; the index rose to 13.3% which means an increase of 5.8%. It

was not a very significant step forward; that is, this is an area that needs more investment.

Chart 2 - Is there enough staff in the federal sustainable use protected areas?

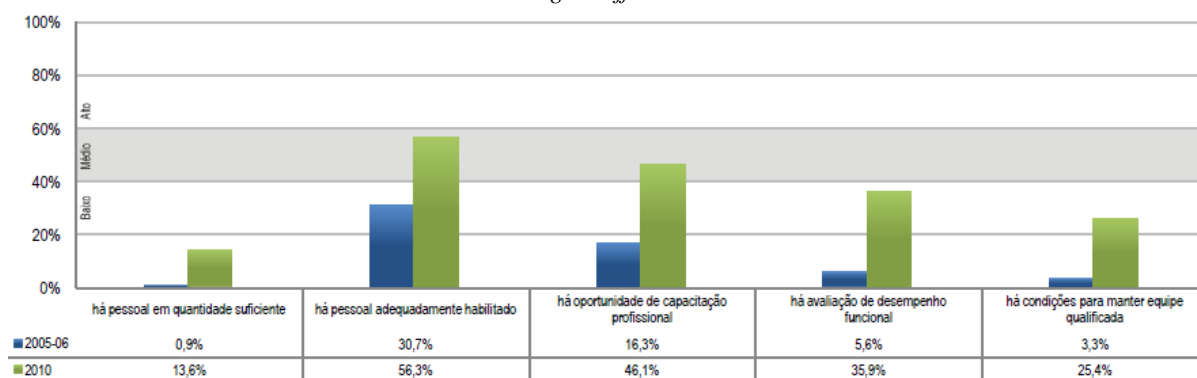


Source: RAPPAM Report 2005/2010 Cycle

The RAPPAM method assessed the human resources specifically in the "federal sustainable use protected areas" category. Graph 2 shows that in the 2005/2006 cycles, the amount of sufficient staff in the units was just 5.7% which is a very worrisome percentage, while in 2010 the percentage rose to 13.8%; it is clear that this increase was low: just 8.1%. It is important to note that this is defined as a low level of

effectiveness, i.e. less than 40%. These data represent an important issue from the point of view of protected area management, and therefore, directly affect the conservation of these environments.

Chart 3 - Is there enough staff in the extractive reserves?



Source: RAPPAM Report 2005/2010 Cycle

From the perspective of "human resources in extractive reserves", the RAPPAM method also pointed out the percentage of human resources. In Figure 3 the alarming rates continue, the number of staff in sufficient numbers in the Exres in application cycles 2005/2006 is only 0.9%, i.e. a low percentage, while in 2010 the amount increased to 13.6 %, a 12.7% increase. No doubt it is an item that needs to be analyzed by protected area management teams. It is very important that these data are

continually monitored, in order to contribute to the reversal of the current critical situation to a satisfactory level of framework and quality.

Based on the analyses performed by the RAPPAM assessment of protected areas on a federal level, including those of sustainable use and in particular extractive reserves, extremely low percentages prevail over the number of staff in protected areas. This represents a gap in the effective management of protected areas which

have too few human resources to carry out the monitoring of such environments.

ROP EXRES is managed by the Chico Mendes Institute for Conservation of Biodiversity (ICMBio), in partnership with two community associations, which are: the Association of Rubber Tappers and Agroextractives from the Lower Rio Ouro Preto (ASAEX) and the Association of Rubber Tappers from Rio Ouro Preto (ASROP). The importance of the association is worth mentioning, considering the fact that both play very important roles for community residents of the CU, they represent those associated with the struggle for socioeconomic rights and intercede in favor of a policy for rubber and other extractive products.

The EXRES management agreement was created based on workshops and meetings in communities, in a participatory manner. This agreement aims to ensure the self-sustainability of the CU, and to lay down rules by which the use of natural resources is guaranteed and duties to be fulfilled by residents are defined. Through this agreement it is possible to have management control of the CU; since the people who live there will be responsible for complying with the rules and also monitoring other residents, this can be considered a positive aspect in the management of the extractive reserve.

ROP EXRES has a deliberative council, which has a stake of 26 (twenty-six) members, and is headed by ICMBio, which is the body responsible for managing it. Participants of the board are composed of various sectors such as government agencies, civil society and traditional populations. The importance of the board should be noted because it is through the board that the CU can be connected with other units and protected areas. The following are council members:

- I - Chico Mendes Institute for Conservation of Biodiversity, one member and one alternate;
- II - State Secretary of Environmental Development - SEDAM/RO, one member and one alternate;
- III - Municipal Government of Nova Mamoré/RO, one member and one alternate;
- IV - National Indian Foundation - FUNAI/Regional Coordination of Guajará Mirim/RO, one member and one alternate;
- V - Municipal Government of Guajará Mirim / Municipal Secretary of the Environment - SEMMA, one member and one alternate;
- VI - Federal Police in Guajará Mirim/Regional office in Rondônia/Federal Police Department, one member and one alternate;

- VII - Military Police of the State of Rondônia/Environmental Police Battalion, one member and one alternate;
- VIII - INCRA - Regional Superintendent of the State of Rondônia-SR-17/RO;
- IX - Association of Rural Assistance and Extension of the State of Rondônia - EMATER, one member and one alternate;
- X - Association of Rubber Tappers and Agro-Extractives of the Lower Rio Ouro Preto - ASAEX, one member and one alternate;
- XI - New Hope Community, one member and one alternate;
- XII - Organization of Rondonian Rubber Tappers - OSR, one member and one alternate;
- XIII - Association of Rubber Tappers of the Rio Ouro Preto Extractive Reserve - ASROP, one member and one alternate;
- XIV - New Colony Community, one member and one alternate;
- XV - Extension of the Apes Community, one member and one alternate;
- XVI - Good Jesus Community, one member and one alternate;
- XVII - Petropolis Community, one member and one alternate;
- XVIII - Ouro Negro Community, one member and one alternate;
- XIX - Forest Community, one member and one alternate;
- XX - National Council of Extractive populations - CNS, one member and one alternate;
- XXI - Divine Holy Spirit Community, one member and one alternate;
- XXII - Three Josephs Community, one member and one alternate;
- XXIII - Pompey Community, one member and one alternate;
- XXIV - Sepetiba Community, one member and one alternate;
- XXV - Our Lady of Rubber Tappers Community;
- XXVI - Association of Agro Açaí Producers of Guajará Mirim - ASAGUAM, one member and one alternate (BRAZIL, 2014, p. 103).

In 1991, residents of the CU ROP EXRES, the State of New Pacaás River Reserve and the New River, participated in the Rubber Tappers Association of Guajará Mirim (ASGM). At that time the ASGM represented all the rubber tappers from different areas. But a few years later, the National Center for Research and Conservation

of Sociobiodiversity (CNPT) and the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) recognized the need for a specific Association for the Rio Ouro Preto EXRES. Thus, ASROP was created due to the fact that transfers of funds are different, i.e. federal nature transfers to federal reserves and state nature transfers to state reserves; thus, they could not be considered the same group.

After the creation of ASROP came another association, also part of ROP EXRES, ASAEX. At first there was a territorial division between the two associations; one of the criteria used by the locals to associate themselves with one or the other was based on political relationships.

In 2002, the scope of each Association was defined on the river. ASROP became the representative body of the upper river, and the low river went to ASAEX. The definition of territorial associations was related to reports that both associations have to present based on the use of resources in projects. These representative bodies are directly linked to internal and external political discussions and participate in matters that are within their jurisdiction; they are members of the EXRES board and assist in preparing the management plan.

In 2007, a socio-economic survey was carried out by ICMBio in order to quantify the EXRES population. It accounted for 583 (five hundred eighty-three) inhabitants and 157 (one hundred fifty-seven) families. 56.6% were men and 43.4% women. According to the ICMBio the area of the reserve is 204,631.55 (two hundred and four thousand, six hundred thirty-one hectares and five thousand five hundred square meters), highlighting the need for human resources in large numbers managing the CU. It is a significant area in scope and has few inhabitants, who play a key role by acting as monitors and often inspectors of such an environment. More human resources could contribute to the unit's governing body, which has difficulty in monitoring such a large area by itself.

For the coming years, the ROP EXRES management plan outlined strategic goals and a mission for the future, stipulating a period of five (5) years to fulfill these objectives. The management plan emphasizes the need to increase the number of servers and collaborators, so that efficient management is carried out. Although there is a deliberative body with many members, this is not enough to meet the demand of the EXRES; therefore, each member is responsible for a distinct function. I.e., there is

one (1) member who represents the municipalities (Guajará Mirim, Nova Mamore), one (1) representative from ICMBio and so it is with all other representatives of the board, there is only one (1) seat holder for each member.

Human resources in the EXRES are paramount, since there is a lack of monitoring of environmental resources, i.e., with a larger number of employees there would be tighter control on the use of protected areas and protection of these environments.

6.2 QUESTION "B" FROM "MODULE 9 - HUMAN RESOURCES" OF THE RAPPAM METHOD: DO EMPLOYEES HAVE THE PROPER SKILLS TO CARRY OUT MANAGEMENT ACTIONS?

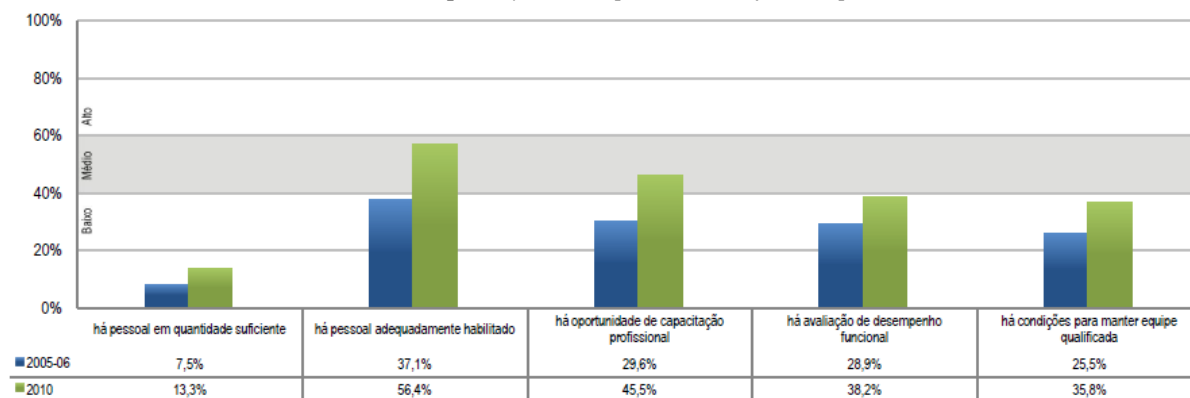
The reserve has only one employee, Mr. Albino Batista Gomes. He belongs to ICMBio, is a career employee stationed in the state of Minas Gerais and exercises a commissioned position (ICMBio Position of Confidence, Conservation Unit, Level: Head DAS) Head of ROP EXRES with housing in the municipality of Guajará Mirim, in the state of Rondônia, which is located on ROP EXRES.

The only employee of the Exres has been an Environmentalist Specialist since 1982, with a master's degree and doctorate in the area of Teaching and Learning. He participated in different trainings made possible by ICMBio directed toward the functions which he develops as head of ROP EXRES. However, only one employee is insufficient to legitimize the Exres management actions appropriately.

On the other hand, the body responsible for managing ROP EXRES, as a federal CU is ICMBio; the unit has a governing board composed of representatives from different segments of society, so those responsible for managing the protected area have the necessary skills for this role.

Representatives of the board are people who are experienced for the position because they are employed by the public bodies which they represent within the board, such as universities, municipal departments, state departments, municipal governments, indigenous institutions, federal police, military police, and associations, among others. The reserve's community is also on the board; that is, these are people who have the capacity to carry out activities and projects for the final purpose of effective CU management.

Chart 4 – Are there adequately trained personnel in federal protected areas?

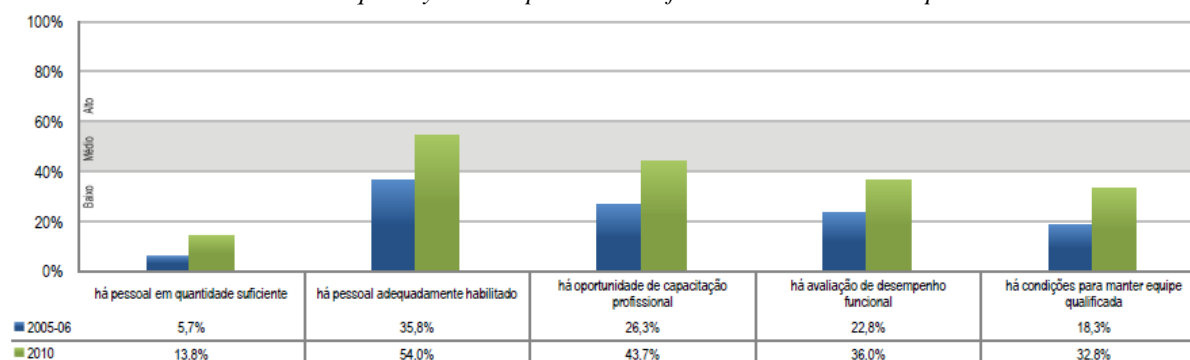


Source: RAPPAM Report 2005/2010 Cycle

Regarding the topic "There are adequately trained staff" to conduct proceedings in federal protected areas, in the years 2005/2006 there was a total of 37.1%, while in 2010 the percentage increased to 56.4%, i.e., increased by 19.3% within five (5) years. Note that this is not the expected result, since it falls within the effective average

rate (between 40% and 60%), while the ideal percentage would be above 60%, which is considered a high level of effectiveness. However, these are certainly important advances in the management of protected areas.

Chart 5 - Are there adequately trained personnel in federal sustainable use protected areas?

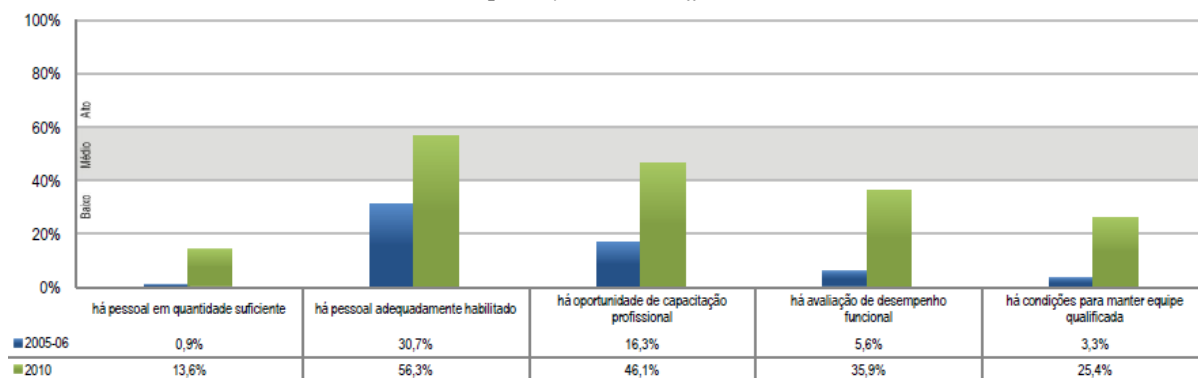


Source: Cycle RAPPAM Report 2005/2010

In regards to the topic, "There is properly qualified staff" in sustainable use protected areas, in the years 2005/2006 the rate was 35.8%; in 2010 the index increased to 54%, achieving an increase of 18% between the two periods. The increase is meaningless if one considers the importance of the topic in question.

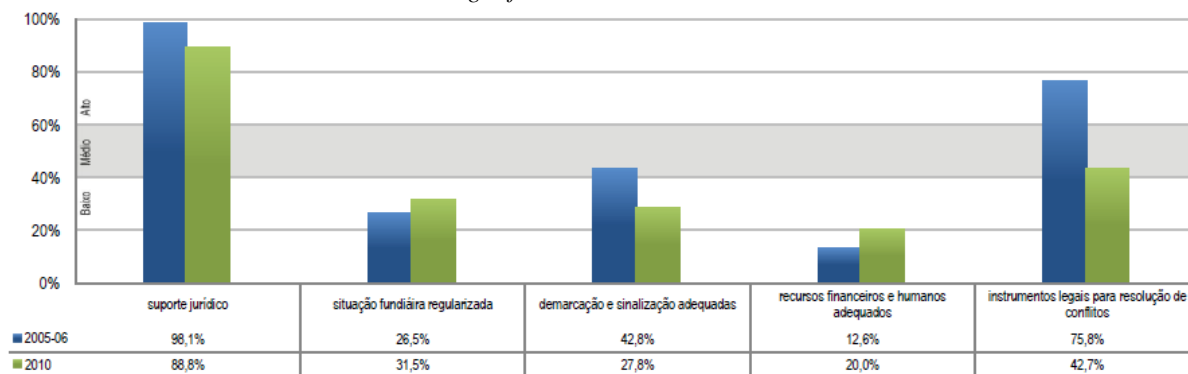
Professional unpreparedness can compromise an entire management team due to a lack of adequate technical knowledge.

Chart 6 – Are there adequately trained staff in the extractive reserves?



Source: RAPPAM Report 2005/2010 Cycle

Chart 7 - Legal framework in extractive reserves



Source: RAPPAM Report 2005/2010 Cycle

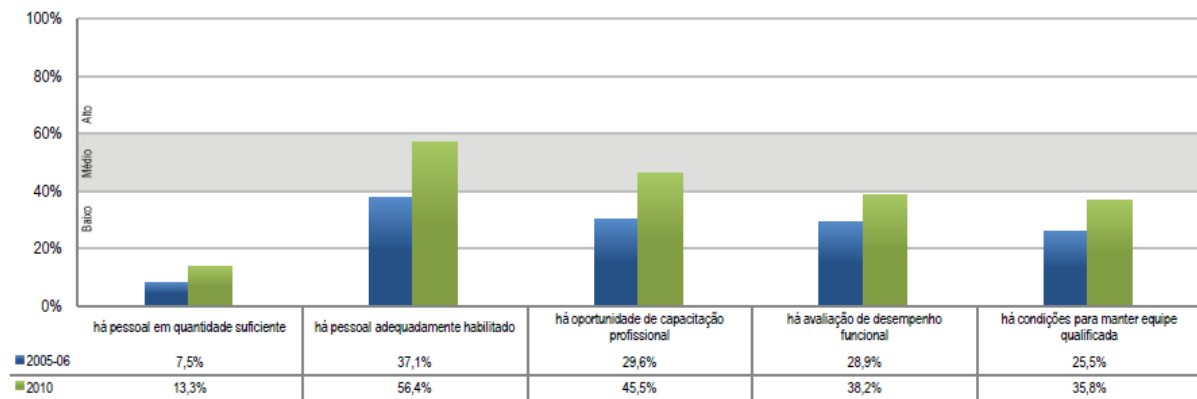
Chart 7 shows information regarding legislation in the extractive reserves, exposing whether or not there are "financial and human resources" in these units. The RAPPAM evaluation explained that in 2005/2006 the amount was 12.6%; it is understood that in this period the EXRES had little support in this regard, since there was an insufficient number of human and financial resources for legal support when compared to the demand. In 2010 the amount increased to 20%, achieving a growth of 7.4%.

6.3 QUESTION "C" FROM "MODULE 9 - HUMAN RESOURCES" OF THE RAPPAM METHOD: ARE THERE TRAINING AND TEAM DEVELOPMENT OPPORTUNITIES, APPROPRIATE TO THE NEEDS OF THE CU?

The management plan indicates a program on management and administration, in turn, through the infrastructure and staff sub-program which listed the priority actions to be developed, among which the ongoing training of the team of ICMBio servers is emphasized with priority for matters relevant to the CU. The document also addresses the need to support the training of association directors, citing ASAEX and ASROP; i.e., there is a concern in regards to training, extending through courses to ROP EXRES employees.

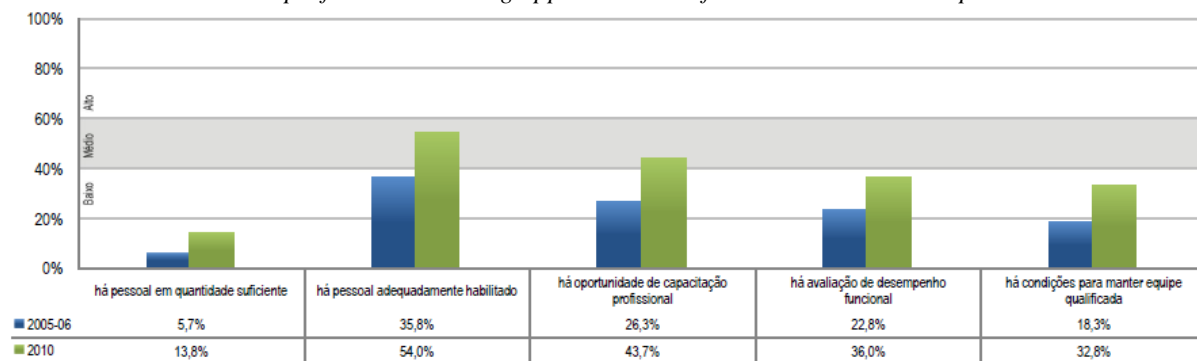
Note that the plan refers to all who directly or indirectly contribute to the unit's management, and therefore require appropriate skills to carry out management actions.

Chart 8 – Are there professional training opportunities in federal protected areas?



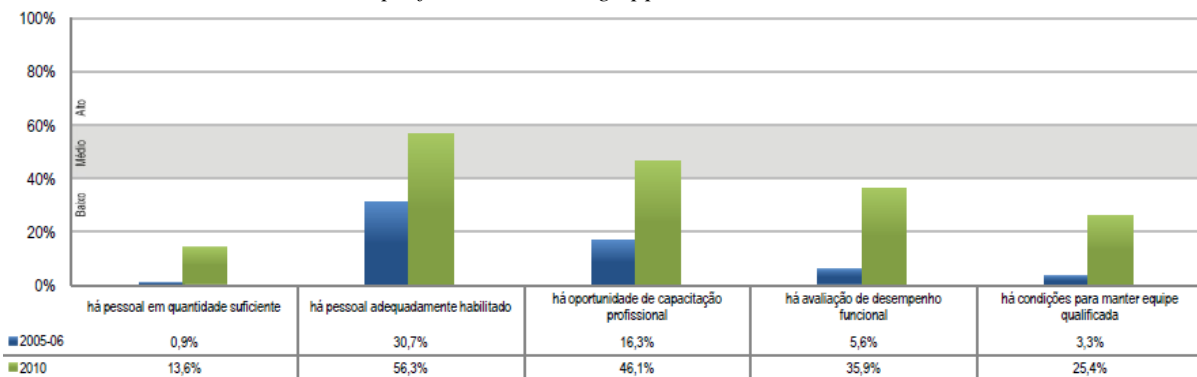
Source: RAPPAM Report 2005/2010 Cycle

Chart 9 – Are there professional training opportunities in federal sustainable use protected areas?



Source: RAPPAM Report 2005/2010 Cycle

Chart 10 – Are there professional training opportunities in the extractive reserves?

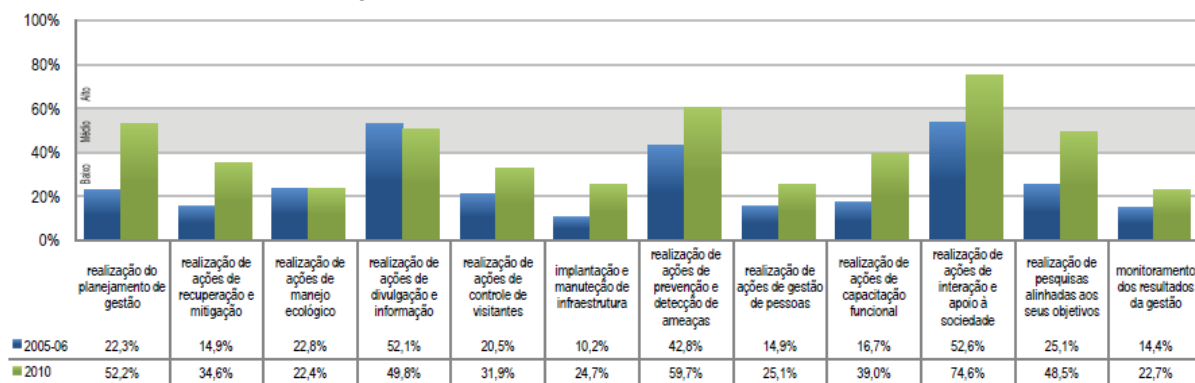


Source: RAPPAM Report 2005/2010 Cycle

The topic "professional training opportunities" aims to show that the professionals working in management bodies of extractive reserves receive preparation through courses, lectures, and workshops. According to Chart 10, training opportunities in 2005/2006 were available in 16.3% of extractive reserves; i.e. very few of the

employees received any kind of training. In 2010 the amount increased to 46.1%; i.e., in that year the topic was average, as defined by RAPPAM (between 40% and 60%); this means that in the course of 5 (five) years there was an increase of 29.8%.

Figure 11 - Results achieved in extractive reserves



Source: RAPPAM Report 2005/2010 Cycle

The RAPPAM 2005/2006 cycles in Chart 11 with regards to "Results achieved in extractive reserves" presented the following indicator: "accomplishment of management actions by people," that is, whether or not those responsible for managing the reserve areas do some kind of work with the community, if there is interaction between residents and the management team. In the years of the above-mentioned result, there was a rate of 14.9%; in 2010 25.1% was obtained, showing an increase of 10.2%. These people's management actions are considered a low rate of management effectiveness according to RAPPAM - less than 40%.

Regarding the "realization of functional training activities," the amount of that item in the years 2005/2006 was 16.7%; in 2010 the percentage was 39% for a total growth of 22.3%. Compared to the item in the preceding paragraph, the functional training activities achieved the best results in the two cycles of application of the RAPPAM method, meaning that the qualifications for employees occurred more frequently in the years cited above than people performing management actions in their own extractive reserves.

Despite this, investment in staff training and development in Exres is unsatisfactory and worrisome, judging by the indices below 40% in Chart 11, indicating a low level of management effectiveness.

The 2014 management plan for ROP EXRES includes the so-called "Management and Administration Program." Under this program there are priority actions such as:

- promote the ongoing training of ICMBio servers, prioritizing issues concerning ROP EXRES.
- seek support for the directors of the associations ASAEX and ASROP with the aim of carrying out basic work on EXRES; for this, logistical, financial, organizational and training support is necessary.

c) ensure improvement in the meetings of the ROP EXRES board promoting cost assistance, in view of the meetings of directors (BRAZIL, 2014, p. 135).

Note that the items that the program brings are of great relevance to meet the CU's needs in relation to staff training and development. Through the priority actions cited above, it is clear that there is concern in equipping ROP EXRES with appropriate infrastructure and human resources, that is, capacitating it for good management.

It is noteworthy that the ROP EXRES management plan makes clear that the training of ICMBio servers will be held on a permanent basis, i.e., the goal is that employees are continuously being trained, which is a positive point for team development.

Another item worth mentioning is the need to provide financial resources to the representatives of the associations so they can participate in board meetings. Board meetings are also ways to develop and empower the team, considering the debates and issues discussed in the meetings.

6.4 QUESTION "D" FROM "MODULE 9 - HUMAN RESOURCES" OF THE RAPPAM METHOD: ARE THERE PERIODIC PERFORMANCE AND PROGRESS EVALUATIONS OF EMPLOYEES?

The evaluation of the single employee Exres follows the pattern of the federal government, in which the employee receives scores from two sources: a) an institutional assessment and b) an individual assessment. The employee is required to make an Individual Work Plan (ITP) with goals and records of all his planned functional actions. The evaluation occurs annually.

The method for evaluating protected area officials' performance is carried out as follows:

a) the employee receives 3 ratings: one issued by their immediate supervisor, one issued by co-workers and one self-evaluation done by the employee himself. The average score obtained from the three ratings is the employee's final score;

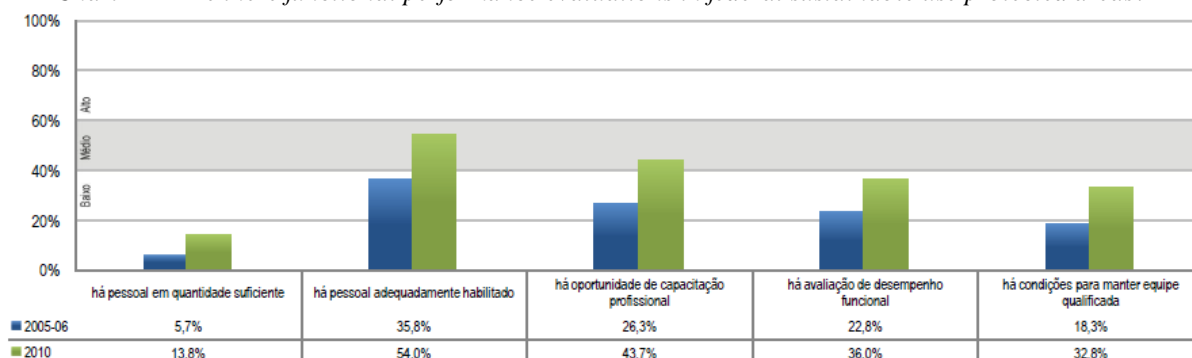
b) the evaluation receives percentage scores. For example, the bylaws of the board mandate that those responsible for protected areas must perform at least two (2) regular meetings per year. In the case that a CU manager holds only one meeting, the score to be allocated is 50% of the total value. If the employee's PTI states that he should issue, "in a timely manner", all SISBIO permits, and he by chance does not meet this goal, delays authorization, or does not give out licenses before the deadline, he gets a score of zero (0) on this evaluation item. Another example are surveillance functions. If the employee is supposed to carry out a minimum of 4 surveillance functions per year, these four will be provided in the system. All data are contained in a digital system; all board meetings have standard proceedings: invitation, attendance, etc.

c) the evaluation consists of 10 items that can be worth a score from 1 to 5. In order for the employee's salary to not be docked, he must achieve a minimum score of 80%.

The management plan does not mention evaluation methods related to employee performance; however, as has been stated, there is a deliberative body that is also responsible for managing ROP EXRES. There is also the participation and support of the two associations ASAEX and ASROP in the case of associations representing the reserve's community, the evaluation takes place by its own representatives and also by the locals. Each one plays a role in assessing whether or not the functions assigned to them are in fact being fulfilled. The management plan proves this through items 31 and 34 recorded in the "Management Agreement" transcribed from the plan.

Through telephone contact with the current chief of ICMBio in the municipality of Guajará Mirim (RO), Mr. Albino Batista Gomes said that ROP EXRES board meetings occur twice a year and should the need arise, extra meetings may also be held.

Chart 12 – Are there functional performance evaluations in federal sustainable use protected areas?

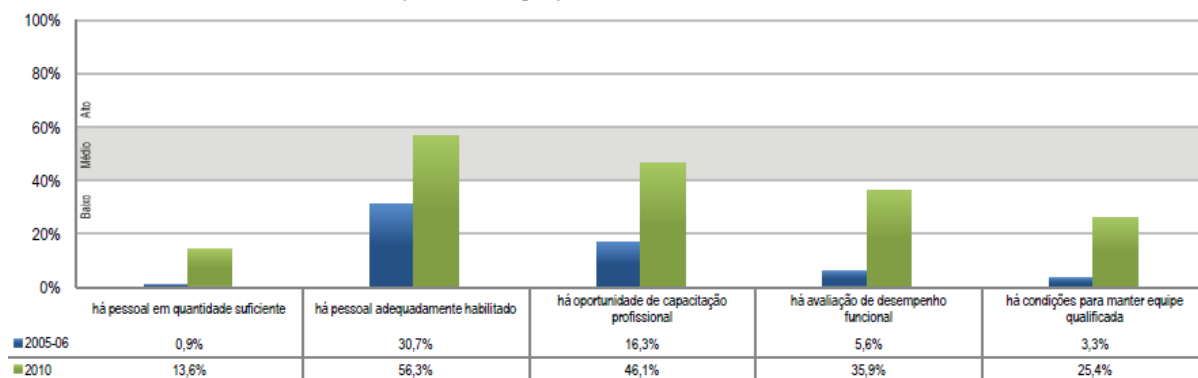


Source: RAPPAM Report 2005/2010 Cycle

With regards to the "functional performance evaluation," Chart 12 shows that in 2005/2006 the percentage was 22.8%; in 2010 the index increased to 36%, resulting in an increase of 13.2%. The highlighted item is interesting, because it shows employee productivity in protected areas, whether they are

performing their activities satisfactorily or not. As might be expected, the low investment in training human resources causes low levels of performance.

Chart 13 – Are there functional performance evaluations in extractive reserves?

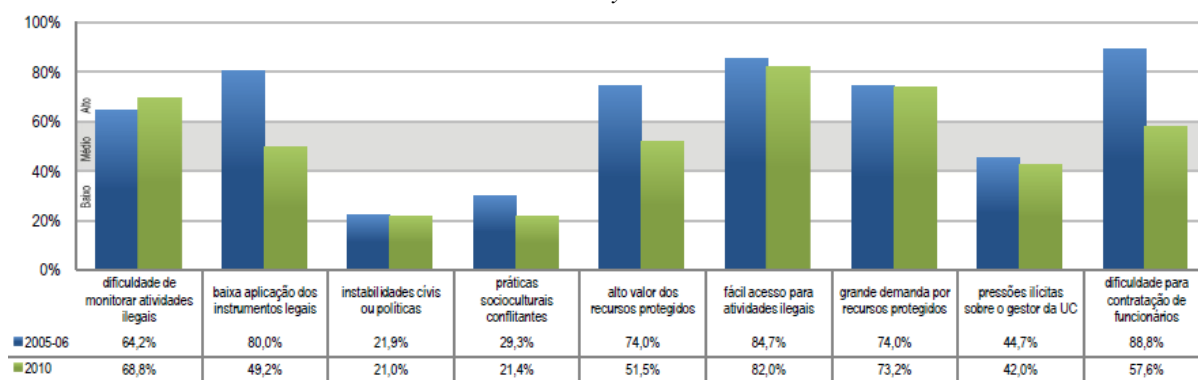


Source: RAPPAM Report 2005/2010 Cycle

Another item worth mentioning in Chart 13 with regards to "functional performance evaluation" is the smallest result of 5.6% in the 2005/2006 cycle. In 2010 the same indicator was evaluated at 35.9%, amounting to

an increase of 30.3%. No doubt this is a topic that had significant advances; however, percentages remain low compared to the average.

Chart 14 - Vulnerability in extractive reserves



Source: RAPPAM Report 2005/2010 Cycle

Regarding vulnerability in the EXRES, Chart 14 points out worrisome figures related to "difficulty in hiring employees." The 2005/2006 cycles' result for this item was 88.8%, meaning that in the period analyzed by RAPPAM the percentage was in the uppermost level, which is in line with the analysis performed earlier about the "amount of staff in CUs" which obtained low rates. This points to a serious failure that compromises the management of protected areas; that is, if governing bodies do not have a large staff, let it at least be satisfactory, in order to meet the needs of extractive reserves.

In 2010 the figure fell to 57.6%, which amounts to a decrease of 31.2% in the periods covered; however, the result is still not satisfactory, because the index indicates a percentage greater than 50% in an area that should have skilled and necessary manual labor workers for all activities related to PAs.

6.5 QUESTION "E" FROM "MODULE 9 - HUMAN RESOURCES" THE RAPPAM METHOD: ARE THE WORKING CONDITIONS SUFFICIENT TO MAINTAIN A TEAM SUITABLE FOR THE OBJECTIVES OF CUs?

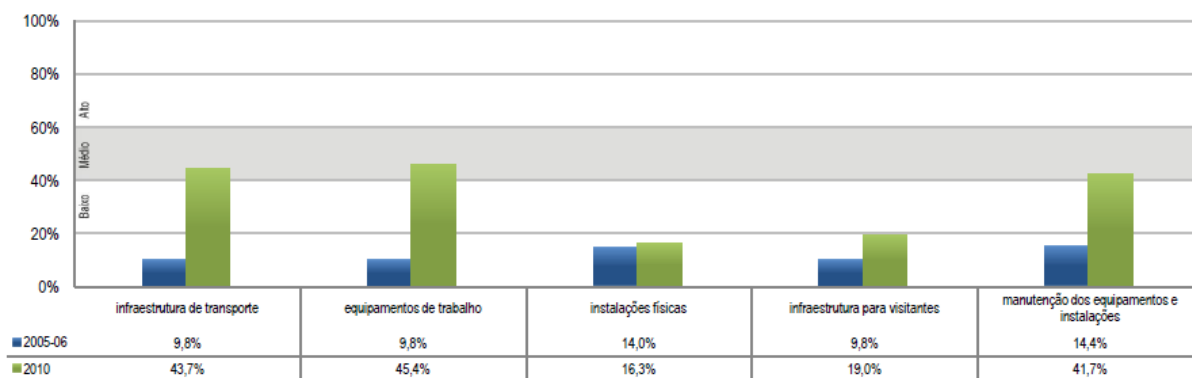
No, the plan indicates that the infrastructure of ROP EXRES does not have conditions suitable for its needs, with only the on-site community within the CU. In the plan, the importance of building a base of support for communities with the ability to save, for example, vessels or other objects is also highlighted.

According to Mr. Albino Batista Gomes, Head of ROP EXRES, the Pompey building is a place where meetings take place with the community and is currently (2019) undergoing renovations. The management plan also draws attention to the need for the associations to have their own offices.

By the time the plan was drawn up in 2014, the ICMBio office was in a rented house, located in the Downtown neighborhood in Guajará-Mirim (RO), urban area of the municipality to which the Exres belongs. Currently, the administrative headquarters are located in

the former building of IBAMA, located at Avenida Dos Seringueiros, No. 1343, district: Liberdade, in the municipality of Guajará-Mirim (RO).

Chart 15 - Infrastructure in extractive reserves



Source: RAPPAM Report 2005/2010 Cycle

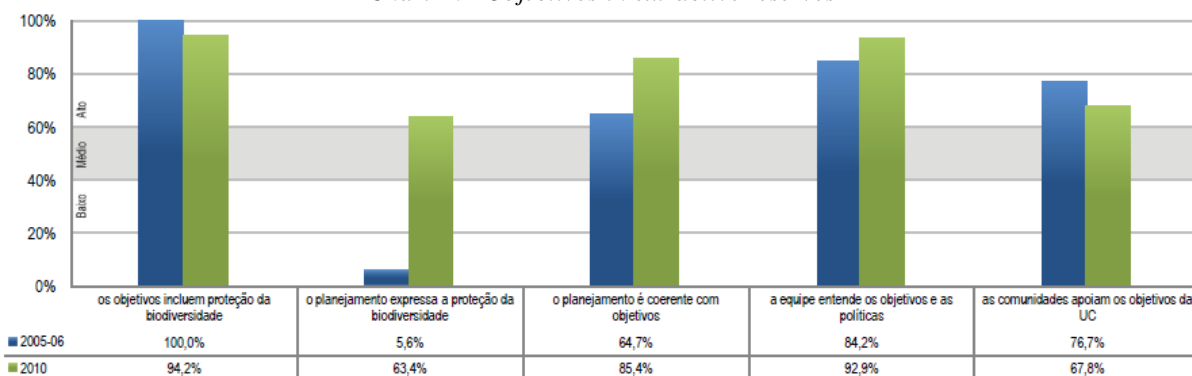
With regards to "transport infrastructure" the application of the RAPPAM evaluation in the years 2005/2006 resulted in a percentage of 9.8%; that is, during this period the locomotion in EXRES was difficult to access due to issues such as lack of fuel, lack of vehicles or small vessels, among other reasons. All these points mentioned led to a low quantitative result in this category. In 2010 the amount increased to 43.7%, an increase of 33.9%.

On "work equipment" the RAPPAM method, as indicated by Chart 15, denotes a rate of 9.8% in the 2005/2006 cycles, indicating that residents along with the management team did not possess the tools necessary to do their jobs. In 2010 the same item increased to 45.4%,

showing a significant increase of 35.6%. This represents a major advance for the above-mentioned topic.

With regard to the item "physical installations" in extractive reserves, that is, structures that adequately meet the needs of the units' residents and managers, Chart 15 shows results with very low rates. According to the 2005/2006 evaluation cycles, the amount was 14% and increased to 16.3% in 2010, representing an increase of only 2.3%. There are difficulties for the EXRES to have adequate physical facilities, and the small increase over the period covered does not represent improvements in this area.

Chart 16 - Objectives in extractive reserves



Source: RAPPAM Report 2005/2010 Cycle

Regarding the topic that addresses whether or not "the team understands the objectives and policies" of extractive reserves, Chart 16 shows positive points in the

above item. The result from the 2005/2006 cycles was 84.2%, a high, satisfactory result from a quantitative point of view. In 2010 the percentage increased even more, to

92.9%, i.e. an increase of 8.7% over the years analyzed. These evaluation data from the RAPPAM method demonstrate a significant and positive step forward for teamwork development in protected areas, namely the fact that teams understand the goals of EXRES and therefore can work towards achieving the purpose of PAs.

VII. IMPORTANCE OF HUMAN RESOURCES IN PROTECTED AREAS

From reading the book *Management of Protected Areas: Sharing a training experience* (2012), we attempted to analyze the importance of human resources in protected areas.

In the chapter entitled *Instruments for Community Participation*, the author Miranda draws attention to the benefits of integrated work, i.e. by means of a more humane and cooperative management system.

On the importance of human resources in protected areas the author states:

Community participation in protected areas arises from the need to improve their management and create alliances with the surrounding communities, partnerships to collaborate in the conservation process of these important areas. Community participation is necessary since the legal requirement is not enough for the country to succeed in the challenge of conservation of natural areas as vast as those found in Brazil (MIRANDA, 2012, p. 240).

It is worth highlighting the role of protected area managers addressed in the book, which are characterized as entrepreneurs, that is, the text points out that a manager is a leader and to this end it takes some initiative to achieve good unit management; one is the ability to listen and understand the needs of the residents. Thus Miranda (2012) says:

(...) the importance of participation of the people in public decisions and policies was recognized, heretofore created exclusively in offices, causing distortions in the initial objectives that often resulted in ignoring local realities. (2012, p. 243)

Based on the knowledge of human resources in protected areas, changes are possible in order to meet the needs of local communities. It is the communities that experience, are familiar with and have empirical knowledge of the reality of the units. Working in cooperation enables efficient management, consisting of exchanges of experiences between the management team and residents of PAs. It is very important to consider the experience of the people in the area, and also discuss relevant issues about the unit with the locals.

The literature concerning the importance of human resources in protected areas is still scarce, which sets up a scenario of little previous research on the topic in question. Thus, the need for scientific studies on the above subject should be noted.

For the management of PAs factors such as adequate infrastructure and skilled personnel are necessary, with particular emphasis on a sufficient number of human resources based on the size of such areas. The role of protected areas will only be fully achieved if the sum of the factors mentioned is in fact implemented in the units, so that they can successfully perform the role of preservation and conservation of biodiversity.

In summary, it can be said that the problems involving CUs are not only reflected in the lack of human resources, but it should also be understood that infrastructure, public agencies and community participation, are points that contribute to the effective management of protected areas. This means that all these issues should be taken into account to address the obstacles faced by PAs.

Regarding the problems faced in protected areas in Brazil:

However, the hiring of qualified personnel alone will probably not solve the problems that conservation areas in Brazil experience, since basic studies in protected areas through partnerships with universities and research institutes are necessary along with a defined infrastructure in each of them, both in terms of human and material resources as well as projects and facilities (HENRY-SILVA, 2005, p. 148).

Efforts to maintain the units are paramount in the process of PA implementation; one can cite as an example the strengthening of management in protected areas, i.e., it is a way to correctly use the protected areas thereby helping to minimize negative environmental impacts in such areas.

Another important factor that should be considered is that the small amount of infrastructure that is installed in the CUs is precarious and low quality. The lack of adequate infrastructure hinders the work carried out in protected areas and also compromises its management. A few examples of actions that are impaired due to lack of the aforementioned factors include: surveillance, monitoring, scientific research, among others. The sum of these factors comes directly or indirectly from a deficiency in infrastructure. The following analysis can also be performed: lack of transportation affects the monitoring and supervision of protected areas. Another important item refers to scientific research for

development. In order to facilitate studies within the units, accommodation for researchers would be viable, since this would facilitate the progress of their work. It would serve as an incentive to contribute directly to the studies that support the improvement of management in protected areas.

Through an analysis of challenges protected areas face, Maganhotto portrays the following scenario:

The great challenge of the units is not in their creation, but in the implementation process, which requires the existence and improvement of different actions such as defining and establishing a management plan, regularization of land as soon as possible, availability of resources humans, implementation of basic infrastructure and achieving financial sustainability, thus minimizing threats to the conservation of resources encountered in the area. (MAGANHOTTO, 2014, p. 216).

No doubt SNUC is an important tool for protected area management in Brazil; it establishes criteria and standards for the creation, implementation and management of protected areas. However, despite the benefits that such a system provides protected areas, the authors note that the guidelines listed in SNUC require implementation so that it can be an effective tool for the conservation of protected areas, in addition to meeting its primary purpose: to protect and preserve nature.

SNUC is weak with regard to support from government agencies that can provide suitable devices for management and preservation of protected areas. Investment is needed in order to meet the system's requirements, so that PAs are able to properly carry out their mission to protect natural resources.

Regarding the lack of human resources, Schiavetti also points out other features that hinder management of these areas:

SNUC represents a public policy meant to strengthen the capacity to plan and properly manage protected areas (PA). However, this protection tool has been criticized due to some deficiencies in implementation and effectiveness for conservation. Among the main problems related to its implementation, the following stand out: undefined land ownership, invasions, lack of human and financial resources and lack of a basis of reliable information about the network of protected areas. (SCHIAVETTI, 2012, p. 612).

A study on CUs carried out in Central Atlantic Forest Ecological Corridor (CCMA) in the State of Bahia, addressed issues such as: management tools, infrastructure, work equipment and land tenure in

protected areas. 48 conservation units at the federal and state level, including those categorized as full protection and sustainable use, were analyzed. With regard to human resources in protected areas, Schiavetti highlights some worrisome data points:

As for human resources, the data indicated that just over half of PAs in the CCMA (56.6%) had three or fewer employees for the performance of various activities, and 13.33% reported having only one manager. (SCHIAVETTI, 2012, p. 617).

One of the points that the lack of human resources directly affects is the inspection of the units that have large territories and few employees in management. Throughout Brazil the status of employees in protected areas is scarce; that is to say that despite the importance of the areas there is no basis for proper monitoring.

Brazil has vast natural resources and it is through protected areas that the preservation of biological diversity is made possible. So the deficiency in the quantity of professionals trained for supervision compromises the purpose of CUs impairs effective management, which also affects local communities. An alternative to this situation would be to conduct public procurement in order to address the shortage of human resources, which could strengthen work teams.

On the supervision of PAs at a national level, Magellan states that:

Studied CUs confirm the national reality as to the unsatisfactory number of human resources in the environmental context, as the country average is just fewer than four monitoring officials per thousand square kilometers. The staff is an important requirement for evaluating implementation because it is directly related to the main objective of these areas: conservation of natural resources, which requires supervision. (MAGALHÃES, 2008 p. 620).

Protected areas require mechanisms that ensure their effective implementation. It should be noted that in order for this to occur, one must first map out the disadvantages of CUs; only then does it become possible to see what needs to be implemented, modified or inserted in the studied scenario.

However, there are items that are directly linked to the management of protected areas; for example: land tenure, staff availability and also working with the communities.

According to Schiavetti, the following items should be considered for effective management of protected areas:

Land tenure regularization, the existence of management tools, hiring managers and the presence of human and financial resources as well as infrastructure, are essential for achieving effective implementation. (SCHIAVETTI, 2012, p. 621).

According to Leite (2015), the RAPPAM method is one of the recurring instruments in evaluating the effectiveness of protected areas; that is, the author points out the relevance of the methodology for this study and its application in protected areas. He further states that through global analysis, the aforementioned method presented five items that represent gaps in the management of the units, namely: human resources, financing, research, community relations and monitoring. Thus, the shortcomings mentioned above indirectly cause problems for protected areas, such as logging, biological invasions and poaching.

By studying the management model of Brazilian PAs, Leite says:

Regarding the current management model and, when considering the existing human resources for protected areas, the monitoring capacity was, in general, insufficient to ensure the effective management of ecosystems. In this sense, the main obstacles identified were related to strategies designed to expand the monitoring capacity and education of the populations located around the protected areas. (LEITE, 2015, p. 125).

The mosaic idea in protected areas constitutes an integrative perspective of various sectors of society. This model proposes integrated, participatory and intersectoral management that makes it possible to work together for the benefit of protected areas, with the aim of achieving better results. The characteristics pertaining to the mosaic idea are beneficial to PAs, since it is based on strengthening management.

There are barriers to the creation and consolidation of mosaics in protected areas; complex projects are needed that can guarantee the involvement of the various public sectors, i.e. it is a field that needs improvements, but there is great strategic potential that drives the issue of mosaics.

According to Melo, human resources contribute to integration processes of protected areas; the author points out:

The asymmetry in the degree of implementation of the conservation units involved and the level of availability of human and financial resources to do so may therefore represent important aspects of the process of integration of protected area management

in a strategic perspective of mosaics. (MELO, 2014, p. 52).

The issue of visitation in protected areas, citing, for example, those related to national parks, involves some essential factors in order to occur in a positive way: one of these factors is the support of human resources. The parks have the function of conservation of biological diversity; however, in that space it is also possible to carry out environmental education, recreation and tourism within nature, i.e. all the items mentioned contribute to the fact that this type of CU fulfill its purpose and strengthen its role.

Regarding the lack of human resources in protected areas, Rodrigues points out some factors that hinder visitation in protected areas:

The lack of human and financial resources is a recurring event in the routine management of protected areas, especially when it comes to implementing and qualifying the infrastructure to support visitation. Thus, depending on the format and the economic feasibility, the consolidation of equipment and infrastructure with funds injected by the concessionaire himself is required. (RODRIGUES, 2013, p. 86).

One of the major problems that directly affects protected areas because of a lack of human resources, are the negative impacts that may happen due to lack of supervision, i.e., the environmental degradation that such areas are subjected to. For proper functioning of the management of protected areas, the organization of responsible public agencies is necessary along with actions to ensure the preservation of natural resources.

Some actions are able to minimize negative impacts within protected areas, including: employee training, environmental education programs and regional development. All these issues will be carried out successfully if the units have appropriate support in the form of human resources for carrying out the work.

According to Pires, a lack of human resources hampers the structure of management of protected areas; the author notes:

Difficulties regarding financial and human resources mean distinct difficulties for the effective implementation of conservation units; moreover, the lack of policies for the management of the units and the disruption of the responsible government agencies pose as a central issue to the degradation of the units. (PIRES, 2015, p. 147).

VIII. MANAGEMENT OF PROTECTED AREAS IN BRAZIL

Based on research conducted on-site at ICMBio, as well as through research publications, participatory projects involving the community in the management of protected areas in Brazil proved important. In this sense, the following examples can be cited:

- a) Cairuçu APA (Rio de Janeiro) through the theater of the oppressed;
- b) The islands and floodplains of Paraná River APA through shared, integrated and participatory management;
- c) Chapada dos veadeiros PARNA (Goiás) and Contagem REBIO (Federal District) through forest restoration, used as a means of environmental education and engagement with communities;
- d) Iguaçu PARNA through environmental education as a strategy for strengthening the management of protected areas.

Regarding the aforementioned participatory projects that involve communities:

a) Cairuçu APA:

The Cairuçu conservation unit developed a project called "Theater of the Oppressed," created by ICMBio in the year 2014. Through the project, an environment for dialogue was created between traditional communities and teams responsible for management of the CU.

The goal of the project is to promote the opportunity for discussion and reflection on the interests of communities and issues related to management of the CU. Workshops were held, in which exercises, games and theater techniques were utilized where participants had the opportunity to discuss issues and, with the collective support of the CU management team, to seek possible solutions. The result of the project demonstrated the importance of such initiatives: the traditional communities now have a new perspective on the role of the APA advisory board; there was also more active participation of the community in reviewing the management plan, i.e., it was a stimulus for discussing issues that affect everyone in the APA and should be addressed.

It is noteworthy that the workshops helped not only residents but also the CU management teams. The exchange of information with the population brought a new vision of the role of the institution, staff and Cairuçu APA.

b) Islands and Floodplains APA:

The unit is located in Umuarama (Paraná); it is an area of vast territory, covering 25 (twenty five) counties in three (3) states (Mato Grosso do Sul, São Paulo and Paraná). In order to manage such a comprehensive unit, ICMBio created a management model classified as "Shared, Integrated and Participatory Management (GCIP)." The idea is to engage with local institutions in order to benefit APA management. Partnerships between municipalities, municipal consortia and the APA's management council resulted in many benefits to the CU, such as:

- b.1) Support in preparing the management plan;
- b.2) Greater flexibility in making decisions about issues related to the APA;
- b.3) Decreased costs of infrastructure and human resources.

The management model (GCIP) was important in view of the project ensuring the integration of institutions into APA administration, providing direct contact with the communities, i.e. benefiting management of the CU.

c) Chapada dos veadeiros PARNA and Contagem REBIO:

The forest restoration project arose from the need to prevent the advance of foreign grasses that produce changes in ecosystems, resulting in environmental changes in native vegetation.

The initiative partnered with students at the University of Brasília and the Brazilian Agricultural Research Corporation (EMBRAPA); research was conducted to find techniques for proper management.

One positive point noted in the course of the project was the involvement of the community in the stages of the study; people helped with everything from collection to planting and monitoring experiments, i.e., they took part in all stages of the project. The community interaction with the process of forest restoration served as a form of environmental education bringing knowledge about the Cerrado directly to management of the CU.

d) Iguaçu PARNA:

The Iguaçu CU aims to protect species of Brazilian fauna and flora from the Atlantic Forest. The project's goal was to find ways to protect the Iguaçu PARNA from hunting pressures, inappropriate land use and water pollution.

The CU is in the vicinity of 14 municipalities. Because of all the threats to biodiversity, the Iguaçu PARNA, with the help of public school teachers and technicians from Departments of Education and Environment, offered an environmental education class on protected areas. The main purpose of the course was to show the public that it has a fundamental role in protecting CUs and

simultaneously exposing the value of environmental services provided by the Iguazu PARNA.

Environmental education has contributed to the community's capacity to identify problems affecting the CU, actions that could benefit the protected area and educational processes on these subjects also occurred.

The participatory projects mentioned above made a significant contribution towards helping the management of protected areas. Community involvement provides an atmosphere of exchange of knowledge and ideas; the population has local knowledge, know the reality of the CU in which they live and can contribute to improved management. The management of protected areas is a major challenge, taking into account the territorial dimension, and the cultural, social and environmental diversity they possess.

It is noteworthy that the managers of protected areas are responsible for sensitizing communities to the importance of participating in matters relating to protected areas. Lectures, workshops, and classes, are forms in which the management team interacts with the population. The sum of the collective work makes unit management effective; communities have the opportunity to discuss issues related to CUs, propose alternative solutions, and understand the importance of preserving biodiversity. Managers are also benefited by the local knowledge of the population; in addition, through enabling residents of PAs with environmental education, they become multipliers of this idea and help to monitor protected areas, making up for the lack of human resources in areas of management.

IX. SHARED MANAGEMENT PROGRAM AT GUAJARÁ MIRIM STATE PARK (RONDÔNIA)

The Guajará Mirim State Park (PEGM) is located at the western end of the state of Rondônia, with an area of approximately 258,813 (two hundred fifty-eight thousand, eight hundred and thirteen) hectares; it comprises the municipalities of Buritis, Campo Novo, Guajará Mirim and Nova Mamore. The CU is inserted in an environmental context of great importance because it has a great diversity of plants and animals occurring in different ecosystems and also because it is located in the vicinity of Karipunas, Uru Eu Au Au, and Ribeirão Laje Indigenous Lands as well as Rio Pacaás Novos EXRES.

The shared management program PEGM was developed by the State Department of Environmental Development (SEDAM), with the aim of establishing a participatory structure, i.e., implementing and encouraging environmental education, eco-tourism and

carrying out scientific research. The shared management model was based on beneficial experiences in national parks in Bolivia. In short, the central idea of this model would be to enter into agreements with non-governmental organizations, such organizations being responsible for performing CU management actions, with the support of state and society to assess such actions in advance.

The implementation of shared management at CUs caused some challenges by environmental agencies for the provision of resources for programs; another obstacle has been found relevant to the complexity of rules for bidding which led to the withdrawal of many companies that initially expressed interest in participating in the program.

The participation of the PEGM surrounding residents was essential to achieve positive results in the program, namely, contributing to the maintenance of the conservation unit. Through this union between the management team and the surrounding residents the creation of an advisory board and of park rangers were made possible, the latter being formed by members of the community from nearby locations.

In 2004 the Park was awarded the Amazon Region Protected Area Program (ARPA), and with support from the Brazilian Biodiversity Fund (FUNBIO) achievement of participative management by the park's advisory board was significantly accelerated. Insertion of the State Park in an ARPA program generated other actions for surrounding residents, such as surveys of the surrounding lands, Brigade training, Forest Fire Fighting training, among others.

Shared management of the CU demonstrated the importance of social organization and working together. With social mobilization and contributions from the CU's surrounding residents, the creation of the advisory board was made possible and is a positive point for management of the Park. It should be noted that the commitment and harmonious work of people living around the PEGM along with environmental agencies have provided learning opportunities and constant improvements in management, for the purpose of maintaining and protecting the CU.

Through the example of PEGM mentioned above one can also conceptualize a shared management program for ROP EXRES, i.e. a participatory management model for the unit with support from non-governmental organizations, local communities and environmental agencies.

The ROP EXRES management agreement provides for public participation in matters relating to the CU, and also for contributions from associations and

environmental agencies that are involved in this agreement with explicitly defined rights and duties.

Regarding monitoring of the reserve, the management plan puts forth some measures mentioned in the management agreement, such as:

- a) It is up to the associations and communities to carry out monitoring of the Reserve. It is up to ICMBio to carry out surveillance of the reserve;
- b) Each rubber tapper is responsible for placement and for other settings; he should not only ensure their placement, but also observe that the resources of the Reserve are being watched over by others;
- c) The behavior and actions of visitors in relation to natural resources and improvements in the EXRES are the responsibility of the recipient. Damages that visitors may cause to the EXRES should be reimbursed by those who invited them. (BRAZIL, 2014, p. 111).

It should be noted that the proposal mentioned herein, including work in partnerships of local communities, managers and public agencies in ROP EXRES is a form of CU management aiming towards greater effectiveness for the protection of environmental resources. The benefits of this model are of great importance both for the population and for environmental agencies.

Local communities play a key role in the management of CUs; they can assist in finding environmental problems in protected areas, including: identifying deforestation, supervising other residents of the area and communicating suspected environmental crimes to responsible staff members. Based on the evaluation of the effectiveness of management carried out by the RAPPAM method in the 2005/2006/2010 cycles, ICMBio does not have a sufficient number of servers to supervise the CU, so the support and integration of the population in this sense is of paramount importance for the management of ROP EXRES.

The strengthening of public policies to protect the way of life of traditional populations, the search for improvements in the quality of access to basic services of local communities and also encouraging more young people to enable them to continue developing work within the CU, are ways to manage the unit and thus maintain the conservation of natural resources and improve the quality of life of its beneficiaries.

X. FINAL CONSIDERATIONS

Human resources are essential for the proper management of protected areas in Brazil; despite the lack of a sufficient number of these professionals, this study

demonstrated some ways to mitigate the damage caused by this problem.

One path that has been pointed to is greater community participation in the management of protected areas. Popular contribution helps and is of great importance for the effectiveness of the administration of the areas, given that working together between management agencies and community is a way to meet the real needs of the PA. Residents should be heard by those directly involved in the conservation of protected areas; it is worth noting that the construction of the ROP EXRES management plan, as has been stated, included a large amount of resident participation, i.e., a joint effort with the objective of meeting and understanding what the local population really needs, and seeking improvements in the relevant issues.

Brazil, as a country rich in natural resources, plays an important role in the preservation and conservation of protected areas that are home to much of the globe's biodiversity. Therefore, management should be seen as a priority by both agencies responsible for these areas, as well as the community around protected areas, and society in general. Every individual has a portion to contribute for the sake of effective management in the units. In this regard we note the importance of the ROP EXRES management plan, which points out forms of protection for the unit and also demonstrates ways to ensure that these objectives are met. For example, the governing board, the strategic objectives, programs and sub-programs aimed at environmental conservation, management, enhancement of traditional populations among other ideas listed in the plan.

The RAPPAM method questionnaire, used as the basis for this study, assisted in the development and contextualization of the problem in question. The instrument can be considered an effective way to quickly evaluate the management plans of protected areas. It also serves as a tool for protected area managers, to elucidate the situation of protected areas with regard to various topics, thus allowing for an analysis of what needs to be corrected.

Despite the lack of literature on human resources in protected areas, the authors referred to in this study show the importance of having a greater framework with enough servers available for the size of protected areas in Brazil. This study also showed the importance of further studies on the above topic to contribute to the management of protected areas.

Finally, it is noteworthy that the governing board of the ROP EXRES unit is an important management tool, since despite the low number of servers, the unit operates

in such a way as to fill this gap. The Exres utilizes this board, and this is a positive point for cooperation in protecting the unit.

As a suggestion, this study points to the possibility of shared management being employed in ROP EXRES, similar to other experiences in protected areas, as reported in Section 9 of this text. The alternative can help alleviate much misappropriation of funds caused by the lack of human resources in the reserve. Either way, we must, first, find out whether or not the CU community complies. If all interested and involved parties are in agreement, this option could finally be included in the next update of the management plan.

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