

THE ECONOMIC IMPACTS OF TOURISM AT MAMIRAUÁ SUSTAINABLE
DEVELOPMENT RESERVE, AMAZONAS, BRAZIL
2008-2017

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Abstract

Tourism in protected areas faced significant changes in the past fifty years. The inclusion of local populations as a strategy for conservation of biodiversity and natural resources gained force in the early 1990s when areas of high biological interest in tropical areas included the community development approach for ecotourism planning. In Brazil, Mamirauá Institute for Sustainable Development - MISD pioneered the implementation of such an approach in the Amazon with Uakari Lodge, that started operations in 1998. The lodge aims to develop an alternative professional activity at its surrounding villages in Mamirauá Sustainable Development Reserve which, combined with the traditional fishery and agricultural occupations promote community development.

This study aims to analyse the last ten years (2008-2017) of economic impacts of tourism at Mamirauá Sustainable Development Reserve to those eleven local communities that work at and co-manage Uakari Lodge. From 2008 to 2017, the lodge generated approx. R\$2.8 million (or equivalent US\$843 thousand) in direct economic benefits to Mamirauá communities, besides other measurable and unmeasurable indirect incomes to the population. An average of 83 families was connected to ecotourism activities annually, and their medium income was of 4.16 minimum salaries per year. The average individual income at the municipality where Uakari Lodge is located is 0.5 minimum salaries monthly, which demonstrates the importance of tourism to related villages.

The final evaluation is that ecotourism is an effective strategy for economic development for the communities connected to Uakari Lodge, although the distribution of benefits is centred in a few villages. This dissertation resulted in economic impact data that, when combined to social and environmental studies developed by MISD proves tourism is efficient for the biodiversity guard at Uakari Lodge surrounding areas. The model could be replicated in other protected areas in the Brazilian Amazon as a conservation strategy and community development.

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List of Contents

Abstract.....	3
Acknowledgements.....	4
List of Contents	5
List of Images, Maps, Tables and Charts	6
Images	6
Maps:.....	6
Tables	6
Charts	6
Introduction	7
Study area and context.....	9
Aims and objectives.....	15
Scope	18
Literature review.....	19
A background on local peoples, protected areas and socioeconomic development	19
A New Paradigm in conservation and Mamirauá Sustainable Development Reserve	21
Ecotourism and social changes at Mamirauá Reserve	22
Uakari Lodge and the Economic Impacts at Mamirauá Reserve.....	25
Methodology.....	27
Results	32
MISD economic support to Uakari Lodge.....	32
Uakari Lodge economic crisis and change in financial management	33
Revenues X Expenses	36
Economic Benefits to Mamirauá Reserve Communities	39
Discussion	50
Tourism in Brazilian Amazon Protected Areas	54
Conclusion.....	56
Recommendations	59
References:.....	61

List of Images, Maps, Tables and Charts

Images

Image 01: Aerial view of Uakari Lodge	7
Image 02: The floating structure of Uakari Lodge from the water level.....	7
Image 03: Economic data as provided by MISD	29

Maps:

Map 01: Central Amazon Conservation Complex	10
Map 02: Mamirauá Sector and the Ecotourism Zone	12
Map 03: Benefited communities at Mamirauá Sector.....	44

Tables

Table 01: Classification of variable and fixed costs at Uakari Lodge	29
Table 02: Number of visitors and nights sold annually and average economic benefits.....	42
Table 03: Average number of families per community with direct economic benefits from Uakari Lodge and percentage from total number of families.....	45
Table 04: Average number of minimum salaries per community (2008-2017)	46
Table 05: Total ecotourism profit shares and social and environmental fees at Mamirauá Reserve.....	47

Charts

Chart 01: Uakari Lodge annual bank balance (2008-2017)	35
Chart 02: Revenues, expenses and resulting balance at Uakari Lodge (2007-2018) ..	36
Chart 03: Revenues and expenses compared to direct economic benefits	37
Chart 04: Percentage of direct economic benefits from revenues and expenses.....	37
Chart 05: Fixed and operational expenses	38
Chart 06: Total ecotourism benefits (services+products) to Mamirauá communities ...	39
Chart 07: Total benefits compared to the total number of families in ecotourism	40
Chart 08: Average direct economic benefits per family	40
Chart 09: Average number of minimum salaries per family (2008-2017.....	41
Chart 10: Percentage of direct economic benefits from annual revenues.....	42
Chart 11: Annual economic benefits from services and products provided to Uakari Lodge	43
Chart 12: Annual percentage of benefits from services and products.....	43
Chart 13: Annual direct economic benefits in Mamirauá communities	45
Chart 14: Total volume of services and products sold per community.....	46

Introduction

Uakari Lodge (Images 01 and 02) is a community-based ecolodge located at Mamirauá Sustainable Development Reserve, a protected area that, together with other neighbouring sites, makes the most extensive protected rainforest surface on Earth, a UNESCO World Natural Heritage. The lodge was funded and is kept by Mamirauá Institute for Sustainable Development (MISD), a scientific research organisation that is kept and is supervised by the Brazilian Ministry of Science, Technology and Innovation; while its management is shared between MISD and communities at the Reserve.



Image 01: Aerial view of Uakari Lodge (Credits: João Paulo Borges Pedro)



Image 02: The floating structure of Uakari Lodge from the water level. (Credits: Eduardo Coelho)

Being created by a research institute, Uakari Lodge works as a study laboratory to MISD and is a rare example of tourism enterprise to collect full information on its economic, social and environmental impacts since its day 1 of activities. This data supports studies on different fields and is the basis to show results on the effectiveness of biodiversity conservation – the lodge’s primary objective.

This dissertation aims to analyse the economic impacts of tourism at Mamirauá Reserve, illustrating that alternative activities can be carried on in the Amazon, with sustainable use of the local natural resources and promoting community development.

With the outcome developed at this study, it is intended to illustrate how tourism can be an efficient money-making activity for riverside communities in the Amazon; and the effectiveness of tourism as an economic alternative for protected areas in Brazil, which has historically been challenging in the country.

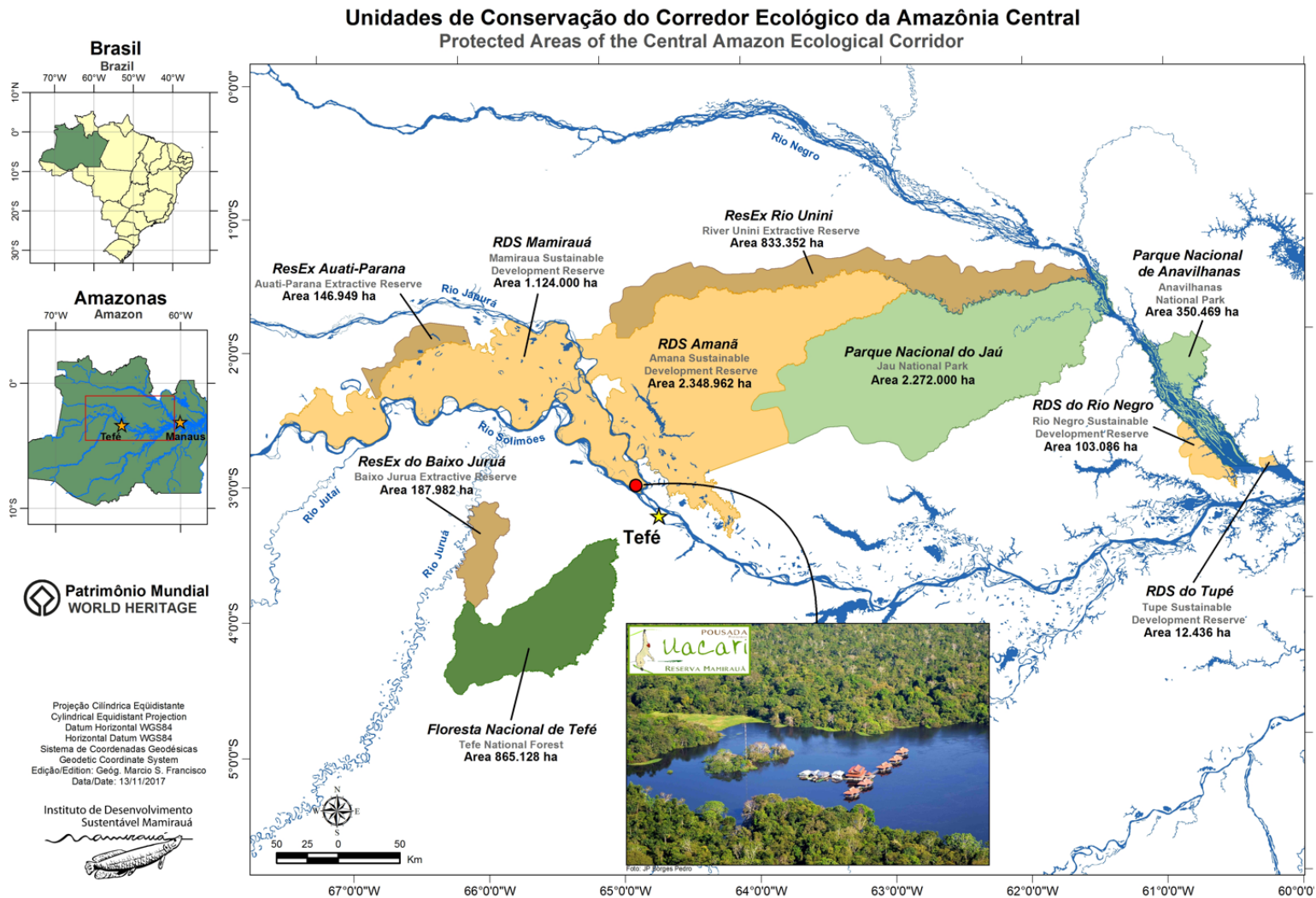
Study area and context

Mamirauá¹ is the first Brazilian protected area of its category: Sustainable Development Reserve. It stretches between the Amazon and Japurá Rivers and takes 1,124,000 hectares in the central area of the State of Amazonas, in Brazil. It is part of the Central Amazon Conservation Complex (Map 01), a UNESCO World Natural Heritage Site formed by ten protected areas of different categories. It is the most extensive conservation land in the Amazon Basin (over six million hectares), one the world's richest regions regarding biodiversity and home to important threatened species such as the arapaima fish, the Amazonian manatee, the black caiman and two species of river dolphins (UNESCO, no date).

Mamirauá's entire area is composed of floodplain forests, meaning all land and vegetation is covered by waters during 4 to 6 months a year, leaving only the top of the highest trees above the water level. These waters are a result of the snow melting in the Andes Mountains, which travels thousands of kilometres, flooding the entire Amazon (MISD, no date). It causes crucial modifications at the reserve's lands and forces fauna and flora to adapt to the flooding.

According to Census, Mamirauá Reserve had 181 communities, 1,823 residences and 10,867 inhabitants in 2011. These groups are divided mostly into riverside communities that typically are united by families. These communities are divided into 18 sectors along the reserve, and each sector is responsible for the maintenance and surveillance of their territories. Each sector organises regular general meetings in which they discuss how to use and protect the natural resources (MISD, no date). On top of the sector general meetings, there is an annual assembly for the entire reserve, when representatives of each sector meet and deliberate on broader topics of interest to the protected area.

¹ Mamirauá is an indigenous term for 'baby manatee'. The main lake at the reserve has been called Mamirauá by the locals as a reference to the abundant number of manatees. The lake was considered a nursery to this species. Manatees were over-hunted in the late 19th century for its flesh and fat, which was used as the fuel for public lighting of Manaus, by then one of the richest and most important cities in Brazil. Sadly, it is rare to find manatees at Mamirauá Lake nowadays.



Map 01: Central Amazon Conservation Complex (Uakari Lodge, 2017).

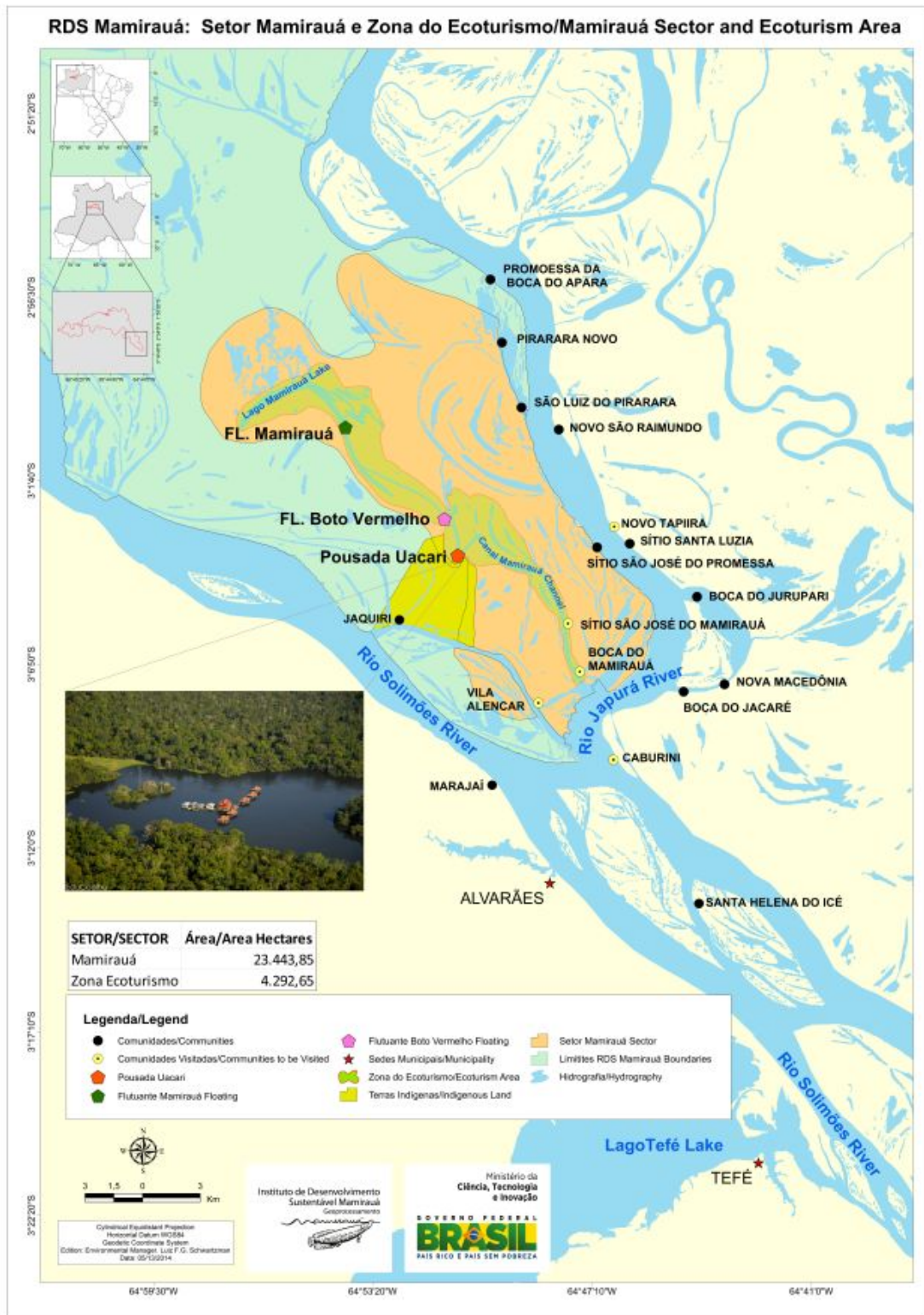
The modern human occupation at Mamirauá dates back to the beginning of the 20th century. Before this occupation, the region was inhabited by several indigenous groups. The Amerindian population was mostly decimated by wars and diseases introduced during colonisation, and the remnant indigenous groups were incorporated into colonial society by the process of miscegenation induced by the Portuguese government. Currently, even the few indigenous communities existing in the region have a substantial degree of miscegenation, both cultural and biological (MISD, 1995).

With the formal creation of the reserve in 1990, the Mamirauá Institute for Sustainable Development – MISD was designated by the government of the State of Amazonas to co-manage the territory and subsidise management plans, communities and the government itself with technical and scientific data to best take continued sustainable exploitation of the natural resources.

A team of selected researchers internationally known were invited to come to the area and work at MISD for the design of Mamirauá Reserve's Management Plan, which was released in 1995. It would be the first time in Brazil when a management plan was written for such a new category of protected area, a 'sustainable development reserve'.

Now, residents would not be removed from their original lands for biodiversity preservation, but the opposite: these communities would be allowed to stay within the territory, take social, subsistence and economic advantage of the natural resources and would be the primary stakeholders on the new conservation approach that was being applied into protected areas in the country.

This first version of the management plan (a second revised edition was published in 2006) selected the areas of interest for full preservation, and others for sustained use of natural resources – this last one subdivided into other levels. For each of these zones, economic activity was designated. At Mamirauá Sector, the closest to Tefé (the central town with an international airport, 60KM distant from the reserve and home of MISD headquarters) and where Mamirauá Lake (that named the reserve) is located, one particular zone was designated for 'ecotourism activities' (Map 02). That was the first time 'tourism' was mentioned as a strategy of local development for communities among other traditional natural resources uses – the document mentions tourism as the 'use of the landscape resource' (MISD, 1995).



Map 02: Mamirauá Sector and the Ecoturism Zone
(In orange, the Mamirauá Sector. The green section inside Mamirauá Sector is the ecoturism zone.)

Peralta, N.; Vieira, F.; Ozório, R. (2017).

The document describes that 'ecotourism has already been identified as a strategic option and it's economic, social and ecological feasibility studies are taken as urgent. The priority implementation of Ecotourism, as a more significant option, could generate short-term resources for the implementation of other options of economic alternatives' (MISD, 1995, page 48).

In 1998 MISD finished an economic feasibility study plan showing 'an investment in ecotourism will be well-regarded by the ecotourism market, is operationally and economically feasible. In the medium term, it will also bring significant benefits to the community' (Janér, A. 998 p.50). The evaluation was considered favourable to the activity and, after that, the British Department for International Development (DFID), has agreed to support the development of ecotourism as one of the economic alternatives for local communities. DFID invested R\$ 570,000 over four years, which was 57% of the project costs. Other funds provided the other 43%, but mostly funds from the Federal Government, which by then included MISD to its group of research institutions across the Amazon.

In order to gain the support of local communities, MISD came with regular visits to communities and participated in all events promoted by Mamirauá Sector. Also, MISD held meetings with the local 11 communities to disseminate and evaluate the results of its activities, for accountability and planning of activities.

Several training events for the local population sought to obtain higher quality tourism services. At the same time, with the support of MISD the locals involved in the development of the lodge started the Mamirauá Association of Ecotourism Auxiliaries and Guides - AAGEMAM. This association quickly became the most important partner to MISD in the organisation and co-management of the lodge. Nowadays AAGEMAM independently selects new community partners to work in tourism, organises qualification training and is responsible for the payments of salaries to all the service providers related to ecotourism.

Researchers from different fields at MISD developed methodologies and produced studies on the impacts of tourism along the years. These researches focused mainly on the environmental impacts (animal behaviour changes, sewage effluent treatments), social impacts (relationship locals x visitors, tourism and empowerment, leadership), economic impacts (for locals and in Tefé, market strategies, economic feasibility) and technology

(minimum impact materials for the construction, maintenance and requalification of the Lodge's primary structure, its boats and other equipment). The results of studies became articles published in Brazilian and international journals, books, dissertations and thesis.

In 2010 MISD decided to start a new plan for its ecotourism project: the full transfer of ownership and management of Uakari Lodge to the local communities. The aim is to increase the benefits of tourism to the local communities, so they take full advantage of the economic benefits, get aptitude to take higher qualified positions (such as the jobs for general manager, financial and marketing coordinators, which still are taken by professionals from other parts of the country) and the total responsibility for the management of the natural resources.

MISD then organised a series of meetings with the communities' representatives to understand their motivation for such a project. These annual meetings aimed to design the transference scenario, the related challenges, the support team and the stretch of time in which it would be feasible.

Mamirauá Institute then developed a new business plan to study the economic feasibility of the transference, once lots of extra investments would need to be done regarding qualification, maintenance of infrastructure, financial preparedness and others. A 10-year project was designed (2013-2022), putting in a timeframe the actions to be taken so the communities at Mamirauá Reserve would be apt to take the ownership of Uakari Lodge's infrastructure and management.

Aims and objectives

Irving (2006) affirms tourism in tropical areas around the globe have been a strategy for local development, especially for those countries with abundant biodiversity, where the market may have different interests with real state, wildlife and water supplies. The Amazon, as an international area of interest, sees at present times the intense commodification of its natural resources.

It is home to 20% of the planet's fresh water supplies, a resource that is endangered globally (UOL Ciência e Saúde, 2011); the recent governments in Brazil have authorised the implementation of 500 hydroelectric dams in the Amazon, changing the water flows, flooding immense areas, forcing human migrations and killing biodiversity (El País, 2017).

The Amazon's rich, low soil makes deforestation intensive, especially in the past two decades. 17% of the rainforest surface is deforested in 2018; livestock is responsible for 65% of deforestation (UOL Ciência e Saúde, 2017). Researchers affirm that if deforestation rates surpass 20%, we reach a 'climate abyss' in which irreversible climate changes will be noticed in the entire Amazon's vegetation, forcing the 'desertification' of the rainforest biome (Alisson, E., 2018).

The promotion of sustainable economic alternatives for the use of Amazon's natural resources is critical and urgent. The economic interventions currently being implemented in the area are risky and most of the times will bring irreversible changes to local biodiversity and human groups, as well as in other areas of the country and the planet.

The more efficient use of natural resources is possible in any field, including tourism. The use of 'scenic resources' for tourism in the Amazon is a reality; however, there are few cases in which private and public managers take the responsibility over impacts in the territory. The abundant offer of biodiversity and the high concentration of protected areas can make this industry take a stronger position among other Amazonian economic fields.

This study comes as an effort to demonstrate the feasibility of a community-based, responsible ecotourism initiative in this region. Uakari Lodge is recognised for the development of a new approach for tourism in the Brazilian Amazon, with sustainable use

of the environment and original models of social and economic management for positive. It is internationally awarded for its results and is frequently highlighted for:

- the creation of long-term economic alternatives for families at Mamirauá Reserve;
- community empowerment, engagement and organisation into an association;
- sustained use of natural resources;
- a co-management model between a scientific institution and local traditional communities that seeks to transfer knowledge gradually, empower local leaders and promote professional qualification;
- an implemented environmental, social and economic impact monitoring methodology to control the company's performance and to make sure the sustainability principles are being implemented;
- a system of community-project funding that benefits not only those who are involved in the ecotourism activities but also those individuals and families that act in different economic activities at Mamirauá Sector;
- an established position in the Amazon ecotourism market;
- partnership with other research groups that develop studies in the same region, funding and promoting science among its guests;
- operational and financial support for the environmental surveillance at the ecotourism zone.

This project aims to analyse a ten-year period (2008-2017) of economic impacts of tourism at Mamirauá Sustainable Development Reserve to the 11 local communities that work at and co-manage Uakari Lodge. The results will be essential to comprehend how tourism can affect residents, what it represents concerning household income and community development and ultimately demonstrate the importance of responsible tourism as a strategy for development at an internationally important biome, the Amazon.

The first objective of this study is to document how Uakari Lodge managed its finances from 2008 to 2017 regarding revenues x expenses. This analysis will bring light over the changes to the financial administration at Uakari Lodge that rehabilitated the company from volatile economic scenarios until recently - being economically stable on a long-term basis. This analysis will also help comprehend the costs of operating tourism in the Amazon; the percentage of the tourist's rates that is turned into economic benefits to local communities; and the support from MISD that helped (and still helps) the lodge become financially independent and profitable.

The second objective is to measure and analyse the generated direct income from Uakari Lodge to the 11 communities in the same ten years (2008-2017), plus other indirect financial impacts. Uakari Lodge has data on the type of economic benefit (acquisition of agricultural goods; services), and that information is available per family and community. With this data it is possible to comprehend the complexity of benefits for communities: according to the distance from the community to the lodge, the participation of tourism in the household income and others.

The results generated by the above objectives will provide data for the final objective, which is to provide an overall analysis of the economic impacts on Mamirauá Reserve and how protected areas can benefit from tourism in the Amazon. It is possible to compare economic and social data in Mamirauá Reserve and the municipality where it is located to demonstrate the importance of tourism to the affected communities and compare revenue to other protected areas that either has community-based tourism projects or not.

Scope

The topic on ecotourism in protected areas is broad and involve the many perspectives on preservation x conservation, sustainable use of natural resources, communities in and surrounding parks and other protected areas categories and the historical evolution of biodiversity protection as a whole. The study of this perspective from a responsible tourism point of view could itself be a complete dissertation or thesis.

For this reason, the research presented here emphasises the strict academic and scientific production related to the geographic area of study. Hence, the literature review focus on the existent academic studies on Mamirauá Reserve, MISD and Uakari Lodge and the parallel to its contemporary ecotourism, protected areas and development discussions.

The literature survey is followed by the compilation of results from raw financial data provided by MISD. The results presented bring information on the direct and indirect economic benefits of ecotourism activities at Mamirauá Reserve and often compare numbers to the regional and national economic outlooks of the period, so it is possible to get a more comprehensible perspective of the impacts to the studied, protected area and its communities.

The results are analysed and discussed later. The confrontation between the presented literature review and economic effects bring the answers to this dissertation's objectives and investigates the challenges, management results and risks taken by MISD on Uakari Lodge, together with final recommendations for more efficient and long-term positive impacts.

Literature review

A background on local peoples, protected areas and socioeconomic development

The development of a new paradigm for protected area management that allied biodiversity protection and local socioeconomic development gained strength during the 1970s; however the first clash took place during the 1st IUCN World Park Congress in Seattle, 1962. It was a landmark for the development of new protection standards when developing countries joined the debate, bringing together discussions on the participation of original peoples, their rights to lands and ethical issues related to removal of populations from protected areas. It became clear they had different interests, needs and perspectives of what a protected area should be. The differences in economic, social and cultural perspectives among countries made sure a new approach to conservation should be aligned for successful conservation (Souza, 2013).

The classic definition for “national park” started a major change and ‘exceptions’ related to private habitation, agriculture, mineral prospection and hunting gained force – it resulted in the creation of the zoning systems, with the definition of what was permitted and prohibited in each of the zones of one single protected area (Barreto Filho, 2002). Still, the 1st congress ended with no changes for impacts on local traditional communities living in territories of conservation interest.

The 2nd IUCN World Park Congress, at the Yellowstone National Park in 1972 ratified the concept of zoning systems. However, ten years after the first congress, it added the ‘anthropologic zone’, recognising that ‘human communities with specific cultural characteristics were part of the ecosystems to be protected’ (Barreto Filho, 2012:112). Three years later, in 1975, the 12th IUCN General Assembly admitted protected areas, the way it was conceived and applied, could end forcing the expulsion or resettlement of ethnic groups.

In the same year, the UN Conference on the Human Environment (known as the Stockholm Conference) assumed there was an issue of under-development as a cause to environmental problems in developing countries. The final declaration, published in December 1972, states ‘economic and social development is essential for ensuring a

favourable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life' (UN General Assembly, 1972). Economic inequality among countries affects the environment and fighting for the conservation of natural resources is a way to promote social development in more impoverished regions.

It was in 1982, during the 3rd IUCN World Congress that a new concept of protected area was designed to include the socioeconomic dimensions of populations and places of biological interest, and how the combination of traditional communities and management of natural resources would be fundamental for conservation (Diegues, 1996). The congress ends recommending protected area managers to comprehend and use the traditional skills of those communities affected by conservation strategies measures and the co-management between authorities and societies that traditionally managed natural resources.

Hence, the 1980s sees the empowerment of traditional communities and their rights to self-determination and choice on lands they have historically occupied. Bringing these groups to conservation strategies becomes the new paradigm. That is not built by chance and is not restricted to the conservation debates but as part of a global movement that connected poverty and environmental degradation and resulted in the Brundtland's concept of 'sustainable development', in 1987 (Souza, 2013). Conservation plans are implemented in areas of high biological interest, with the empowerment of local populations through small-scale economic development for their benefit, encouraging these communities to take ownership of territories and promoting the sustained use of natural resources.

The Earth Summit in Rio de Janeiro, in 1992, sees the definitive marriage between conservation and local socioeconomic development and the term 'integrated conservation-development projects – ICDP is coined to refer to strategies that 'attempt to ensure the conservation of biological diversity by reconciling the management of protected areas with the social and economic needs of local people' (Wells, M. et al, 2012: ix). The ICDPs focused in three different strategies: protected area management, design and implementation of buffer zones and local social and economic development. The logic behind these projects were based on compensation and substitution strategies. The concept is promoted in the 1990's, and development programs in more deprived areas of tropical countries see growing

funds for their implementation, including many in Brazil, and more specifically in the Amazon.

A New Paradigm in conservation and Mamirauá Sustainable Development Reserve

The work developed by Márcio Ayres in the Mamirauá region, together with other fellow scientists are influenced by this new paradigm that involves communities in conservation planning. Involving locals was essential for the acceptance of the creation of a protected area, and the development of sustainable economic activities with the use of natural resources made clear to authorities a new category of conservation area not only matched new global tendencies but could also alleviate poverty and attract international investments.

Márcio Ayres' Mamirauá Institute received lots of attraction from those international funds – the primatologist was an enthusiast of the new models of conservation strategies, had a considerable important network and always made sure to show the biological importance of the area. Mamirauá is home to many endemic species, endangered aquatic animals, the most significant number of tree species per hectare in floodplain forests and the highest diversity of fish species in the Amazon (Koziell, I., Inoue, C. 2006). Some of the funders include the British Department for International Development (DFID), the European Union (EU), the World Wide Fund for Nature (WWF) and the Wildlife Conservation Society (WCS) – the past two still fund specific projects at MISD.

A remarkable team of researchers joined MISD with the final objective to elaborate the management plan norms and to support local communities to implement it. Mamirauá becomes a rare case in Brazil where participatory management of natural resources is firmly connected to scientific production, which becomes known as the 'Modelo RDS de conservação da biodiversidade' (in English 'the Sustainable Development Reserve - SDR - model for the conservation of biodiversity') (Queiroz, H., Peralta, N. 2006). MISD still takes as a guide to its projects the alignment of permanence and participation of local communities at the protected areas and the formation and maintenance of a continuous scientific database to evolve with sustainable use of natural resources.

The SDR Model is based on the improvement of the quality of life to local traditional communities, which can be monitored by the evolution of family income and results for primary education and health. Peralta (2005) studied the social changes in Mamirauá after the implementation of Mamirauá Reserve and used data on health to demonstrate the improvement in the quality of life. She compares the scenario in two communities involved in MISD projects (Vila Alencar and Caburini) in two different moments (1994 and 2003), and these two to other similar communities of different territories.

Peralta shows the polyparasitism² reduced from 70% in 1994 to 34% in 2003. Also, family planning had a significant change. The average number of children at Mamirauá Reserve is eight, while in Vila Alencar and Caburini the average in 2004 was four children. She collects testimonials on the fact, and a 30-year-old woman from Vila Alencar says 'what changed was that I stopped having children one after another, I did not have any more children. I could buy my contraceptive to take' (Peralta, 2005:96), referring to ecotourism as an alternative to income in the area.

These facts, combined with the explicit reduction of human pressure over natural resources, build the fundamental trust among local populations that a protected area could benefit them.

The zoning system (the beginning project that brought the necessary trust between locals and researchers newly arrived in the area) established the 'total preservation area' where settlements and natural resources were restricted. These areas were surrounded by 'sustainable territories' where most of the communities were settled, and the economic activities of the exploitation of natural resources could take place. The projects MISD started supporting locals were mostly based on fishery, forestry and ecotourism. (Peralta, N.; Vieira, F.; Ozório, R., 2017). DFID funded the implementation of these three alternative economic activities.

Ecotourism and social changes at Mamirauá Reserve

Mamirauá Reserve is recognised as an important site for Latin America for getting a successful result in applying the new paradigm of conservation in practice, making local

² The presence of multiple parasites in the same host.

socio-economic sustainable development an efficient strategy for the protection of biodiversity. The three main economic activities (fishery, forestry and ecotourism) represented critical economic gains for locals – in some cases the increase of 84% of household income (Koziell, I., Inoue, C. 2006).

In 2006 DFID developed extensive research in Mamirauá Reserve to evaluate the results of their funded projects in the area, ten years after the start of the agreement. It brings information from the funder's point of view on how MISD addressed issues on the creation of the protected area, governance and project management, surveillance and the economic activities encouraged among the populations in Mamirauá, including ecotourism which was classified as a 'sustainable livelihood alternative'.

The final report considered the DFID investment important for locals as the costs for a private investor in starting a lodge in the area would be risky – the high expenditures on infrastructure, skilled labour and qualification; the location distant from the classic, well-established ecotourism lodges in the Amazon would make it a lower guarantee of financial return (Koziell, I., Inoue, C. 2006). It was then considered a worth investment for DFID, as a precursor to attracting private money.

Nelissa Peralta - manager at Uakari Lodge at its earlier years - monitored, evaluated and produced scientific investigations on changes caused by tourism in the area, mostly related to social alterations within the local population. She developed her MSc study at Vila Alencar and Boca do Mamirauá communities, where an expressive part of their inhabitants got involved somehow with Uakari Lodge.

One first significant impact of tourism found on her studies is related to migration. From 1998 to 2004, Peralta notices the increase of 33% on the population and number of residences. This rate may be related to the possibility of permanence at Mamirauá with the new economic activities. One of the local informers says '...before ecotourism, they were considering leaving (the entire family), because agriculture was not doing well. The ones who once considered moving to town do not mention it anymore' (Peralta, 2005:101). Another representative statement from a local at Peralta's work (2005:110) is

...before ecotourism, the community depended on the agriculture. Many of us left to town to find a job, a better life. Today almost

everyone has a rabeta³, a TV connected to a dish antenna. Ecotourism brought good profit. Those who are not hired (*at Uakari Lodge*) are providing them services. Many people managed to renovate their homes, some did not have their own and now have. With the growth of ecotourism and the start of the reserve, everything has changed in the community.

The economic changes caused by ecotourism at Mamirauá Reserve has caused social impacts that are not well seen by the elderlies and those who chose to keep the subsistence agriculture as the primary activity, which now has partly been abandoned by newer generations. In a different study Peralta (2008) evaluates the impact of ecotourism activities into the production of 'farinha de mandioca'⁴. At Vila Alencar, it is estimated that the community consumes 28 ton of farinha de mandioca yearly, which once was all produced locally. In 2005 the community produced 10 ton, which means the other 18 ton had been purchased in the near towns, and the estimated investment to buy the ingredient was about 44% of the profit made with ecotourism.

If on the one hand, Mamirauá sees the economic growth and effective biodiversity conservation through the introduction of new alternative activities such as ecotourism, on the other hand, there is the necessity of spending family income for the consumption of a product that once was produced locally. Tourism money has an induced employment effect in the population's new consumption habits (Armstrong, R., Goodwin, H. 2014). However, causing economic dependence on tourism and having new generations abandoning traditional subsistence agriculture could bring unexpected, unwanted negative impacts in case of a crisis as tourism is an unstable, volatile economic activity, especially in more impoverished regions.

The issue of impacts on family agriculture is addressed continuously by MISD in two ways: with technical assistance on agroforestry and limitation of working periods at the lodge, which cannot be more than 11 days. The limitation of working days has been applied as a strategy to encourage locals to keep the agricultural production and to let more people be benefited from ecotourism in the region. In fact, Peralta (2008) collected testimonials on the

³ 'Rabeta' is a propelling engine Amazonians attach to wooden canoes for faster navigation.

⁴ 'Farinha de mandioca' is cassava flour, which is the base of food in Amazonian communities. Cassava is a root of fast growth and high carbohydrate value, which is important in floodplain regions in the Amazon – families plant cassava during the dry season, produce flour and keep it for the flood seasons, when agriculture is not feasible due to flooded lands.

issue, and a local 30-year-old woman says ‘...last year everyone worked on the farm because we realised the money we make and used to spend on food in town could be used some other way’ (Peralta, 2008:35).

Uakari Lodge and the Economic Impacts at Mamirauá Reserve

As said ecotourism in the 1990s becomes an essential strategy for conservation of biodiversity hotspots and combines protection to socioeconomic benefits for local populations. Poverty and areas of considerable biological interest often coincide, and these local communities may depend on the exploitation of natural resources to live (Agrawal, A., Redford, K. 2006). Bringing economic alternatives for alleviating poverty in rural areas is, for the past three decades, encouraged by conservationists, NGOs, protected area managers and other experts.

Ecotourism was not implemented by MISD to solve poverty issues or to become a full-time new type of work for locals but as an alternative for poverty alleviation. The strategy to let population work 11 days per month at the lodge aimed to force communities to dedicate time to their original activities and minimise unexpected social changes (Peralta, 2008). This rotation methodology makes around 54 people work directly at the lodge and other dozens indirectly.

During the high touristic season (June to September) more people are benefited – which happens to be at the same period of peak flooding, when other subsistence and economic activities are inviable, making tourism a significant source of family income. (Ozório, R., Janér, A., 2016). Once Mamirauá gets 100% flooded and no land for three to four months a year, the traditional activities of fishery, agriculture, hunting and forestry are interrupted, and Uakari Lodge is on its full capacity with the Summer holidays at the northern hemisphere.

As an alternative economic occupation, ecotourism benefits Mamirauá Sector inhabitants in diverse ways: provision of hotel services, conducting visitors as guides, managing the lodge, providing the lodge with agricultural and fishery products and producing and selling handcraft. Besides direct profit from services and products, Uakari Lodge finances community projects. From 2002 to 2012 an agreement between MISD and the local communities made sure 50% of net profit was distributed for those projects; from 2013 on

the financial management of the lodge was restructured and Uakari Lodge started charging a 'social-environmental fee' to fund local projects⁵ (Peralta 2008; Ozório, R. et al., 2017).

Peralta (2005) affirms the average purchasing power for families at Mamirauá Sector (communities directly involved at the ecotourism project) has increased 148%, and 55% of the family income was related to Uakari Lodge in the period from 1998 to 2005. At Vila Alencar, 62% of family income comes from tourism. It is easy to comprehend the choice for tourism and the increase in average family income at Mamirauá Sector, as we again analyse the case of farinha de mandioca production. In 2005 the production of farinha de mandioca would provide in average R\$0,60 per kilo. Each member of the community can produce one ton per year, taking the full dry season time and investments, and making a total of R\$600.00. In the same year, each of the Uakari Lodge local guides (from Vila Alencar community) made R\$1,746.00, working 109 days or an average of nine days per month.

⁵ From 2009 to 2012 no community projects were funded for the lodge's financial restructuring, which will be better studied ahead.

Methodology

MISD, as a research unit connected to the Brazilian Ministry of Science, Technology and Innovation has mainly scientific interest in tourism at Mamirauá Reserve. It has produced a substantial volume of data to show and monitor impacts of tourism to the local communities, to the environment and has shared its experience and social technology in several areas of the country and abroad.

Most of the scientific production of MISD on tourism and Uakari Lodge was published in the early years, mainly at the first decade of operations, when monitoring impacts was fundamental for the long-term sustainability of the initiative, the maintenance of external funds and the strengthening of the newly-created protected area itself.

As related along the project proposal and previous chapters, Nelissa Peralta has an essential role in the documentation of MISD's experience in tourism, collecting data, community's perceptions and historical economic information that has been fundamental to this study. Others have collaborated to Peralta and MISD for the economic analysis and impacts of Uakari Lodge such as Ariane Janér who have written the initial feasibility analysis plan for tourism at Mamirauá Reserve and Rodrigo Ozório, who was responsible for the later business plans for the lodge.

Uakari Lodge and MISD associated researchers have developed methodologies on the collection and analysis of the economic data. Most of the data until 2012 has resulted in studies, but most recent data has not been examined if not for the elaboration of business plans, which is mostly focused on the financial feasibility and profitability of the lodge and not on the economic impacts for community families and members at Mamirauá.

To study the economic impacts of ecotourism at Mamirauá Reserve in the past ten years, some of the applied methodologies for investigation of data will be repeated. The comprehension of how Uakari Lodge becomes efficient for biodiversity conservation is connected to how natural resources receive fewer exploitation pressures, and that is related to how families are benefited by the alternative economic activities implemented locally.

MISD has been collecting data on family income from tourism since they received their first guest, back in 1998 and when the current structure was not built yet – by that time visitors

stayed at one of the floating scientific bases at the Reserve. Since then, the methodology for the collection of data is simple: Uakari Lodge's manager (a community member) and an AAGEMAM representative's take note of the person's name, the service or product provided, name of family and community.

The information has historically been collected as 'family income' and not as individual payments. Uakari Lodge developed a family mapping, and by family, it is considered the home unit. Peralta (2004) classified families in Vila Alencar according to their formation and can be used as the case example for communities at Mamirauá Reserve. Her studies show 66,7% of homes are formed by nuclear families (marital union); 20.8% are extended families (a nuclear family plus another adult relative), and 4% are single homes (adult living alone).

All this data is monthly transferred to an electronic database called 'socioeconomic monitoring'. This data is yearly checked to provide information for communities' representatives (called 'presidentes' in the Amazon) at the annual 'accountability meeting', a 2-day encounter when every ecotourism stakeholder is invited to get together and comprehend the year's results and design strategies for the following period of 12 months.

The compiled data (provided in a power-point style document for the 'presidentes') is the first information MISD has agreed to provide for this study and will be the starting base to document detailed information for the ten-year frame of investigation. The detailed information on the 'socioeconomic database' has also been provided, so it is possible to analyse the number of impacted families, what families and communities have been providing the lodge over time, number of people involved etc.

The third data source comes from the detailed revenues X expenses databank. The economic data on revenues will not be split into direct sales (visitor contacts the lodge and makes reservation) X intermediated sales (bookings from DMCs, travel agencies, tour operators) once it has not been collected that way. Hence, the information on revenues is, in this study, only presented in gross annual results. It could be developed a methodology to estimate the percentage of direct and indirect sales by the number of visitors in each category, but once this information does not influence the expected results for this study, it will not be explored here.

Expenses have been provided in a long, detailed table in which every expenditure (from stationery items, bank fees, taxes to significant investments and acquisitions) has not been classified before. The image 03 shows an example of presentation of expenses from 2017.

Month	Category	Description	Amount (R\$)
67 Abril	Salários	Guia Naturalista	RS 1.881,00 RONNAYANA RAYLA
68 Abril	Salários	Assistente Financeiro	RS 980,00 VITOR EDUARDO
69 Abril	Salários	Governanta	RS 1.059,00 VIVIANE MORAES
70 Abril	Salários	Guia Naturalista	RS 439,00 LIQUIDO SALARIAL REF 02/2017 - ronnyana
71 Abril	Taxas de apoio socioambiental	Outros	RS 5.513,27 OC005215 - TAXA SOCIOAMBIENTAL - SÍTIO SÃO JOSÉ
72 Abril	Taxas Bancárias	IOF	RS 130,47 I.O.F
73 Abril	Taxas Bancárias	Tar transf recurso-Eil	RS 0,95 Tar transf recurso-Eil
74 Abril	Taxas Bancárias	Tar DOC/TEDE eletrônico	RS 70,40 Tar DOC/TEDE eletrônico
75 Abril	Taxas Bancárias	Tar Liquid Dispog Exterior	RS 450,00 Tar Liquid Dispog Exterior
76 Abril	Taxas Bancárias	Tar pag salar cred conta	RS 27,20 Tar pag salar cred conta
77 Abril	Taxas Bancárias	Tar processamento cheque	RS 15,20 Tar processamento cheque
78 Abril	Taxas Bancárias	Tar débito automático	RS 1,00 Tar débito automático
79 Abril	Taxas Bancárias	Tar pacote de serviços	RS 153,00 Tar pacote de serviços
80 Abril	Taxas Publicas	COFINS	RS 85,85 COFINS AAGEMAM
81 Abril	Taxas Publicas	COFINS	RS 4.058,20 PAGT COFINS S/ APLICAÇÃO FINANCEIRA
82 Abril	Taxas Publicas	ISS	RS 10.028,69 PAGT ISS REF 03/2017
83 Abril	Taxas Publicas	COFINS	RS 487,85 PAGT COFINS APLICAÇÃO FINANCEIRA
84 Agosto	Curso de capacitação	Outros	RS 480,00 FUNDO FIXO - Josiney e Gelson
85 Agosto	Custos Escritório	Outros	RS 35,95 FUNDO FIXO - ESCRITÓRIO
86 Agosto	Custos Escritório	Correios	RS 8,80 FUNDO FIXO - CORREIO
87 Agosto	Custos Escritório	Papelaria	RS 92,00 FUNDO FIXO - PAPELARIA
88 Agosto	Custos Escritório	Telefone	RS 36,00 FUNDO FIXO - Crédito para celular
89 Agosto	Custos Marketing	Participação em Eventos	RS 974,00 PAGT REQ OC008549 - IR ref Taxa de Inscrição Invoice Adventure Travel (ATTA 2017)
90 Agosto	Custos Marketing	Participação em Eventos	RS 5.000,00 OC008498 - Pagamento participação na feira WTM Londres 2017
91 Agosto	Custos Marketing	Participação em Eventos	RS 220,15 PAGT REQ OC008548 - Invoice ref Inscrição Adventure Travel (ATTA 2017)
92 Agosto	Custos Marketing	Participação em Eventos	RS 5.503,75 PAGT REQ OC008548 - Invoice ref Inscrição Adventure Travel
93 Agosto	Custos Marketing	Site-Internet	RS 129,40 OC008154 - PAGT HOSPEDAGEM LOCAWEB AGOSTO
94 Agosto	Custos Marketing	Site-Internet	RS 129,40 PAGT REQ OC008452 - LOCAWEB 09/17
95 Agosto	Custos Operacionais	Outros	RS 195,00 OC02012554S (CONTRIBUIÇÃO ENCONTRO PROFESSORES) FUNDO FIXO - Compra de anais nº 11 para posuada/Frete encomenda/Frete transporte
96 Agosto	Custos Operacionais	Outros	RS 148,00 Pedro reunião/
97 Agosto	Custos Operacionais	AAGEMAM	RS 21.121,00 OC008240/OC008239 - PAGT DIÁRIAS AAGEMAM
98 Agosto	Custos Operacionais	AAGEMAM	RS 20.540,92 OC008471/OC008471 - PAGT DIÁRIAS AAGEMAM
99 Agosto	Custos Operacionais	AAGEMAM	RS 514,00 FUNDO FIXO - AJUDA DE CUSTO

Image 03: Economic data as provided by MISD.

They will be split into variable and fixed costs, according to the categories shown in table 01 below.

Variable Costs	Fixed Costs
Freelance wages	Salaries
Food costs	Rent
Stationary	Promotion
Fuel	Boats
Transportation	Infrastructure
Research support	Bank Fees
Office supplies	Taxes
Profit sharing (2008-2012)	Freights
Social and Environmental Fees (2013-2017)	Operational licenses
	Depreciation

Table 01: Classification of variable and fixed costs at Uakari Lodge.

It will be possible to analyse the profitability of the lodge based on this data, taking into consideration the investments and costs taken by MISD. MISD has gently ceded this databank for the production of this study.

The direct economic benefits from Uakari Lodge to local communities comes from four of the categories above. Salaries and free-lance wages to community members will be classified as 'services'. Food acquisition (to both the staff and visitors) related to local fishery and agricultural production will be classified as 'products'. Profit sharing and social and environmental fees, which fund community projects, will be classified as 'indirect benefits'.

In order to provide accurate information on the results, one issue will have to be dealt with in this study. The Brazilian economy has been very sensible in the past years, more specifically after 2014. This makes the indexation of values fundamental, especially for the analysis of such an extended period (2008-2017). Hence, adjustments to comprehend the purchasing power of each period after inflation will provide better, more precise results.

There are at least seven different official inflation indexes in Brazil. They are differently used in diverse scenarios, depending on the region of the country and the targeted economic field. For this study, it is used the 'Índice Nacional de Preços ao Consumidor' – INPC (National Consumer Price Index). This index covers families with low monthly incomes (one to five minimum salaries) and reflects the rise on the cost of living for those who are more sensitive to variations in the inflation (IBGE, no date). This is the case for more impoverished families in the Northern areas of Brazil and, more specifically, the Amazon and Mamirauá Reserve. At the municipality where Uakari Lodge is located, Uarini, the average family monthly income is 1.3 minimum salaries (IBGE, 2016) which in December, 2017 would be R\$1240.20 or US\$373.00. The index is calculated by the Brazilian Institute for Geography and Statistics.

The indexes will be applied to calculate values related to economic benefits for communities at Mamirauá Reserve only. The other information will be presented as the values were collected. This decision is taken because the related results are essential concerning percentage or comparison only and hence outcomes would be the same.

The applied indexes were updated to values in December 31st, 2017 – chosen date to limit data collection and analysis. Data will be provided mostly in Brazilian Reais, the local currency. As of December 31st 2017, the rate to US Dollars was R\$1.00=US\$0.30.

Some of the descriptions of facts bellow come from personal experience. I was the manager at Uakari Lodge from 2013 to 2014, the beginning years of implementation of the new

business plan. Part of the facts have not been registered yet in documentation or other studies and then will not be referred.

Results

As a not-for-profit initiative, Uakari Lodge has particular economic attributes on its management. As MISD's priority is economic development for biodiversity conservation, it strives to connect as many locals and generate as much qualification and remuneration in the communities, which probably would not be an option for regular hospitality companies either in the Amazon or anywhere else.

This fact makes it important to elucidate some of economic history at Uakari Lodge and to explain some of the choices made along its twenty years of operation in the Amazon.

MISD economic support to Uakari Lodge

From the first Uakari Lodge's feasibility plan, developed in 1998, Janér alerted MISD's support would be more than technical and scientific – some financial support should be taken to keep activities, as the high costs of operation in the Amazon could be covered by the institute's existing infrastructure and expertise (Ozório, R.; Janér, A. 2012). Part of the costs taken by MISD from the beginning of Uakari Lodge's operations were: rental of central office and boat docks in Tefé (which was located at MISD venues in town), the operational manager's salary (which has been taken by an external professional, with no ties to the communities at Mamirauá Reserve), surveillance of the area, internet, water and electricity bills and part of the terrestrial and aquatic transport operation. These represent around 13% of Uakari Lodge's operational costs.

In 2010 MISD decided to start a new project to Uakari Lodge, transferring the full ownership and management of the lodge to the communities. The objective was to maximise the volume of social and economic benefits for the local populations and empower them to take higher responsibilities for tourism (Ozório, R.; Janér, A., 2012). The project was discussed along many years with Mamirauá Sector communities, AAGEMAM and the entire reserve, which established community conditions and needs to take over the ecotourism project (Ozório, R. et al., 2017).

Hence, in 2012 a new business plan was launched and included a 10-year investment program (2013-2022) for MISD at the infrastructure and equipment of the lodge, qualification

for future local leaders to take the higher administrative positions, market preparation etc. The business plan included a financial program that should enable Uakari Lodge to take the costs related above (and until 2012 funded by MISD) and be economically independent of the institute.

The first two years of implementation of the new business plan (2013 and 2014) was successful, with the lodge incorporation part of the new costs and MISD investing considerable amount of money into ecotourism infra-structure, qualification and preparation of the team for the communities' takeover.

In 2015 MISD was affected by the significant economic crisis in Brazil. The institute, connected to the Federal Government, faced a sudden reduction in investment for science and technology in the country bring unexpected suspension of financial support, which forces scientific studies to be reduced in 60% and dismiss 42% of MISD's researchers and employees (Paiva, B. 2016). The ongoing 10-year project for Uakari Lodge is also affected, and the approved financial plan has to be accelerated – the lodge is forced to take some of the costs some years before expected. Luckily, the years 2013-2016 had been more profitable than initially calculated and the initiative could re-adapt the on-course business plan (Ozório, R.; Pinto, G; Cobra, L; Nassar, P. 2017).

The outcomes below consider the scenario above. From 2008 to 2012, economic results do not include the Uakari Lodge costs taken by MISD. From 2013 on, numbers presented comprise the planned expenditures the institute passed to the lodge according to the 2012 business plan and those unplanned costs tourism had to take because of the institute's economic crisis. At the present moment (2018), MISD is only responsible for three costs: internet connection bills, boat docks and the manager's salary, which was the 2020 initial planned scenario, an acceleration of two years.

Uakari Lodge economic crisis and change in financial management

Ecotourism in Mamirauá grew at a fast pace in the beginning years of operation. A different experience in the region, an international ecotourism destination, with close relation to science and local communities and in a very remote area made. In 2002, the first year with complete operation of current infrastructure (ten rooms, capacity of twenty visitors) the lodge

had 404 guests; in 2005 it hosted 830 – a growth of more than 100% in only four years (Pousada Uacari, 2013).

It was part of Uakari Lodge's management and philosophy to annually share profits with the local communities – in average 50% of the company's profit was distributed to finance projects at the villages that took part of the activities, making the benefits of lodge reach even those who were not directly involved to tourism.

The concept of 'profit' was broad, however. It did not consider future expenses or the high depreciation rate of infrastructure – a floating lodge in the extreme Amazonian weather (hot sunny days and daily severe storms) makes buildings and equipment deteriorate much faster than the average in the hospitality business.

An unexpected 'perfect storm' hit the lodge in 2006. The Tefé Airport, port of entry to 95% of Mamirauá's guests, shut down at the end of 2005 and 2006 for safety reasons. There was a decrease in the number of visitors at 24% in 2006, and then other 5% in 2007. The re-opening of the airport in 2007 was followed, two years later, by the American and European economic crisis, which made the number of guests decrease once more.

With high operational costs, Uakari Lodge lived years with difficult financial results combined with deterioration of its infrastructure that urgently needed renovation. The few tourists arriving at Mamirauá Reserve faced a degenerated infrastructure that soon became known by the travel industry, and American and European tour operators were cancelling bookings in concern of clients' possibly-bad experience (Ozório, R.; Janér, A. 2012).

With no money for investments, MISD had to contribute more than expected and planned for the operational costs at Uakari Lodge, a situation that lasted six years (2006-2011). It was also a period to re-evaluate the management of the lodge, comprehend what costs are involved and long-term plan for renovations and acquisition of new boats, solar energy equipment, product development, promotion and others.

However, the primary concern for MISD was the consequence of the crisis from the communities' perspective. For six years, communities did not have profit sharing, affecting the trust they had in the proclaimed benefits of ecotourism.

At first, these groups saw significant development of ecotourism and believed a newly-developed protection area could indeed be an alternative to traditional over-exploitation of natural resources. Once the period of crisis hit Mamirauá, the pressure for forestry and fishery economic activities was high, and tourism was set behind by many, which until recently still affected local's perspectives of the activity.

The 2012 business plan brought a new perspective into the management of finances for the lodge – a more traditional approach, for-profit perspective of economic planning. The depreciation rate was estimated for the entire structure and equipment of the lodge and savings were planned for their renovation independently of the profit, being considered 'costs' and not as profit. The profit sharing was substituted by the new 'social and environmental fee', an extra payment of R\$50.00 (approx. US\$15.00) charged to every visitor at Mamirauá. It made the community projects' financing independent of the financial results at Uakari Lodge (Ozório, R.; Janér, A. 2012; Pousada Uacari, 2013). The first projects financed by the social and environmental fee were in 2014.

The more conservative approach to the lodge's financial results brought a more stable scenario, even with the extra costs anticipated by the MISD crisis. With long-term bank financial investments with high interest, Uakari Lodge accumulated financial reserves and became better prepared for possible economic stress situations as we see the yearly bank balances in **chart 01**:

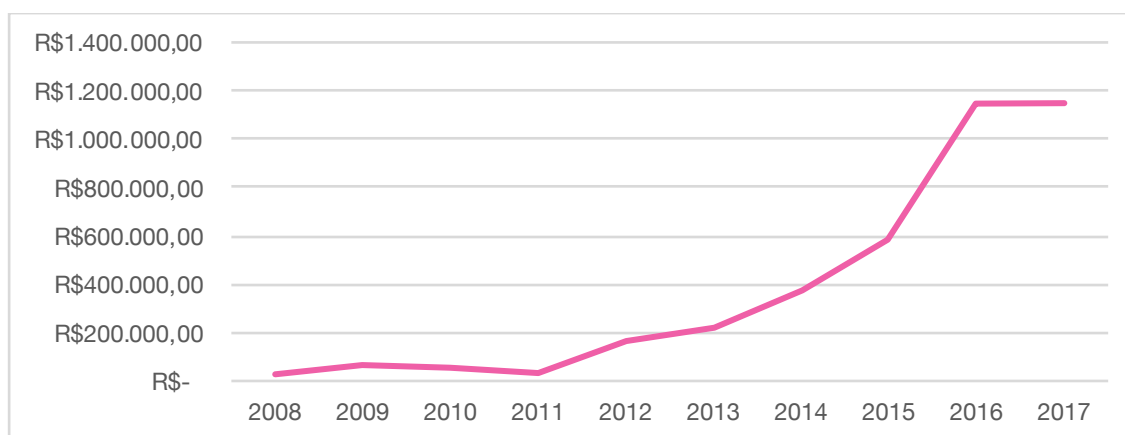


Chart 01: Uakari Lodge annual bank balance (2008-2017)

The decision for bank investments was taken in 2013 when the lodge started separating profit and capital for future investments into equipment and infrastructure due to depreciation rates – this last one being invested in long-term financial market banking products.

Revenues X Expenses

The economic results at Uakari Lodge tend to face losses and nearly-neutral profits as the **chart 02** bellow shows⁶. The beginning years of the study period (2008 and 2009) faced small financial loss; from 2010 to 2013 profit was very close to zero (in terms of volume); 2014 and 2015 had vast improvements in financial flow; while 2016 and 2017 the profitability decreased fast, with substantial losses in the past year.

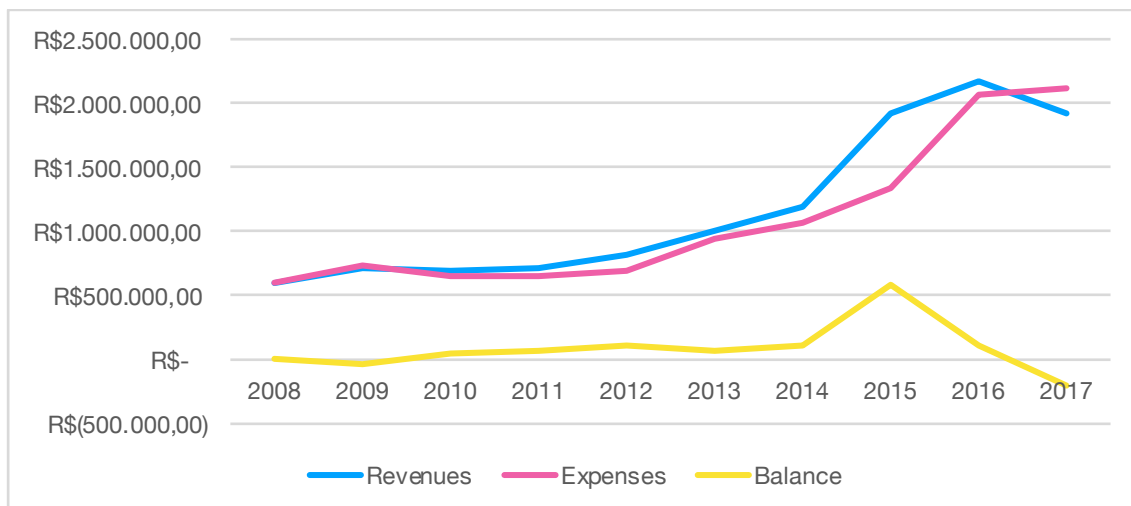


Chart 02: Revenues, expenses and resulting balance at Uakari Lodge (2008-2017)

The growth in results in 2014 and 2015 is credited to the active marketing decisions in the previous years, when Uakari Lodge took part of many travel shows, visited critical buyers in Europe and trained DMC staff at many companies across Brazil, launched new website and social media pages, together with the promotion of the country during the FIFA World Cup and the upcoming Rio2016 Olympic and Paralympic Games (Ozório, R.; Pinto, G; Cobra, L; Nassar, P., 2017).

⁶ The accumulated revenues and expenses for the past ten years at Uakari Lodge is presented at this chart with no monetary corrections.

On the other hand, results in 2016 and 2017 is mostly related to three reasons: those were the years when Uakari Lodge had to incorporate the costs MISD could no longer take for its financial crisis; the decrease in the volume of visitors if compared to the previous four years (16% shorter than expected by the 2012 business plan) is due to the reduction of international visitors in Brazil in general (economic and political crisis, plus zika virus and international repercussion of violence in Rio de Janeiro); and a nearly-null investment in marketing strategies, ‘wiping down’ part of the lodge’s position in the market (Pousada Uacari, 2017).

Comparing revenues, expenses and the total benefits it is possible to confirm the number of services, products and other economic remunerations is nearly stable (with short rise) along time, while revenues and expenses rise and are unstable in these ten years (**chart 03**):

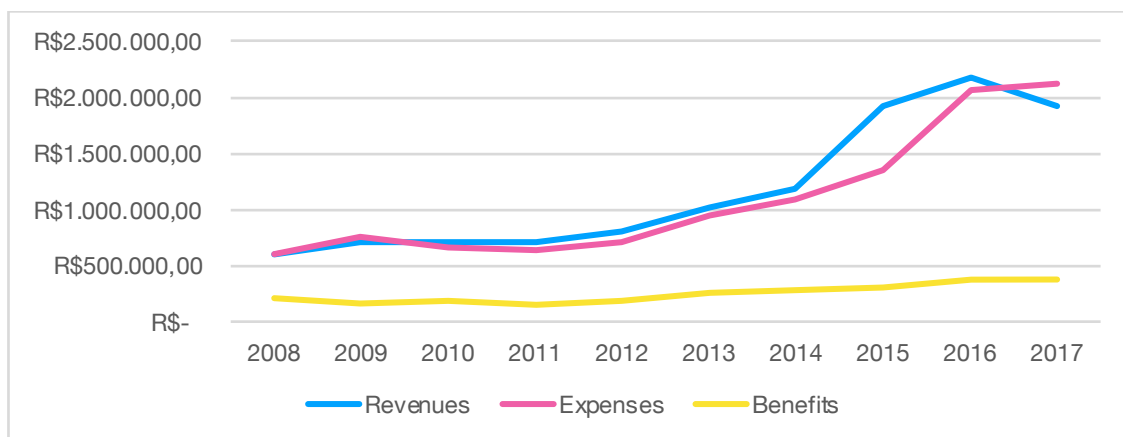


Chart 03: Revenues and expenses compared to direct economic benefits.

This information is crucial because it shows the results of benefits from ecotourism to Mamirauá communities from 2008 to 2017. Although the lodge faced (and is currently facing) multiple challenges, it gets to maintain the volume of services e purchase of products locally to promote alternative activities other than traditional exploitation of natural resources.

Expenses at Uakari Lodge rose as much as the revenues with short or neutral profitability. When compared the percentage of revenues and expenses that turns into economic benefits to Mamirauá communities it is possible to understand the rise in operational costs (**chart 04**). It then has pressure on visitor rates.

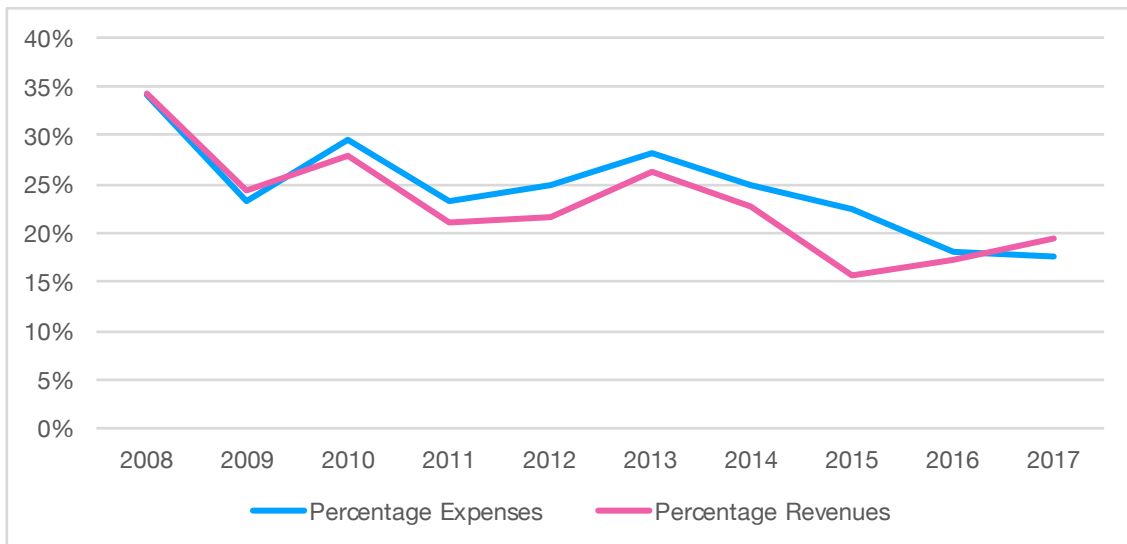


Chart 04: Percentage of direct economic benefits from revenues and expenses

Overall there is a tendency to decrease in the share of economic benefits from the visitor's rates. In 2008 for every R\$100.00 the visitor paid, Uakari Lodge left to local communities R\$34.00. In 2017 it was R\$19.00 – nearly half of 10 years before. From 2015 on, the lodge was in a financially stable, long-term position to raise salaries above the inflation rates, which results in a new better benefit from 2015 to 2017. If there is a rise in costs, Uakari Lodge is forced not to raise the local benefits for the sake of operation.

The rise of costs has partially been related above: the high equipment and infrastructure depreciation rates, the financial problems caused by the airport shutdown and the 2008/2009 economic crisis in the United States and Europe and the new approach on the management facing future necessary long-term investments as current costs and not as profit.

When we split the expenses into fixed and operational costs and compare it to the revenues, we observe the stability of the rise across the years (**chart 05**). Operational costs are very similar to fixed costs until 2014; from 2015 on there is an increase in the operational costs which can be partly explained by the rise of salaries above inflation from that year on and the costs Uakari Lodge took from MISD.

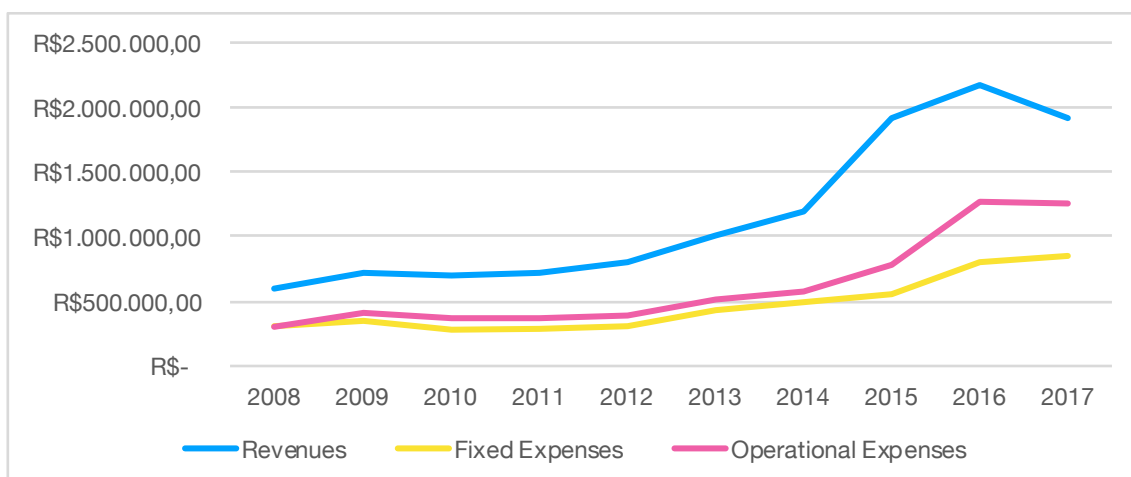


Chart 05: Fixed and operational expenses (compared to revenues)

Economic Benefits to Mamirauá Reserve Communities

The benefits can be categorised into direct and indirect benefits. This study will focus on the direct benefits which are composed of services provided (management and other office positions, guiding, boat piloting, cooking, housekeeping, maintenance and renovations) and fishery and agricultural products sold to the lodge.

Indirect Benefits include funding of community projects; handicraft sold to visitors during community tours; other services as laundry (which is paid directly to the person who supplies the service); tips; and sport fishing.

Direct benefits:

The total direct benefits to Mamirauá Reserve communities from 2008 to 2017 is R\$2,837,903.30 (or US\$854,790.15). The year-by-year distribution of remuneration from services and products is shown in **chart 06**:

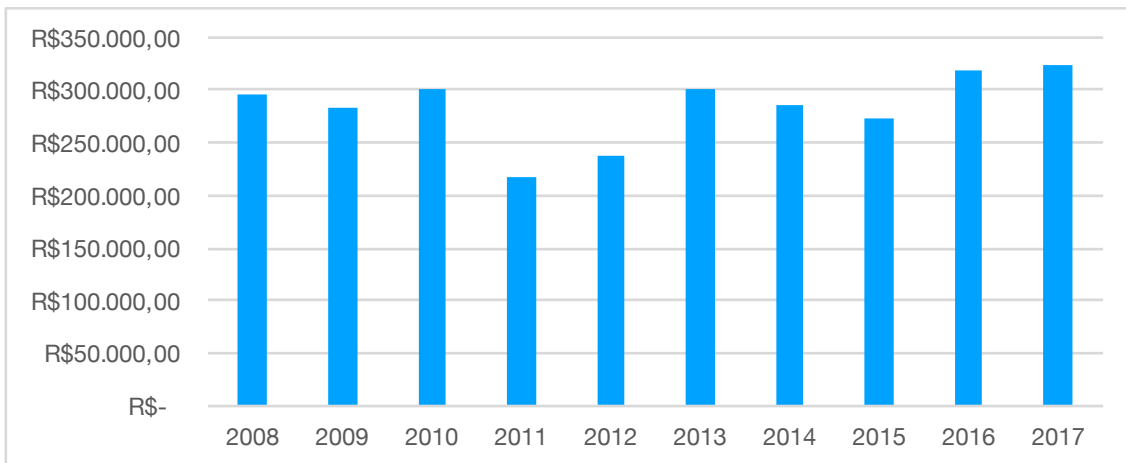


Chart 06: Total ecotourism benefits (services + products) to Mamirauá Reserve Communities.

The average amount of benefits runs around the R\$300,000.00, but it is essential to consider the number of families involved in ecotourism has a variation along the years as we see at **chart 07**:

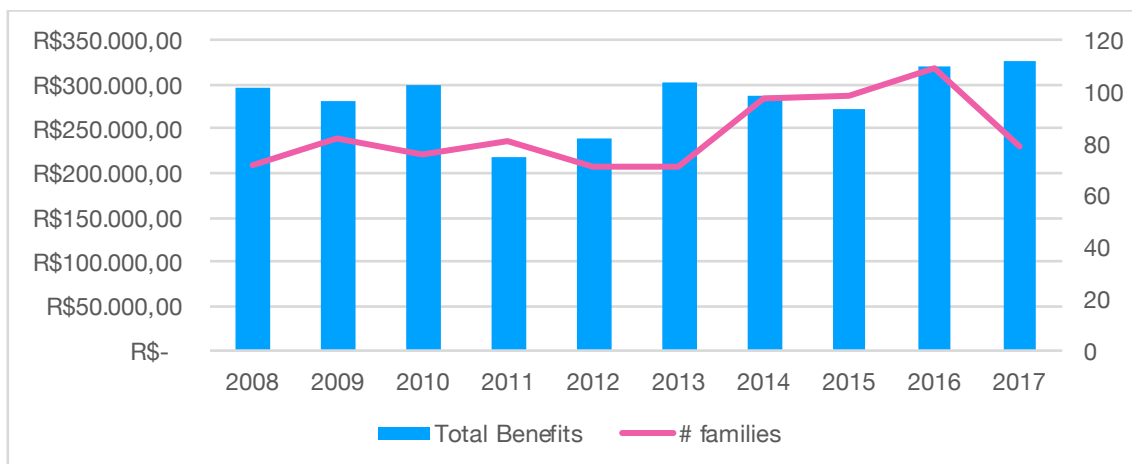


Chart 07: Total benefits compared to the total number of families in ecotourism

The number of families with economic benefits grows from 2013 on when the visitation grows at Uakari Lodge. 2017 faces a decrease in demand which reflects in the total number of families, but the total of benefits is as stable as the previous years which can be explained by the rise of salaries at that year.

The average economic benefits per family follow what is seen at **chart 08**. Once there is an increase in the number of visitors from 2013 to 2016, but no liquid rise on salaries at the same period, the average payments per family is shorter than the average in the other years. As said above 2017 has a decrease in the number of visitors and, hence, the number of families involved, but the rise in salaries makes the average benefits high.

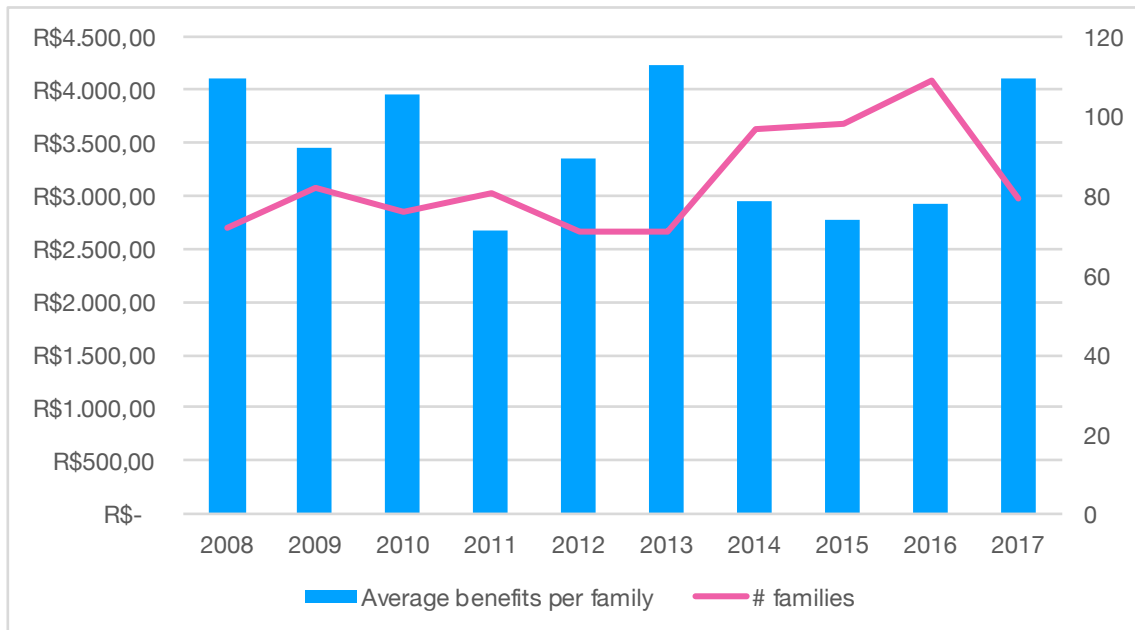


Chart 08: Average direct economic benefits per family.

We can compare the average benefits per family to the legal minimum salary⁷ of each year for better comprehension of what the average family benefits mean locally. The average number of minimum salaries per family, per year, is shown in **chart 09**. Considering the full 10-years period, each family made an average of 4.16 minimum salaries per family per year.

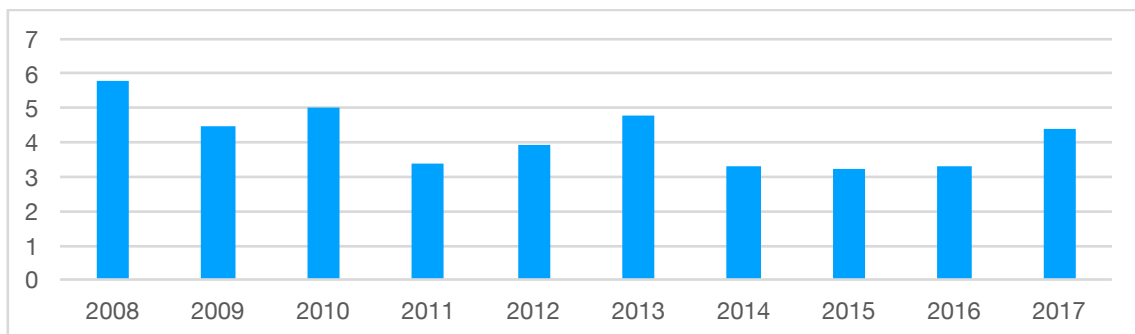


Chart 09: Average number of minimum salaries per family (2008-2017)

We can also compare to the average number of minimum salaries at the municipality where Uakari Lodge is located. It belongs to the town of Uarini, where 47.9% of the population makes 0.5 minimum salaries per capita (IBGE, 2016). If we consider ecotourism is an alternative economic activity (most people keep their traditional extractive activities), locals dedicate no more than 11 days per month, and the context of living inside a protected area,

⁷ Minimum salary in Brazil is based on a monthly labour of 44 hours a week.

it is possible to affirm Uakari Lodge has an essential share in the income for Mamirauá families.

MISD has provided the number of visitors and nights sold per year, and it allows us to calculate the average contribution to the local economy each tourist leaves when visiting Mamirauá Reserve:

Ano	# visitors	Benefits / visitor	# nights	benefit / night
2008	636	R\$ 548,02	2308	R\$ 151,01
2009	713	R\$ 396,03	2517	R\$ 112,19
2010	547	R\$ 548,67	2014	R\$ 149,02
2011	596	R\$ 364,09	2105	R\$ 103,09
2012	621	R\$ 383,81	2277	R\$ 104,68
2013	705	R\$ 486,30	2741	R\$ 125,08
2014	733	R\$ 447,14	2803	R\$ 116,93
2015	1049	R\$ 313,13	4093	R\$ 80,25
2016	1048	R\$ 364,54	4252	R\$ 89,85
2017	805	R\$ 462,48	3320	R\$ 112,14

Table 02: Number of visitors and nights sold annually and average economic benefits.

On average, each visitor contributed R\$431.42 (or US\$129.94) and for every night a tourist spends in Mamirauá she/he leaves R\$114.42 (or US\$34.46) as direct economic benefits. The percentage of benefits per year, when compared to the annual revenues, is shown in **chart 10**:

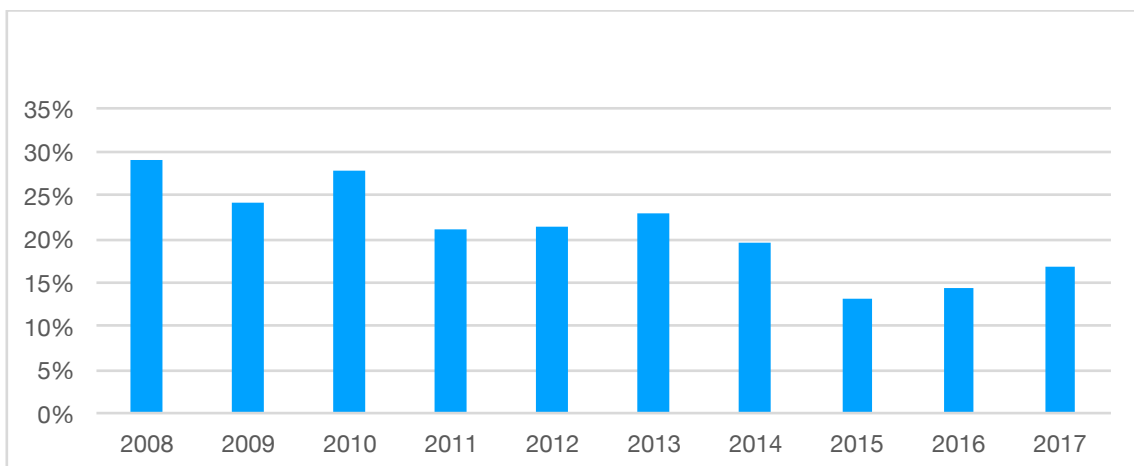


Chart 10: Percentage of direct economic benefits from annual revenues.

21% or 1/5 of the revenues become direct economic benefits to Mamirauá families. The percentage decreases along time, showing the more conservative approach to the financial administration at Uakari Lodge and the extra costs taken from MISD.

The benefits from services are more significant than the benefits brought by the sales of fishery and agricultural products as **chart 11** shows. The volume of economic impacts with products is more stable than services, but these take a more substantial share of remunerations. The percentage is better seen in **chart 12** – about 94% of the benefits come from the daily jobs at the lodge.

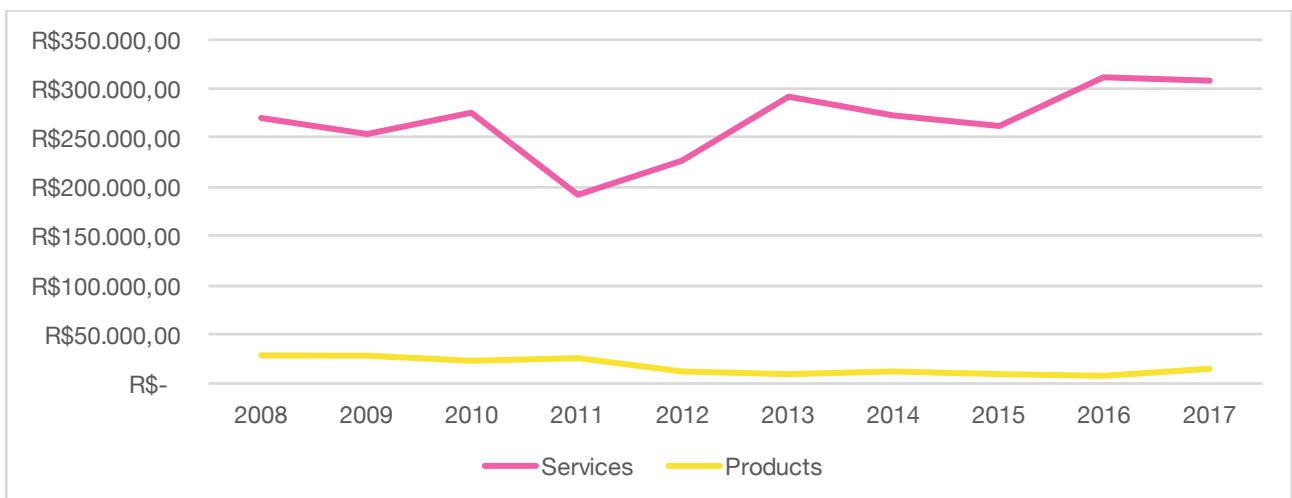


Chart 11: Annual economic benefits from services and products provided to Uakari Lodge.

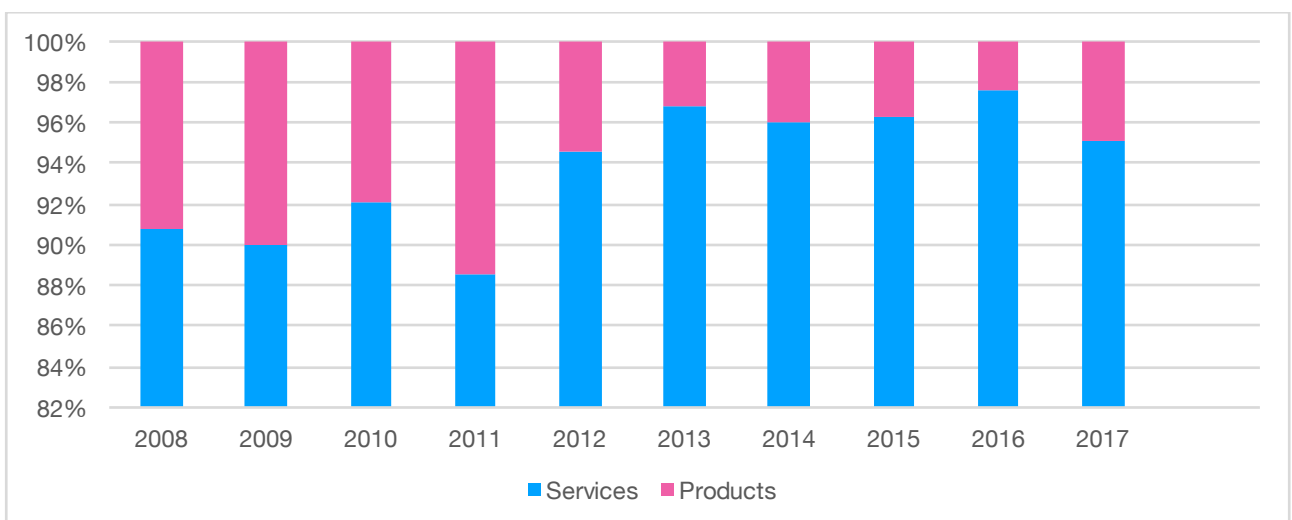
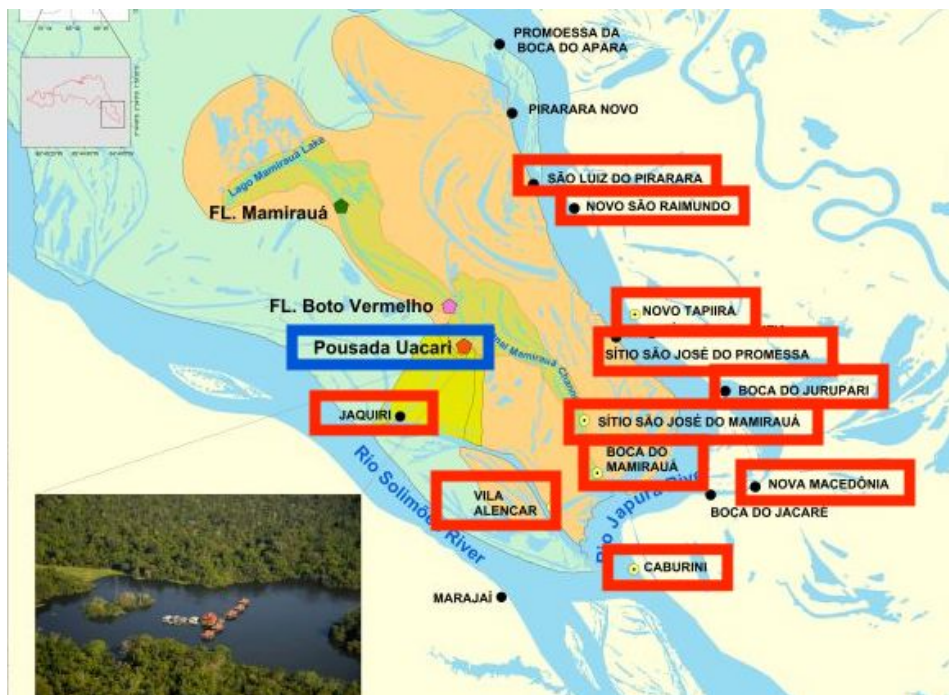


Chart 12: Annual percentage of benefits from services and products.

The level of details from the data provided by MISD allows the analysis of benefits per community, bringing information on the level of connection and dependency of each one of them to ecotourism as an economic activity.

The eleven most involved communities (shown on **map 03**) are Boca do Mamirauá, Vila Alencar, Caburini, Sítio São José, Jurupari, Pirarara, Sítio Promessa, São Raimundo, Tapiira, Nova Macedônia and Jaquiri.



Map 03: Benefited communities at Mamirauá Sector.

Uakari Lodge (in blue rectangle) and benefited communities (in red rectangle). Scale: 1:300,000cm.

There are other localities that eventually take services or sell products to Uakari Lodge; from 2008 to 2017 ten communities were involved somehow in the ecotourism activities in Mamirauá and the total volume of benefits is R\$37,052.85 as of December 31st, 2017 – which is a little more than 1% of the total economic remuneration locally.

The average number of families per community with direct economic gains is shown in table 03. The top four communities in remuneration are Vila Alencar, Caburini, Boca do Mamirauá and Sítio São José. Altogether these communities represent 84% of families involved with Uakari Lodge’s activities.

Community	Average # of families	% of total families
Vila Alencar	26,9	33%
Caburini	17,9	22%
Boca do Mamirauá	15,7	19%
Sítio São José	8,4	10%
Tapiíra	5,2	6%
Sítio Promessa	2,5	3%
Macedônia	1,7	2%
Jurupari	1,3	2%
Jaquiri	1,1	1%
Pirarara	0,9	1%
São Raimundo	0,8	1%

Table 03: Average number of families per community with direct economic benefits from Uakari Lodge and percentage from total number of families.

If we compare the four most benefited communities (with more families and gross economic profits) to the four least ones, it is possible to confirm the economic connection of a community is influenced by its geographic proximity to the lodge (regarding accessibility by aquatic routes) (**Chart 13**). Vila Alencar, Caburini, Boca do Mamirauá, and Sítio São José takes 73% of the total economic benefits from Uakari Lodge, while the bottom four take 8%.

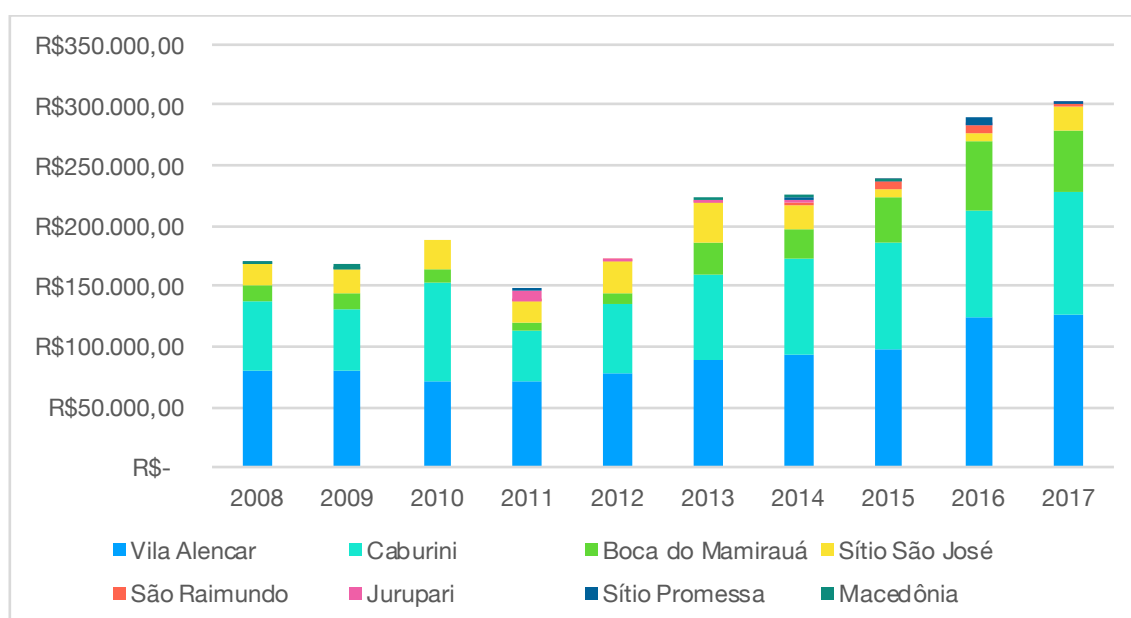


Chart 13: Annual direct economic benefits in Mamirauá communities.

Families made an average of 4.16 minimum salaries annually with ecotourism in Mamirauá as informed above. The analysis of average minimum salaries per family at each of the eight communities above (**table 04**) reveals further information and shows groups nearer Uakari

Lodge not only take more of the gross benefits but also their families individually are more involved with the activity and make more money.

Community	Average # of minimum salaries (2008-2017)
Vila Alencar	5,34
Caburini	6,31
Boca do Mamirauá	1,93
Sítio São José	4,27
São Raimundo	2,00
Jurupari	0,82
Sítio Promessa	0,86
Macedônia	0,33

Table 04: Average number of minimum salaries per community (2008-2017)

Services are more commonly provided to Uakari Lodge by the communities with more gross benefits, while products represent most of the income at the bottom communities concerning remuneration. It is possible to affirm the communities with a less economic connection to ecotourism usually take most of the remuneration from the sale of fishery and agricultural products. Chart 14 shows the top four and bottom four communities in the volume of benefits, and compare the shares on services and products for each of them:

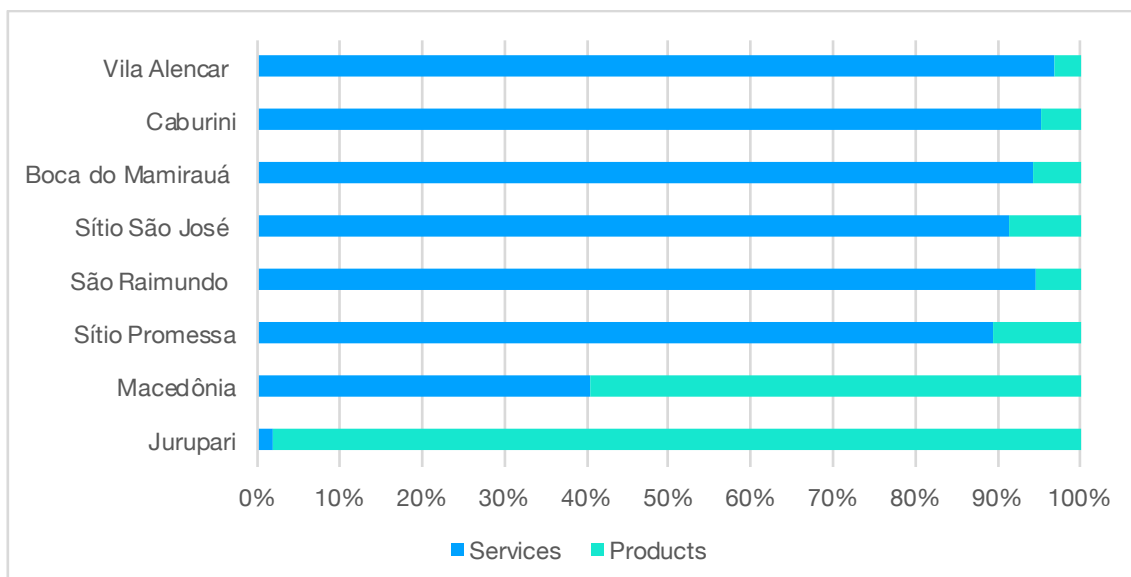


Chart 14: Total volume of services and products sold per community.

Geographic location is an essential factor in connection with the lodge mainly because of transportation. The 'rabetas' (wooden canoes with slow-powered propelling engines), the most common mean of locomotion in the Amazon for more impoverished families, are slow

and travel around 10-15km/h and getting to the lodge can take hours. On the other part, Uakari Lodge's food and beverage manager visits every community twice a week for the purchase of products – so it is easier for further populations to make invest in agricultural production than travelling to provide services at the lodge.

It is important to remember other alternative economic activities are developed in these communities that are at Mamirauá Sector, but out of the ecotourism zone. Usually, those groups are connected to the MISD's fishery and forestry management projects. On the other hand, MISD faces some resistance to include these other programs in communities like Vila Alencar, Caburini and Boca do Mamirauá that have the most robust connections to Uakari Lodge.

Indirect Benefits:

The direct benefits from services and products are the focus for this study, but it is possible to identify and estimate other side benefits from Uakari Lodge that take an important role on the primary objective of the development of ecotourism in Mamirauá Reserve: the incentive to biodiversity conservation.

- *Funded community projects:*

The profit shares – that was substituted by the 'social and environmental fees' from 2013 - is an indirect benefit that comes from the Uakari Lodge's revenues. The total funds distributed from 2008 to 2017 are at table 05 with the monetary correction:

Year	Profit shares / social and environmental fees
2008	R\$ 51.974,70
2009	R\$ -
2010	R\$ -
2011	R\$ -
2012	R\$ -
2013	R\$ 42.027,48
2014	R\$ 42.173,23
2015	R\$ 55.923,71
2016	R\$ 62.429,76
2017	R\$ 47.340,00
TOTAL	R\$ 301.868,88

Table 05: Total ecotourism profit shares and social and environmental fees at Mamirauá Reserve.

The communities defined the methodology for the use and distribution of these funds. Annually, 20% of total fees fund the surveillance of the ecotourism zone; the participating communities and AAGEMAM divide the other 80%. The money is not directly transferred to communities and the association, though: they must develop a community project according to the year's budget. This project must be approved by the other communities, and MISD then finances its implementation (with the fees). Examples of funded projects include the construction of schools, community centres and religious buildings; the acquisition of boat transportation; implementation of agricultural community business; development of community power plants. Some of these projects generate other economic benefits; these will not be estimated in this study.

- *Handicraft:*

It is part of every program at Uakari Lodge the visit to one of the participating communities. At the end of the visit, tourists are welcomed at the community centre, where locals sell promote handicraft made locally. Nardey (2007) studied the economic impacts of the handicraft market in Mamirauá and estimated every visitor spent, by that year, around R\$15.00. With monetary corrections tourists should spend by 2017 R\$20.25 (or US\$6.09).

Nardey's study enables us to calculate an estimated impact of handicraft in Mamirauá from 2008 to 2017. About R\$150,923.25 (or US\$45,458.81) were spent at artisanal artefacts in communities visitors went to learn more about life in riverine villages in the reserve.

- *Tips and laundry services:*

It is not part of the Brazilian culture to pay tips for services. However, once Mamirauá is mostly visited by foreigners (around 80% of tourists) that usually come from North America and Europe, locals end up getting paid extra when their services end. There are no studies that estimate the number of tips to locals and numbers will not be provided here.

Laundry is a separate service available at Uakari Lodge but not intermediated by it. Visitors can contract directly with housekeepers working at the lodge at a fixed price. There are no studies on these numbers as well.

- *Sportfishing:*

This activity is conducted by an American tour operator called Untamed Angling, in partnership with Uakari Lodge for accommodation. Sportfishing happens during three weeks in October. Untamed Angling has a contract with the Mamirauá Reserve Communities Association and pays for the use of one of the lakes for the activity and funds protection of the area. It was established in 2015, and Uakari Lodge estimates an economic benefit of R\$90,000.00 per year (or US\$27.108,00).

Discussion

Mamirauá Reserve was one of the first protected areas to test a new perspective of tourism for biodiversity protection: inclusion of local population as a strategy for conservation through sustainable use of natural resources.

As described in the literature review and confirmed in the analysis of economic results, Uakari Lodge has been tested for better conservation results taking community development as the number one strategy. It was the pioneering initiative of its kind in the Amazon, with no profit interest, and hence the experience went through positive and negative results regarding financial outcomes but long-term, stable results on the protection of biodiversity.

The methodology for economic impact control developed by MISD brings the opportunity to re-evaluate and adopt decisions for the best efficacy of internal management and its impacts to Mamirauá communities. One strong characteristic is the fact social and environmental results influence directly in the economic management of the lodge, which makes its administration singular if compared to regular eco-lodge destinations in the Amazon. It may explain some of the inconstant financial results of Uakari Lodge.

Besides that, the lodge faces two main challenges. The first is common to more impoverished and under-development areas and countries – tourism is more sensitive in these regions to the economic and political settings where they are located, especially when the destination has an international appealing. The outcomes of the global economic crisis in emergent and developing countries tend to be harsher and impacts on tourism are more intense. This is the case when the 2008 global crisis made economic results at Uakari Lodge face losses that were only recovered five years later.

A second challenge is to manage the lodge in such an economic-political-geographic scenario with its pioneer biodiversity conservation objectives. The holistic approach to conservation is recent, and there was no ready-to-apply formula or previous long-term cases to follow. Hence Uakari Lodge's constant 'apply and evaluate' style of management was and still is risky – especially with the new objectives of transferring the full ownership and management of the lodge to the local communities. On the other hand, it made history in ecotourism in the Amazon, creating impact assessment methodologies and results available

for future initiatives to replicate. The studies behind Uakari Lodge resulted in journal articles, books and manuals and are of great value to ecotourism development in the Amazon.

The decision to use the profit for bank financial investments from 2013 on showed to be a good choice as interest has been providing the lodge a safe, stable economic situation for long-term uncertain scenarios. As an example the 2017 bank balance with losses around R\$200,000.00 matches the interest made at the same year in bank long-term financial investments, alleviating the deficit.

The fact a scientific institution is behind Uakari Lodge eases the risks it takes on decisions and daily operation and management. Some of the support MISD still provides to the lodge are fundamental, like access to the internet in a very remote area. Also, the constant impact assessment that can be expensive, take dedicated teams and many working hours is facilitated by MISD researchers and is a challenge the communities might face after the transference of ownership and management, creating new costs to the lodge.

The methodology for economic assessment developed by MISD (the aim of this study) shows to be simple, and Uakari Lodge can carry it on with no significant extra costs. It is clear the economic impact assessment cannot be evaluated separately from social, environmental results, and no sustainability conclusion can be taken without all these aspects together, but they bring many responses and tracks to follow for responsibility in action.

This study is an example of data that can be extracted from economic analysis. The fact MISD has been rigorous to the collection of financial results and community outcomes make impacts on the society and environment easier to comprehend and manage.

As for these results – direct economic impacts of tourism on local communities in Mamirauá Reserve – we can conclude Uakari Lodge works as an alternative to the traditional exploitation of natural resources in the ecotourism zone and, hence, is as an efficient strategy to biodiversity conservation as the pressure over fauna and flora are diminished if compared to pre-ecotourism era.

The results are different across the area and can result in different levels of pressure on natural resources. The nearer communities to Uakari Lodge (Vila Alencar, Boca do

Mamirauá, Caburini and Sítio São José) that take 73% of the economic benefits see the diminished pressure as most families provide services to the lodge, and products represent a small parcel of the income. It can be verified by the testimonials collected by Peralta (2005) mentioned along literature review and the studies on the interaction of ecotourism and environment at the reserve.

The lodge, the visited areas and the 14 existing ecotourism trails are located in the four communities above. Storni et al. (2007), Paim et al. (2012) and Pedro (2012) show animal behaviour and quality of water has not been negatively impacted by the presence of tourists to the area. Considering tourism is the primary commercial activity around Uakari Lodge and these four communities, we can then conclude the economic benefits created by this recent alternative activity is efficient for biodiversity conservation in the area.

MISD has not assessed the zones of the other seven communities in terms of environmental impacts, and hence it is not possible to accurately evaluate the role of tourism for conservation strategies; it is possible though to estimate, by parallelism, that income generated by tourism for these areas have some positive impact in the sustained use of natural resources.

However, the engagement to conservation may be related to the economic benefits those communities get. That can be mitigated by the 'social and environmental fees' that fund community projects independently of the geographic location and adherence to tourism activities.

A critical aspect for analysis is what such benefits mean in a scenario of poverty such as in Uarini – municipality where Uakari Lodge and most of the communities are located. Families in Mamirauá Sector benefit and have a higher average income than those in other areas. The fact 47% of Uarini's population make half a minimum salary puts the social and economic scenario in a critical situation where any improvement in the family income will make a difference in the quality of life.

Ecotourism financial results alleviate poverty in Mamirauá, but the average of 4.16 annual minimum salaries is not enough to consider those families out of underdevelopment levels. The fact 47% of Uarini's population make half a minimum salary puts the social and

economic scenario in a critical situation where any improvement in the family income will make a difference in the quality of life.

This makes the direct contribution from each visitor's fares to locals be significant. The average of R\$431.42 in direct benefits per tourist, when the minimum salary in 2018 is set at R\$954.00 means, a visitor generates nearly 0.5 minimum salaries to local population when coming to Mamirauá. It is a considerable volume of resources for the local economic and social scenario.

The side, indirect economic benefits from tourism at Mamirauá Reserve are expressive concerning value and volume of benefits. It is not possible at this study, with the data provided by MISD, to have the accurate financial results for 'social and environmental fees', handicraft, tips, laundry services and sport fishing activities. It is likely, though, that at least R\$800,000.00 was made in indirect benefits from 2008 to 2017, representing nearly 1/3 of the volume of direct benefits.

Taking the full revenues made by Uakari, it is possible to conclude benefits go beyond the direct and indirect impacts listed above. Direct benefits can be reinvested in other means of production like agriculture, fishery and livestock; indirect benefits have been used to finance small community business, and the other expenses Uakari Lodge have and spend in the nearer towns start a chain of necessary linkages for the regional economy. Ozório and Janér (2012) showed that every R\$1.00 spent by the tourist at the lodge turns into at least R\$4.72 for the economy locally, including Mamirauá Reserve and the municipalities of Uarini, Tefé and Alvarães.

The economic linkage perspective allows us to confirm the economic benefits of tourism in the Mamirauá Reserve are relevant to a broad region. The fact it is a not-for-profit initiative, made by locals and soon owned by communities make the financial impacts stay locally, being different from other lodges in the Amazon that are mostly made on international investors.

Tourism in Brazilian Amazon Protected Areas

The State of Amazonas alone has 27% of its territories protected in the most diverse categories. Together, these protected areas take over 42 million hectares (Instituto Socioambiental, 2011); territories with sustainable use is nearly half of those lands (20 million hectares) where 65 thousand families live and use natural resources (INESC, 2014). As a comparison, the United Kingdom has approx. 24 million hectares.

The involvement of those protected areas and their residents is slow, and there aren't many cases of established tourism routine as in Mamirauá (Coelho, E. 2013). Community-based ecotourism in the Amazon tend to be taken by external agents, and protected area managers and governments are not the leading developers of tourism in these lands.

The support public stakeholders (Federal and State Governments) provide to local communities seem to be limited due to restrictions on budget and human resources, which is historically an issue to the management of natural resources in Brazil. The country has the 4th longest protected area but one of the smallest budgets for conservation. The investment per hectare in 2010 was only \$4.43 (US\$1,26). As a comparison, Argentina invested R\$21.37; Mexico R\$39.71; South Africa R\$67.09 and the United States, R\$156.12 (Medeiros, R. et al., 2011).

The limited financial and human resources put challenges in the implementation of tourism and other alternative economic activities in protected areas. In the Amazon Oliveira (2013) shows 38% of the conservation territories presented a low level of implementation of management plans, land regularisation and biodiversity monitoring; 58% a medium level and only 4% (10 of the 247 studied protected areas) showed high administration standards.

Those in charge for the management of protected areas have recognised the importance of tourism in the Amazon and recently published a report on the economic contributions of tourism to conservation units and their surrounding communities in Brazil to push changes for higher public investments and budget. The report shows 8 million visitors have been to protected areas annually and spend over R\$1 billion at the cities, towns and communities in and around those lands and every R\$1 spent for management of national parks have generated R\$7 concerning economic benefits for the country (Souza et al., 2017).

However, the current scenario is not promising. The present-day government of President Michel Temer has established severe cuts for the conservation of protected areas: from R\$1,264 billion in 2017 to R\$589 million in 2018 - a cut of 52%. This budget reduction has been affecting not only the management of protected areas regarding infrastructure and human resources but also has an impact on the plans Brazil has on deforestation, climate change adaptations and the fundamental Water Resources National Management Plan, a project that started in 1997 and now is close to extinction. The plan is a crucial strategy for fresh, clean water supply in the country in the next years.

The results at Mamirauá Reserve are then (and unfortunately) an isolated case that seems to have worked for the support of a research institute that was funded by international funds and believed in the new perspectives of ecotourism as a strategy for community development and biodiversity conservation.

Conclusion

The economic impact of tourism on local households at Mamirauá Reserve is crucial to the maintenance of several families in the region, creating an essential alternative activity other than the traditional exploitation of natural resources. Uakari Lodge can give communities a compensation for hosting a protected area in a territory that has been occupied by these families for generations.

The total direct economic benefits of R\$2,837,903.30 is high for any Brazilian standards. Literature has not shown any community-based experience in Brazil that proves to have brought this volume of the financial impact to one single region, with an average of 83 families being qualified and making a relative share of the income from tourism.

The administration of revenues and expenses at the lodge is historically submitted to external stress of varied types such as infrastructure (Tefé Airport shutdown), international financial crisis (the 2008 United States / Europe economic issues) and even the internal economic issues (when MISD faced strong funding cuts from the Federal Government from 2015 on). It makes the annual financial results be volatile and hinder more robust, long-term plans that could bring extra benefits to the local communities.

Tourism operations in the Amazon add extra costs and challenges to the issues above: extreme weather conditions, lack of transportation infrastructure and the high cost of maintenance, products and services makes revenues and expenses high but with a low percentage of direct benefits to the local families connected to tourism at Mamirauá Reserve.

The fact the average percentage of direct benefits along the years has decreased substantially – from 34% of revenues in 2008 to 19% in 2017 – seems to be a more responsible decision from the management. It helps guarantee long-term administration a stable economic situation that allows the lodge to be financially able to keep benefits in case of external stress that affects demand somehow. The 2017 scenario was an example when the annual bank balance faced losses of R\$200 thousand, but that did not affect the operation – but the opposite: Uakari Lodge raised salaries above the inflation rates of that year.

The more conservative administration of finances that include long-term bank financial investments, combined with structured international promotion also funds the current business plan that transfers ownership and management of Uakari Lodge to local communities. If after the 10-year plan Uakari Lodge is independent of MISD and also can prepare locals to a step ahead and conduct tourism by themselves, then the DFID investments will be entirely legitimate to its initial objectives – besides showing that the inclusion of community development for biodiversity conservation ends up being efficient.

The differences in the average family income according to the distance from the village to the lodge is an important fact to balance how tourism in Mamirauá affects people's lives locally. It makes it challenging to analyse what type of benefit is 'better' for a family: is it preferred to bring high direct economic benefits through services to a family (as in the nearer communities) OR is it better to have few benefits from the agricultural and fishery trade, encouraging the maintenance of traditional activities sustainably (as in the further populations)?

The four nearer villages to Uakari Lodge (Vila Alencar, Sítio São José, Boca do Mamirauá and Caburini) bring high volumes of profit to their families; but would it be bringing too much dependency from tourism in a scenario that has proven to be more volatile and likely to face constant economic constraints? From the local's perspective, it might be difficult to decide on what is better when poverty is knocking at your door: the fact tourism is successful at Mamirauá Reserve makes its short-term benefits too tempting.

That is another argument in favour of the full passing of ownership and management of the lodge to local groups: it is an incentive to higher qualification and local raise of responsibility for impacts of all kinds, and that helps legitimise the local influence of ecotourism on those people's lives.

The indirect contributions also make an essential part of Uakari Lodge's impacts locally. Production and selling of handicraft; funding to community projects; creation of alternative economic benefits from fishery: all these impacts together help promote the maintenance of culture, the creation of side economic benefits, the stabilisation of families in reserve and the reduction of migration to more prominent urban areas.

As important as creating economic alternatives for locals to stay and not migrate is the fact they protect natural resources locally, even after the creation of a conservation area. Brazil has some of the most significant biodiversity on the planet; however, it also has some of the most concerning deficits in the management of conservation areas. The lack of federal support for protected lands is an incentive for those who claim these areas will be more useful if providing traditional extensive agricultural production and mineral resources, especially in the post-Trump era. It is the development of alternative economic activities for local and surrounding communities that will help change this anti-environmental severe discourse, and tourism at Mamirauá has shown to be a relevant case to show.

The Amazon is in its beginning stages of tourism development, although the destination has been visited for many decades – the potential for future projects such as MISD's is broad and brings solutions for anyone who is fond of ecotourism, enjoy being close to nature and has dreamed or considered visiting the area. Hence, the case of Uakari Lodge can be taken by public and private stakeholders as an example for community development and conservation strategy.

Recommendations

The long experience of twenty years at Uakari Lodge has taught (in sometimes harsh ways) the best possible way to manage the initiative and make it reach its primary objective: conservation of biodiversity in an Amazonian protected area.

The relationship with local communities – the principal agents the lodge has to reach its purposes – is established. However, the results of this study show two main issues to tackle to improve the long-term development of benefits to the population at Mamirauá Reserve and take responsibility for its impacts.

The first issue is the unequal distribution of direct benefits among communities. It is comprehensive there would be a distortion caused by distance in such environment, but Uakari Lodge could increase its benefits for the expansion of the results it has for the conservation of natural resources in its surroundings.

Promoting the extension of benefits to further communities may guarantee not only social development but also the protection of the environment in a broader area of the reserve. Uakari Lodge's impacts are mostly restricted to a small area of the 1,24 million hectares reserve, and it has now the domain over methodologies to develop activities in other regions, take visitors to different communities and possibly fit the commuting costs so other locals can provide services and products.

It also will help reduce an apparent dependency of closer villages to the lodge. As mentioned above, tourism has shown to be unstable economic activity in the region, and although Uakari is better prepared for crisis scenarios in the most recent years, it may face longer challenges that would impact negatively at locals and bring disbelief that could be difficult to recover in the short-medium terms.

The non-balance between the provision of services and products is a second issue to be addressed for two reasons. In any of the communities, there is a balance between both, and it might have consequences.

At the villages where services are stronger, the impacts on newer generations for the maintenance of traditional agricultural and fishery activities is already a concern for older people – which, combined with the economic dependency on tourism could be an even

stronger defeat in case of crisis at Uakari Lodge. Younger populations providing services at Uakari Lodge might not be acquiring knowledge to subsistence production, meaning the slow end of traditional activities. It is the responsibility of MISD to reinforce the importance of keeping those activities and promote the awareness about the risks of tourism in remote areas concerning economic dependency on external, unexpected facts.

On the other hand, the villages where products represent the significant fraction of economic benefits may not be receiving the same qualification commitment MISD has to other groups, meaning the impacts might be reduced to economic when it would be broader. Considering the communities altogether are taking the ownership and management of the lodge soon, the different qualification on services can bring an internal dependency situation, where the most distant communities could be submitted to the decisions of the nearer groups – which certainly would result in disputes and disagreements.

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