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## **GESTÃO SUSTENTÁVEL DE MADEIRA NA FLORESTA AMAZÔNICA BRASILEIRA: RESPOSTAS LOCAIS AOS DESAFIOS GLOBAIS SUSTAINABLE LOGGING MANAGEMENT IN THE BRAZILIAN AMAZON FOREST: LOCAL RESPONSES TO GLOBAL CHALLENGES**

*Sustainable logging management in the brazilian amazon forest: local responses to global challenges*

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**RESUMO:** Este artigo discute o plano de manejo florestal sustentável no contexto brasileiro. A teoria mostra que é relevante no desenvolvimento de políticas locais com impacto global. Esses são fatores amplamente promovidos pela comunidade internacional e o mecanismo de combate ao desmatamento da Amazônia. Esta pesquisa utilizada foi a abordagem metodológica do método qualitativo e a coleta de dados foi por meio de entrevistas semiestruturadas, observação e análise documental. Concluímos que a integração entre os atores (governo, recursos florestais gerenciais e comunidade) é importante para resultados positivos em meio ambiente sustentável.

**PALAVRAS-CHAVE:** desmatamento. Floresta de manejo. Brasileiro.

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### **INTRODUCTION**

Local crises are of concern to all part the word today. Each region presents specific local problems, but these problems have an impact on a large scale (Ostrom, Burger, Field, Norgaard & Policansky, 2009). The case of problems with the management of forest resources is more serious because the problem is not local; the impact

is global (García-Ruiz, López-Moreno, Vicente-Serrano, Lasanta-Martínez, & Beguería, 2011). Fearnside (2012, p. 70) states that the Brazilian “Amazon rainforest provides an important environmental service with its storage of carbon, thereby reducing global warming”.

Many are the causes of Amazonian deforestation, but logging has relevant participation (Pires & Costa, 2013). Brazilian Legal Amazon has about 5 million square kilometers, occupying approximately 59% of the national territory. It has 510 million hectares of vegetation cover equivalent to one third of the Tropical Forests of the world and approximately one billion cubic meters of sawn wood of high quality that could be worth trillions US dollars (Amin, Motel, Combes, Kere, Olinga & Schwartz, 2014). The rich biodiversity of the Amazon rainforest may be scaled evaluating each hectare of forest. It is estimated the presence of 150 species of trees, which corresponds to an average total biomass is 300 tons / ha. The species are commercially usable only 6 to 10 trees / ha, or wood volume ranging from 20 to 50 m<sup>3</sup>. The rational forestry takes 10% of the trees (Amin et al, 2014).

Therefore, the administration of the forest to obtain economic, social and environmental benefits must respect the mechanisms sustaining ecosystem with forest management (Brazilian Law 11.284/2006). Is necessary to the preservation of the Amazonian biome and define a boundary between natural resources that should remain untouched and management areas that can generate economic and social benefits for the region (Ministry of the Environment, 1998).

Management of sustainable production in Tropical Forests is a way to keep the main environmental functions of forests. But is the issue of forest management only was importance after the publicity of the acts of imports of unsustainably produced timber (i.e. TV, scientists, Internet, and others actors). Forest management for multiple uses means the administration of an area with forest cover, with different use purposes (e. g. the protection of watersheds and watercourses, recreation, scenic beauty) and maintenance of habitat for wildlife, including logging production (Robinson, 2013).

This study indicates that a solution is a set of elements based on interactions among the actors involved. Furthermore, the positive nature of collaboration between the actors that control and use the forests resources is solution for best outcomes. Nevertheless, previous studies on solutions have not focused exclusively on investigating the involvement of the professional administrator in the management of forest resources and adoption of forest concessions policy how viable alternatives. Therefore, the issues in the interplay of relationships between actors (i.e. private administrator of forests and government or legal agents) are few explored.

To address this gap, this paper show that is possible in solution networks of actors integrate resources in interaction to develop solutions in the forest resources, and identify the related benefits for the two or more part involved . The theoretical point of departure for the study is that interaction between actors and the resource integration is the primary characteristic successful in the management of forest resources.

## LITERATURE REVIEW

### **Professional Administrator in the Management of Forest Resources**

The science of management has how characteristic the participation of several areas in your structure of formation (transversal) (Taylor, 1911). Actually the administrators have work in positions of quite unusual sectors, including forests manager (Regi, Schuch, Gomes & Kneipp, 2014). The professionalization of managers of parks and forests is essential for the conservation and proper use of natural resources (Mulkey & Day, 2012). Basso et al. (2011, p. 160) claim that other aspect important in this process is the forest certification. It forces managers to seek qualification to meet the requirements of certifying agencies and governments. The contribution from the professional administrator in this process is important in preservation of the environment, the social contribution to local communities (native) and economic development (Roberts & Gilliam, 1995).

Thus, the role of the forests manager may include educator, technician, mediator, conflict manager, public relations and others competencies. In the relationship collaborative among managers, scientists, government agents and the public general to address the institutional barriers and incentives to local strategies for forests management can be the solution for global problems. This important role for manager (administration) of resources environmental in a bridge for conflict solutions of interest in different objectives (i.e. social, economic

and environmental, state, local community, legal policies, private sectors) (Cortner, Wallace, Burke & Moote, 1998; Danielsen, Skutsch, Burgess, Jensen, Andrianandrasana, Karky, & Zahabu, 2011).

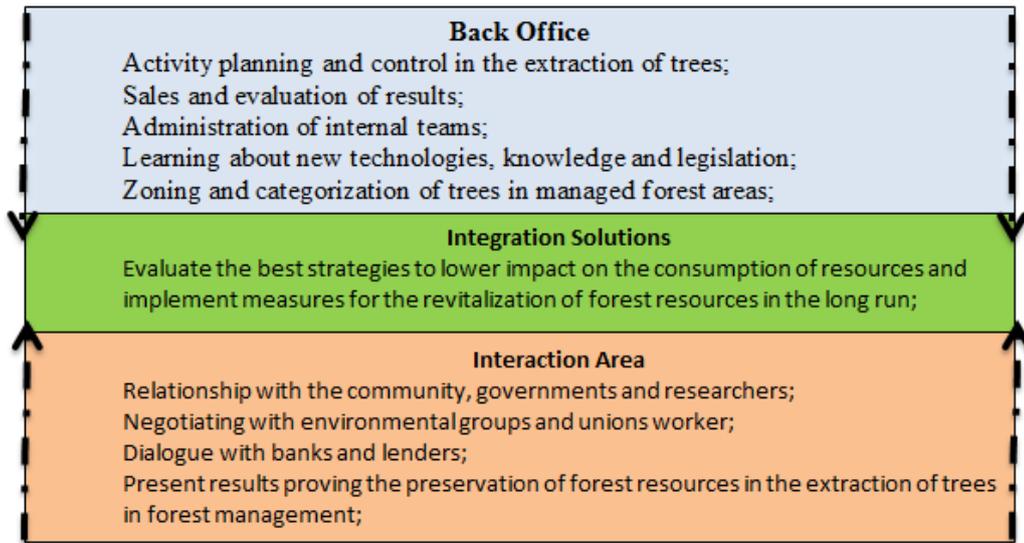


Figure 1: Activity Manager Forests Resource

For this reason, multiple competences and roles may be needed of forests manager professional. Your mission is to work with balance at different context and diverse people through internal activities (office) and externals (in locus - forests and community native) (Nijnik & Bizikova, 2008). But, your contribution big is the ethical work, transparency in action, dialogue with local institutions and global commitment, decision, planning for future with base in actions relevant for next generations (Sewpaul & Jones, 2005). This work can divide into three independent areas (back office, interaction between stakeholders and integration solutions), but integrated by collective and social interests.

Then, notes (figure 1) that the work of the forests manager has a key role in the balance between the use of natural resources and environmental conservation. Its function is to establish connection with the various sectors of society in order to promote sustainability in the conscious use of renewable natural resources and non-renewable.

### Adoption of Forest Concessions Policy in Brazil

The sustainability of management brings the assurance quest for continuous improvement of the systems used and the development of new systems, considering the high number of variables found in Amazonian forests (IMM 2002; Amin et al, 2014). The plan for sustainable forest management refers to the management of the forest to obtain economic and social benefits, respecting the mechanisms sustaining ecosystem. This definition shows that to be sustainable it must be economically viable, environmentally sustainable and socially just (IBAMA, 2013; Amin et al, 2014).

At this point, it should be noted that the Legal Amazon is divided into western and eastern Amazonia. The Western Brazilian Amazon consists of the states of Acre, Amazonas, Rondônia and Roraima, having total area of 2.18 million square kilometers, equivalent to 42.8% of the Brazilian Amazon area and 25.6% of the national territory. The eastern Amazonia consists of the states of Pará, Maranhão, Amapá, Tocantins and Mato Grosso, with an area of about 3.0 million km<sup>2</sup>

The history of commercial logging in the Amazon has more than three hundred years. Since the sixteenth century, hardwoods were removed from the forests nearby riverbanks and exported in logs for European metropolises. There was no legal protection for the forests in the extraction of trees. That changed because the operation plans of extracting trees must conform to the norm of the State Decree No. 12,447 of October 10, 2006 (Based on CONAMA Resolution No. 406 and Ordinance 186).

Rondônia is one of the Brazilian states that more deforestation. It is the fourth-ranked (Pará, Mato Grosso, Maranhão and Rondônia). However, in proportional terms Rondônia had greater deforestation. Among the identified key factors that contributed to growth of deforestation in the state are: the opening of roads,

infrastructure investments, growth of cattle, expansion of mechanized agriculture, the timber industry migration to frontier areas, land grabbing and lack land regularization (Rondônia State, 2009).

The Government intends to tackle this problem through the Plan for the Prevention, Control and Alternatives to Deforestation in Rondônia. The aim is gradually reduce deforestation in Rondônia State. He wants that in year 2015 the indicators of annual increment is zero. The plan is organized into four themes: spatial planning and land regulation, encouragement for sustainable production, command and control actions to prevent deforestation and capacity building for decentralization of environmental management. The Government will use as strategy development social inclusion, integrating society, economic actors and politicians (data analysis of documentary research).

Studies IMAZON-Institute of Man and Environment in the Amazon shows that in the years 1998 to 2004 there was a fall in consumption of raw material (logs trees) in the Amazon region. The reasons identified were intensifying enforcement against illegal logging and the cancellation of hundreds of the management plan in 2003 for reasons of irregularity. However, survey data from Mercoeste / SENAI-2005 show that players of low production and development of Forest Bases industry factors could be reduced in the short term. The segment demonstrates positive trend to expand its participation in the regional economy and has the potential to expand their participation in markets.

### Local Solutions for Global Benefits

The main objective of the Brazilian Federal Government to the policy of forest concessions is to conserve the green cover of forests by improving the quality of life of people living in its surroundings and stimulating the formal economy with products and services from managed forests. The Law of Public Forest Management (Law 11.284 / 2006), which established the Forest Service, created the possibility of concession of public forests.

The government can grant companies and communities the right to manage public forests to extract trees and provide tourism services. The counterpart to the right of the sustainable use is the payment to the government of amounts that vary according to the price proposal submitted during the bidding process. The forest concession policy allows federal, state and local governments to manage their forest assets in order to combat the invasions of public lands for the predatory exploitation of existing resources (e.g. livestock and agriculture). The contracts only allow obtaining the forest resource by the techniques of forest management and reduced impact logging. The forest granted remains standing and is used in a rotation system that allows continuous and sustainable timber production. Only four to six trees per hectare are removed and the return to the same area will occur every 30 years.

Municipalities and communities neighboring the concession area being favored by generating jobs, investment in services, infrastructure, financial returns arising from the payment for the products that have been granted and benefits guaranteed by the concession contract. All citizens could benefit with the conservation of forest resources and the certainty of buying products that respect the forest. The concession agreement prohibits access to genetic resources, the use of water resources, exploitation of mineral resources, fisheries or wildlife and commercialization of carbon credits. The ownership of the land remains with the government throughout the concession period and the buyer receives the right to conduct forest management in the area. Law 11.284 / 2006 is the legal framework for the realization of the concessions. It is describing how the process that involves the lifting of the concession areas suitable for the preparation of the notice, public hearings with the population and monitoring the activity occurs.

**Table 1. Local Solutions for Global Benefits**

Standard	Factor	Group (Local/Global)
Environmental impact	Monitoring of growth dynamics and forest recovery.	Local and Global
	Reducing damage to the remaining forest during harvesting.	Local and Global
	Investments in infrastructure and services for the local community.	Local
Direct social benefits	Generation of local jobs	Local
	Employment generation of forest concession	Local
	Diversity of products exploited in the management unit (Consumption	Local/Global

	and exports)	
Efficiency	Diversity of exploited species in the management unit (Consumption and exports)	Local/Global
	Diversity of services operating in the management unit	Local
Adding value	Degree of local processing the product	Local/Global

## METHODOLOGY

The methodological approach, empirically based, was through qualitative research, descriptive typology; with application of the case study. The focus of this study is to explore **management sustainable logging in Brazilian Amazon Forests: local responses to global challenges**. The methodological approach was through qualitative research, descriptive typology; with application of the case study how empirical based. The focus of this study is to explore management sustainable logging in Brazilian Amazon Forests: local responses to global challenges. The study has been carried out during 2013-2014 when 13 personal interviews were carried out with representatives from both sides of the dyad (government agents and forests private manager).

Additional data was gathered through participant observation and document analysis. The time span of the case is about nine months, from September 2013 to May 2014. The data has been analyzed through content analysis of the interview transcripts. The analysis has been ongoing since the first interview. Partial participant observation has been an important way to gather data. This has been possible due to good access to the case. The adductive research process used enables to go back and forth between theory and practice as the research process evolves. The research method applied can be defined as a qualitative, exploratory case study. This choice rules out direct applicability on other country. However, this choice allows the researcher to go deeper into the subject and explore something new and unique.

### Data analysis

This section is divided into three parts. The first part presents a synthesis of the content analyzed the interviews, the second part presents the photographic records of the work locus of observation and, finally, to analyze documentary. A summary of the discussion containing the interview analysis may be seen in Table II. The table includes four theses about sustainable management of forests, which according to our analysis provide an understanding of the important process of preserving forests.

These are focal issues in management sustainable logging. Furthermore, they offer a help for researchers and practitioners to understand the various roles of important actors in value for local and global action of Amazon forest preservation and to analyze opportunities for professional manager beyond its conventional borders (professional new sector).

The contemporary literature emphasizes the role of manager in preservation forests. It also stresses the importance of interaction with others actors (government, community, certificate organs, researchers and scientists, legal system). From an environmental point of view, this means that human elements are the focus. Consequently, as the first thesis implies, the goal for the low environmental impact is to support the decision and action of use coordinated and controlled resource in forests explore.

**Table 2 - Synthesis of the Content Analyzed the Interviews**

<b>Theses</b>	<b>Comments</b>
The goal for sustainable management of forests support the lower impacts environmental;	<b>When there is control by the government; an educational system aimed to raise awareness of the value of preserving the environment; the local community realizes the value of forest resources for subsistence get without destroying, the degradation impacts are smaller. The professional manager of public forests has an important role in all these local actions have global scope.</b>
The sustainable management of forests is a global responsibility;	<b>The natural resources of the forests are removed to be consumed by distant buyer extraction area. When local communities understand the value of the forest, they act as protectors against degradation scale. Thus, even if the buyer wants to buy without knowing the origin, the native community avoided the</b>

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**removal of the forest well into the illegal sale.**

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The local effects of the sustainable management of forests can be achieved globally;

**The results of preserving forests positively affect the global climate, preserves the symbiosis of fauna and flora, allows the use of renewable resources with global distribution, creating new forms of interaction between people (ecological tourism) and provides hope for continuity of the planet.**

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The positive effects of sustainable management of forests are perceived in economic, social and environmental determinants.

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**The community must work and incomes, the industry can use without destroying the environment that renews its resources for future use (as photographic records).**

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The photographic records show the community inserted in place forest work with sustainable management. The effect of employment generates dignity of life and improved the health and education through professional engagement.



**Photographic 1 - Field staff**

Forest is mapped and selected the trees that can be removed. The spaces left by trees harvested favors the development of new trees by inserting the sunlight and forest regeneration is faster when there is no disorderly devastation. The government issues and environmental certification makes police surveillance, but the main tax is the community that may or may not report irregularities.



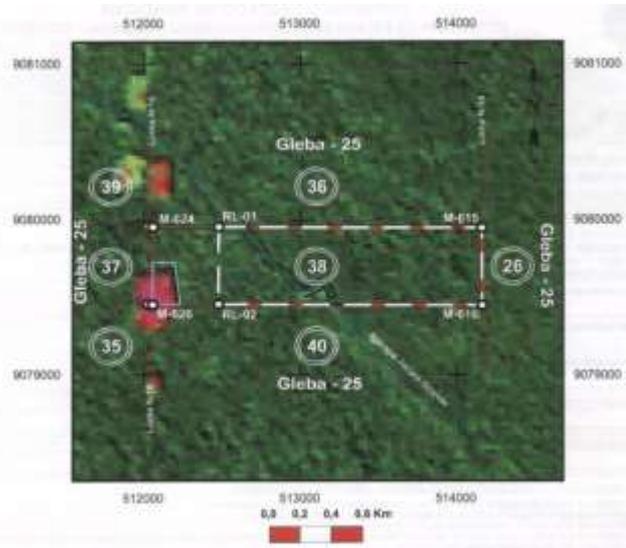
**Photographic 2 - Measurement to harvest trees**

Documentary analysis demonstrates that the private manager of public forests has an obligation to comply with legislation. When errors are found is criminally punished and must indemnify the State. However, was observed during the interviews that there are still many gaps in oversight. The main problem is the amount of police for surveillance.

 <b>GOVERNO DO ESTADO DE RONDÔNIA</b> SECRETARIA DE ESTADO DE DESENVOLVIMENTO AMBIENTAL - SEDAM/RO COORDENADORIA DE LICENCIAMENTO E MONITORAMENTO AMBIENTAL - COLMAM	
<b>Licença Ambiental em Propriedade Rural</b>	
<b>LAPR Nº:</b> 8035/2012	<b>VALIDA ATÉ:</b> 30/01/2015 <b>PROCESSO Nº:</b> 1801/1898/2011
<b>DADOS DO PROPRIETÁRIO:</b>	
<b>PROPRIETÁRIO:</b>	
<b>CPF/CNPJ:</b>	<b>RG:</b>
<b>DADOS DA PROPRIEDADE:</b>	
<b>PROPRIEDADE:</b>	
<b>LOCALIZAÇÃO:</b> Lote: 38, Setor: MANOÁ, Gleba: RIO PRETO-25, Projeto: PROJETO FUNDIÁRIO ALTO MADEIRA, Município: Porto Velho/RO, CEP: 76.800-000	
<b>TRANScrição/MATRÍCULA:</b> 15.871, REGISTRADO 27/07/1983, NA COMARCA DE PORTO VELHO - RO.	
<b>Área da Matrícula:</b>	<b>Área Total do Imóvel:</b>
105.1438 ha	105.1438 ha
<b>Área da Reserva Legal:</b>	<b>Área Remanescente:</b>
84.1151 ha	21.0287 ha
<b>Área Total Antropizada:</b>	<b>Área de Preservação Permanente Total:</b>
4.3107 ha	5.1675 ha
<b>ATIVIDADE PRINCIPAL NA PROPRIEDADE:</b>	
SEDAM-1 - Agricultura	
<b>INFRA-ESTRUTURA:</b>	
Sem Informação	
<b>A SECRETARIA DE ESTADO DO DESENVOLVIMENTO AMBIENTAL RECONHECE:</b>	
-A PROPRIEDADE COMO INSCRITA NO SISTEMA DE MONITORAMENTO E PROTEÇÃO AMBIENTAL;	
-A PROPRIEDADE ESTÁ SITUADA NA ZONA 2, SUBZONA 2.1 DO Z.S.E.E. 2ª APROXIMAÇÃO;	
-A PROPRIEDADE NÃO TEM PASSIVO AMBIENTAL FLORESTAL;	
-A PROPRIEDADE ESTÁ SITUADA A MAIS DE 10 KM DE TERRAS INDÍGENAS, A UMA DISTÂNCIA DE 8,596 KM DA (FLONA) FLORESTA NACIONAL JACUNDA, E ENCONTRA-SE FORA DA ÁREA DE AÇÃO CIVIL PÚBLICA;	
-A PROPRIEDADE ENQUADRA-SE NO QUE ESTABELECE A RESOLUÇÃO Nº 428 DO CONAMA DE 17/12/2010;	
-A PROPRIEDADE COMO APTA COM O QUE ESTABELECEM O CÓDIGO FLORESTAL - LEI 4.771/66, E SUAS ALTERAÇÕES E A LEI COMPLEMENTAR ESTADUAL Nº 233 DE 06/06/2000 - ZSEER/O;	
-O PRAZO DE VALIDADE DA LAPR ESTÁ DE ACORDO COM A PORTARIA Nº 183/2010 GAB/SEDAM, DE 05/10/2010.	
Esta Licença não desobriga seu detentor do cumprimento do que estabelecem Lei da Natureza nº 9.605/98 e o Código Florestal, bem como o que estabelece a Instrução Normativa nº 03, de 04 de março de 2002, do MMA.	

**Doc 1 - Environmental license**

Each property has geodesic mapping. It serves to state control of compliance with legal obligations. It is also a security administrator for the forest resource.



**Doc 2 - Geodesic mapping**

Our approach is managerial, and in a forest resource context, we study the relation between professional manager and control of forests resource in study analysis. To be able to understand and manage the forests resource the manager need integrated effort together community and government agents for to get the goal of preserve the environment.

This means, as implied by the third thesis, that the sustainable management of forests is a global responsibility. This conclusion is important because it makes it possible to first analyze the role of the government as legal provider in a context of forest protection. This is in line with the underpinning understood of

the management perspective, because the manager has a duty to contribute to the environmental protection compliance process. Second, a distinct meaning of concept participative manager in protection environmental may be developed.

## CONCLUSION

We conclude that the issues can be resolved through integration between government policies (legislation, control and punishment for irregularities) and developed competencies in the management of forests. The local community plays have important role in preserving and monitoring of legal compliance. When all stakeholders are involved in the same goal is easier to preserve the environment and used of natural resources in a forests.

Note that the environmental preservation of forests is based on a set of elements that are cared for by governments, administrators and community. Each actor plays a role in the expected results and only with the alignment of roles and commitment to the individual responsibilities can to preserve forest resources. When results are achieved all of humanity and the planet has benefits. Therefore, no matter if the forest is in America, Asia or Europe, because the planet will always win with the best environmental outcomes generated by human protection to the natural resources of forests.

The predation modifies the structure of forests with changes in land use. Forest management is the instrument recognized worldwide as a mechanism capable of maintaining tropical forests sustainably. For it is necessary for surveillance, monitoring, research, dissemination of knowledge and incentives of the various spheres of society and the government to adopt continuously.

With the implementation of forest concessions, the supervision and monitoring are the weakest elements of the system. Need a strong action in education and responsiveness of local people (government officials, administrators, and community) with the goal of not compromising sustainability forests under concession. Therefore, the limit for illegal logging is of paramount importance in order to reduce deforestation and increase the competitiveness of wood originated from areas under forest management. At this point the administrator of forest management plans can contribute to the development of integrated solutions with government and the community.

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