

**SUSTAINABLE LOGGING MANAGEMENT IN BRAZILIAN AMAZON
FORESTS: LOCAL RESPONSES TO GLOBAL CHALLENGES**

FÁBIO ROGÉRIO DE MORAIS

Centro Universitário da FEI
moraisfabiobh@gmail.com

MARCOS TÚLIO COUTO SOUSA

Faculdades Associadas de Ariquemes
niceluz1@hotmail.com

GILMARA LIMA DE ELUA ROBLE

FEI University
gilmararoble@gmail.com

ERYKA EUGÊNIA FERNANDES AUGUSTO

FEI University
eryka_fernandes@hotmail.com

ÁREA TEMÁTICA: GESTÃO AMBIENTAL

SUSTAINABLE LOGGING MANAGEMENT IN BRAZILIAN AMAZON FORESTS: LOCAL RESPONSES TO GLOBAL CHALLENGES.

ABSTRACT

This paper discusses the sustainable forest management plan in Brazilian context. The theory shows that it is relevant in the development of local policies with global impact. These are factors that have been widely promoted by the international community and the mechanism to combat amazon deforestation. This research utilized the methodological approach of qualitative method and the data collection was through semi-structured interviews, observation and document analysis. We conclude that integration between factors (government, management of forests resources and community) is important for positive results in a sustainable environment.

KEYWORDS: Deforestation. Forest Management. Brazilian.

1 INTRODUCTION

Local crises are a concern to all parts of the world today. Each region presents specific local problems, but these problems have an impact on a large scale (Ostrom, Burger, Field, Norgaard & Policansky, 2009). The set 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 covers 510 million hectares with vegetation, equivalent to one third of the Tropical Forests of the world and approximately one billion m³ of sawable 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 can be measured in the evaluation of each hectare of forest. We estimate the presence of 150 species of trees, which corresponds to an average total biomass is 300 tons / ha. Only from 6 to 10 species of trees/ha or wood volume ranging from 20 to 50m³ are commercially usable. The rational forestry takes 10% of the trees (Amin et al, 2014).

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

Management of sustainable production in Tropical Forests is a way to keep their main environmental functions. However, it was only after the revelation of import acts of unsustainably produced timber that the forest management issue gained notoriety (i.e. TV, scientists, Internet, and others factors). Forest management for several uses means administration of an area covered by forest, with different purposes (e. g. the protection of watersheds and watercourses, recreation, scenic beauty), and maintenance of wildlife habitat, including logging production (Robinson, 2013).

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

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

2 PROFESSIONAL ADMINISTRATOR IN THE FOREST RESOURCES MANAGEMENT

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

Thus, the roles of the forest's manager may include educator, technician, mediator, conflict manager, public relations and other competencies. The collaborative relationship among managers, scientists, government agents and the general public to address the institutional barriers and incentives to local strategies for forests management can be the solution for the global problems. This is an important role for the manager (administration) of environmental resources in a bridge for conflict solutions that are of interest for 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).

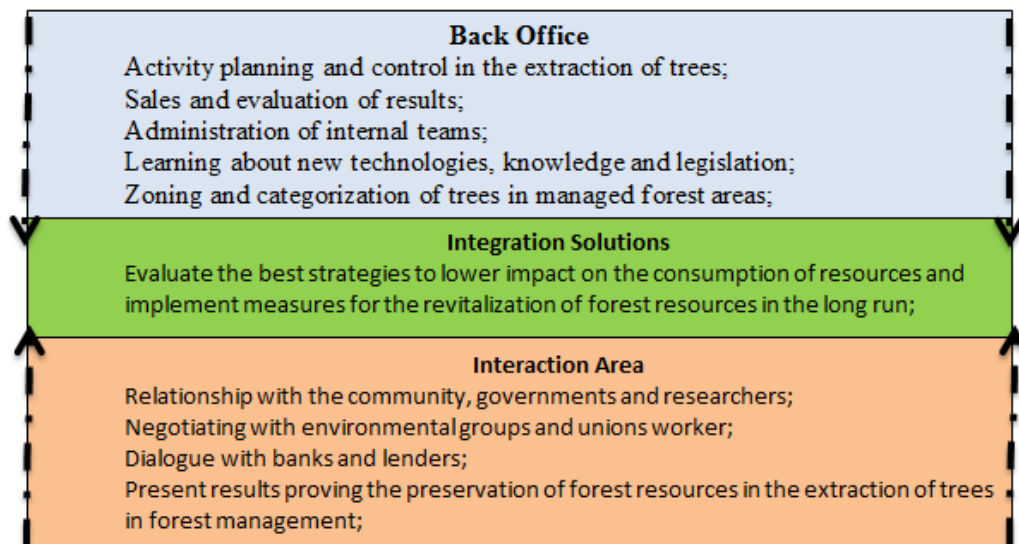


Figure 1: Activity Manager Forests Resource

Whence, there are multiple competences and roles suggested to the forest's manager. Their mission is to work with balance at different contexts and people through internal activities (office) and externals (in locus - forests and native community) (Nijnik & Bizikova, 2008). But, their biggest contribution is the ethical work, transparency in action, dialogue with local institutions and global commitment, decision-making, planning for the future with base in actions that are relevant for next generations (Sewpaul & Jones, 2005). This work can be divided in three independent, but integrated by collective and social interest areas (backoffice, interaction between stakeholders and integration solutions).

Then, note (figure 1) that the work of the forest's manager has an important role in the balance between the use of natural resources and environmental conservation. Their function is to establish connection with the various sectors of society in order to promote sustainability in the conscious use of renewable and nonrenewable natural resources.

3 ADOPTION OF FOREST CONCESSIONS POLICY IN BRAZIL

The sustainability of management brings assurance to the quest for continuous improvement of the systems already used and the development of new systems, considering the high number of variables found in the 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 ecosystem sustaining mechanisms. This definition shows that for it to be sustainable it must be economically viable, environmentally sustainable and socially fair (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 km², 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 km².

The history of commercial logging in the Amazon is more than three hundred years old. 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 against the extraction of trees. This changed because the operation plan of extracting trees must conform to the norms 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 with the most deforestation. It is the fourth-ranked (Pará, Mato Grosso, Maranhão and Rondônia). However, proportionally speaking, Rondônia had the greatest deforestation. Among the identified key factors that contributed to the increase of deforestation in the state are: roads construction, infrastructure investments, cattle growth, expansion of mechanized agriculture, the migration of the timber industry to frontier areas, land grabbing and lack of land regularization (Rondônia State, 2009).

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

Studies of the IMAZON-Institute of Man and Environment in the Amazon shows that in the years from 1998 to 2004 there was a decrease in consumption of raw material (logs trees) in the Amazon region. The identified reasons were intensified enforcement against illegal logging and the cancellation of hundreds of management plans in 2003 for reasons of irregularity. However, survey data from Mercoeste / SENAI-2005 show that workers of low production and development of Forest Based industry factors can be reduced in the short term. The segment

demonstrates a positive trend to expand its participation in the regional economy and has the potential to expand their participation in the market.

4 LOCAL SOLUTIONS FOR GLOBAL BENEFITS

The main objective of the Brazilian Federal Government to the forest concessions policy 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 proposed price 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 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 surrounding the concession area are favored by employment generation, 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 are benefited 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's described how this process that involves the mapping of the concession of suitable areas for the preparation of the announcement, public hearings with the population and monitoring of the activity occurs.

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	Generation of local jobs	Local

benefits	Employment generation from forest concession	Local
	Diversity of exploited products in the management unit (Consumption and exports)	Local/Global
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 of the product	Local/Global

Figure 2: Local Solutions for Global Benefits

5 METHODOLOGICAL APPROACH

The methodological approach was through qualitative research and descriptive typology; with application of the case study empirically based. The focus of this study is to explore **Sustainable Logging Management 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 private forests manager).

Additional data has been 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 of gathering data. This has been possible due to good access to the case. The abductive research process used enables us 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 excludes direct applicability on other countries. However, this choice allows the researcher to go deeper into the subject and explore something new and unique.

6 DATA ANALYSIS

This section is divided in three parts. The first part presents a synthesis of the content analyzed in the interviews; the second part presents the photographic records of the local work of observation and, finally, the analyzed documentary. The discussion containing the interview analysis is summarized in Table I. The table includes four theses about sustainable forest management which according to our analysis provide an understanding of the important process of preserving forests.

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

The contemporary literature emphasizes the role of the manager in the preservation of forests. It also stresses the importance of interaction with others factors (government, community, certified

organs, researchers and scientists and the legal system). From an environmental point of view, this means that human elements are the focus. Consequently, as the first thesis implies, to achieve the goal of a lower environmental impact it is necessary to support the decision of using coordinated and controlled resources in forests exploitation.

Theses	Comments
The goal of the sustainable management of forests is a lower environmental impact;	When there is control by the government, an educational system aimed to raise awareness on the importance of preserving the environment, the local community realizes the value of forest resources for subsistence without its destruction, and the impacts of degradation are smaller. The manager of public forests has an important role so that all these local actions have global scope.
The sustainable management of forests is a global responsibility;	The natural resources of the forests are removed to be consumed by distant buyers. When local communities understand the value of the forest, they act as protectors against the degradation scale. Thus, even if the buyer wants to buy without wanting to know the origin, the native community avoided the removal of the forest to the illegal sale successfully.
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 the continuity of the planet.
The positive effects of sustainable management of forests are perceived in economic, social and environmental determinants.	The community must work and earn, the industry can use the environment without destroying it so that it renews its resources for future use (as photographic records).

Figure 3 - Synthesis of the Content Analyzed the Interviews

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




Photo 1 - Field staff

Forest is mapped and the trees that can be removed are selected. The spaces left by harvested trees 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 make the police surveillance, but the main contribution is from the community which may or may not report irregularities.



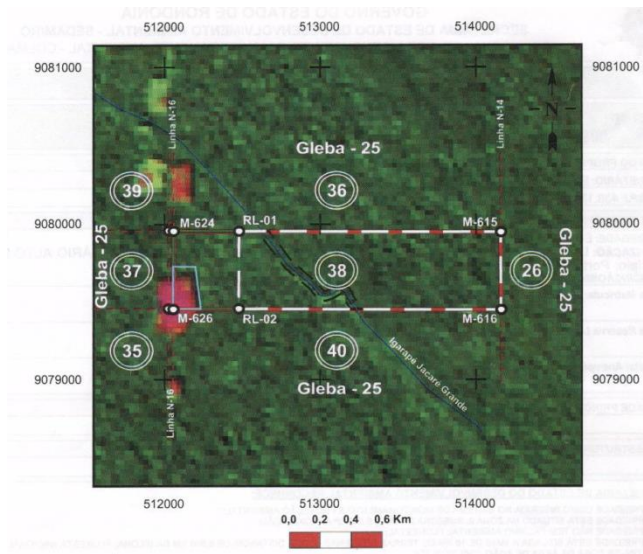
Photo 2 - Measurement to harvest trees

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

 GOVERNO DO ESTADO DE RONDÔNIA SECRETARIA DE ESTADO DE DESENVOLVIMENTO AMBIENTAL - SEDAM/RO COORDENADORIA DE LICENCIAMENTO E MONITORAMENTO AMBIENTAL - COLMAM	
Licença Ambiental em Propriedade Rural	
LAPR Nº: 8035/2012	VALIDA ATÉ: 30/01/2015 PROCESSO Nº: 1801/1898/2011
DADOS DO PROPRIETÁRIO:	
PROPRIETÁRIO:	
CPF/CNPJ:	RG:
DADOS DA PROPRIEDADE:	
PROPRIEDADE:	
LOCALIZAÇÃO: Lote: 38, Setor: MANOA, Gleba: RIO PRETO-25, Projeto: PROJETO FUNDIÁRIO ALTO MADEIRA, Município: Porto Velho/RO, CEP: 76.800-000	
TRANSCRIÇÃO/MATRÍCULA: 15.871, REGISTRADO 27/07/1983, NA COMARCA DE PORTO VELHO - RO.	
Área da Matrícula:	Área Total do Imóvel:
105,1438 ha	105,1438 ha
Área de Reserva Legal:	Área Remanecente:
84,1151 ha	21,0287 ha
Área Total Antropizada:	Área de Preservação Permanente Total:
4,3107 ha	5,1675 ha
ATIVIDADE PRINCIPAL NA PROPRIEDADE:	
SEDAM-1 - Agricultura	
INFRA-ESTRUTURA:	
Sem Informação	
A SECRETARIA DE ESTADO DO DESENVOLVIMENTO AMBIENTAL RECONHECE:	
-A PROPRIEDADE COMO INSERIDA NO SISTEMA DE MONITORAMENTO E PROTEÇÃO AMBIENTAL; -A PROPRIEDADE ESTÁ SITUADO 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 DISTANCIA DE 6,586 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 4.771/65, E SUAS ALTERAÇÕES E A LEI COMPLEMENTAR ESTADUAL Nº 233 DE 06/08/2000 - ZSEE/RO; -O PRAZO DE VALIDADE DA LAPR ESTÁ DE ACORDO COM A PORTARIA Nº 163/2010 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 a geodesic map. It serves to indicate the control of compliance with legal obligations. It's also a security administrator for the forest resources.



Doc 2 - Geodesic mapping

Basically, our approach is administrative, and in a context of forest resources, we study the relation between professional manager and control of forests resources in study analysis. In order to be able to understand and manage the forests resources, preserving the environment, the manager needs integrated efforts together with community and government agents.

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 of all 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 can be developed.

7 FINAL CONSIDERATIONS

We conclude that the issues can be resolved through integration between government policies (legislation, control and punishment for irregularities) and competences developed in the management of forests. The local community plays an important role of legal compliance in preserving and monitoring. Preserving the environment and use of natural resources in forests is easier when all stakeholders are involved.

Note that the environmental preservation of forests is sustained by a set of elements that are cared for by governments, administrators and community. Each factor plays a role in the expected results and preserving the forest results is possible only with the alignment of roles and commitment to the individual responsibilities. When results are achieved all of humanity and planet will benefit. So, regardless the forest being in America, Asia or Europe, the planet will always win with the best environmental outcomes generated by human protection of the natural resources of forests.

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

With the implementation of forest concessions, the supervision and monitoring are the weakest elements of the system. A strong action in education and responsibility of local people (government officials, administrators, and community), with the goal of not compromising sustainability forests under concession is needed. Therefore, the limit for illegal logging is of supreme 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 solutions integrated with the government and the community.

REFERENCES

- Ahrens, S.(1997). *O manejo de recursos florestais no Brasil: conceitos, realidades e perspectivas*. In: Curso de Manejo Florestal Sustentável, 1., 1997, Curitiba. Tópicos em manejo florestal sustentável. Colombo: EMBRAPA-CNPQ, p. 5-15.
- Amin, A. M., Choumert, J., Motel, P. C., Combes, J. L., KERE, E. N., OLINGA, J. G. O., & Schwartz, S. (2014). A spatial econometric approach to spillover effects between protected areas and deforestation in the Brazilian Amazon. *Etudes et Documents n° 06*, CERDI, 2014.
- Basso, VM, Jacovine, LAG, Alves, RR, Vieira, SLP, & da Silva, FL (2011). Forest Certification Group in Brazil. *Forest and Environment*, 18 (2).

Brasil. Ministério do Turismo. *Turismo Sustentável e alívio da pobreza no Brasil: reflexões e perspectivas*. Brasília, 2005. Disponível em: <<http://www.slideshare.net/melfigueredo/turismo-sustentavel-e-alvio-da-pobreza-no-brasil>>. Acesso em 19 de junho de 2013.

Brazilian Law 11.284/2006 - Management of Public Forests for Sustainable Production Act of 2006, 11284 Brazil.

Cortner, H. J., Wallace, M. G., Burke, S., & Moote, M. A. (1998). Institutions matter: the need to address the institutional challenges of ecosystem management. *Landscape and Urban Planning*, 40(1), 159-166.

Danielsen, F., Skutsch, M., Burgess, N. D., Jensen, P. M., Andrianandrasana, H., Karky, B., ... & Zahabu, E. (2011). At the heart of REDD+: a role for local people in monitoring forests?. *Conservation Letters*, 4(2), 158-167.

Fearnside, P. M. (2012). Brazil's Amazon forest in mitigating global warming: unresolved controversies. *Climate Policy*, 12(1), 70-81.

Farias, A. S. de.; [et ali].(2007). *Arranjo Produtivo Local Madeira e Móveis de Ariquemes - RO*. Núcleo de Arranjos Produtivos Locais de Rondônia – NEAPL/ RO.

Flick, Uwe.(2009). *Desenho da pesquisa qualitativa*. Porto Alegre: Artmed. Coleção pesquisa qualitativa, coordenada por Uwe Flick. Cap. 1.

Flores, Nilton Cesar.(2012). *A sustentabilidade ambiental em suas múltiplas faces*. Campinas, SP: Millennium.

García-Ruiz, J. M., López-Moreno, J. I., Vicente-Serrano, S. M., Lasanta-Martínez, T., & Beguería, S. (2011). Mediterranean water resources in a global change scenario. *Earth-Science Reviews*, 105(3).

Gentil, J.(1988). *A juta na agricultura na várzea na área de Santarém Médio Amazonas*. Boletim do Museu Paraense Emílio Goeldi, Antropologia, 79, p. 1-50.

Hanan, Samuel Assayag & Batalha, Bem hur Luttembarck.(1999). *Amazônia: contradições no paraíso ecológico*. – 5 Ed. – São Paulo: cultura editores associados.

Imazon – Instituto do Homem e meio Ambiente da Amazônia & SFB – Serviço Florestal Brasileiro.(2010). *A atividade Madeireira na Amazônia brasileira: produção, receita e mercados*. Hummel. A. C .; [et al].; Belém.

IMM - Indústria De Madeiras Manoa Ltda E Triângulo Pisos E Painéis Ltda. *Manejo Florestal – princípios, critérios e indicadores para florestas nativas - Relatório Sumário do Processo de Certificação de Manejo Florestal*, Cujubim/RO, NBR 15789:2004.

IMM - INDÚSTRIA DE MADEIRAS MANOA LTDA.(2002). *Plano De Manejo Florestal Em Regime Sustentável*. Resumo Público - IMM 01/01 TB - REV. 01 - Curitiba/PR, Maio.

Lima, Elaine de Cacia de.(2003). *Qualidade Multitemporal Da Paisagem: Estudo De Caso Na Floresta Ombrófila Mista Em General Carneiro – PR*. Dissertação. Universidade Federal do Paraná. CURITIBA.

Ministry of the Environment (1998). Identifying Priority Areas for the Establishment of National Forests in the Amazon. Brasília, DF: MMA [et al.]. 56 p.

MMA - MINISTÉRIO DO MEIO AMBIENTE.(1998). *Identificação de Áreas Prioritárias para a Criação de Florestas Nacionais na Amazônia Legal*. Brasília, DF: MMA [et al.]. 56 p.

Mulkey, S., & Day, J. K. (2012). *The community forestry guidebook II: Effective governance and forest management*. FORREX Forum for Research and Extension in Natural Resources, Kamloops, BC and British Columbia Community Forest Association, Kaslo (No. 30, p. 6). BC FORREX Series Report.

- Nijnik, M., & Bizikova, L. (2008). Responding to the Kyoto Protocol through forestry: a comparison of opportunities for several countries in Europe. *Forest Policy and Economics*, 10(4), 257-269.
- Ostrom, E., Burger, J., Field, C. B., Norgaard, R. B., & Policansky, D. (1999).
- Paiva, M. P.(1988). *Conservação da Fauna Brasileira*. Interciência. Rio de Janeiro.
- Queiroz W. T. de,(1997). *Técnicas de Amostragem em Inventário Florestal*. Professor, Titular Doutor/ FCAP. Belém/PA .
- Pires, G. F., & Costa, M. H. (2013). Deforestation causes different subregional effects on the Amazon bioclimatic equilibrium. *Geophysical Research Letters*, 40(14).
- Revisiting the commons: local lessons, global challenges. *science*,284(5412).
- Regi, M. D. L. S., Schuch Jr, V. F., Gomes, C. M., & Kneipp, J. M. (2014). Management Competencies in professional training of administrators. *Journal of Evaluation in Higher Education*, 19 (1).
- Roberts, M. R., & Gilliam, F. S. (1995). Patterns and mechanisms of plant diversity in forested ecosystems: implications for forest management.*Ecological Applications*, 969-977.
- Robinson, G. O. (2013). *The Forest Service: A study in public land management*. Routledge.
- Rondônia. (2009) *Plano de prevenção, controle e alternativas sustentáveis ao desmatamento em Rondônia. 2009-2015*. Porto Velho, 56 p. Disponível em: <<http://www.sedam.ro.go.br>>. Acesso em 19 de junho de 2013.
- Rosa, Neiva Tolotti da.; Heyer, Lígia Fonseca.(2007). *Desenvolvimento Sustentável: Um Estudo De Caso No Ramal Do Banco E No Ramal Novo Horizonte Município De Rio Preto Da Eva - Amazonas*. Revista Eletrônica Aboré Publicação da Escola Superior de Artes e Turismo – Ed. 03.
- Scolforo, J. R. S. & Mello, J. M.(1997). *Inventário Florestal*. Lavras: UFLA-FAEPE.
- Scolforo, José Roberto S.(1997). *Biometria Florestal* .Módulo 3. Métodos para Classificação de Sítios Florestais. Lavras: UFLA / FAEPE, 157.
- Scolforo, José Roberto S.(1993). *Mensuração Florestal: Módulo 3: Relações Quantitativas*, em Volume, Peso e a Relação Hipsométrica.Lavras, ESAL / FAEPE. pg. 292.
- SEDAM/RO, Secretaria de Estado do Desenvolvimento Ambiental de Rondônia.
- Sewpaul, V., & Jones, D. (2005). Global standards for the education and training of the social work profession*. *International Journal of Social Welfare*,14(3), 218-230.
- Silva J. N. M.(1997). *Manejo Florestal*, EMBRABA, CPATU, SPI, Brasília – DF.
- Silva, M. F. M.; [et al.].(1978). *Nomes Vulgares de Plantas Amazônicas*; Belém/PA – INPA; 222 páginas.
- Soares, C P. B; Neto & F. P; Zouza, A. L.(2006). *Dendrometria e inventário florestal*: Viçosa, Editora UFV.
- Taylor, F.W. (1911). *The Principles of Scientific Management*. New York: Harper Brothers.
- Triviños, A. N. S.(1987). *Introdução à pesquisa em ciências sociais: a pesquisa qualitativa em educação*. São Paulo: Atlas.
- Yin, Robert K.(2005). *Estudo de caso: planejamento e métodos*. 3. ed. Porto Alegre: Bookman.