

**Between the Local and the International: Sustainability of Brazilian Rainforest
Products for the Natural Cosmetics Market¹**

João Paulo Cândia Veiga²

Murilo Alves Zacareli³

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¹ Proposal title: Private Actors and Institutional Arrangements in Amazonian Communities.

² Professor at the University of São Paulo - International Relations Institute and Political Science Department. Researcher at the Center for the Study of International Negotiations.

³ Master candidate at the University of São Paulo - International Relations Institute. Researcher at the Center for the Study of International Negotiations.

Abstract

This working paper provides the preliminary results of the research involving local extractive communities in the Amazon forest. The aim is to assess the impact of the partnership between public and private actors in terms of socioeconomic development and environmental sustainability in a network of stakeholders and local extractives families that manage natural resources - seeds and fruits - as a Common Pool Resource (CPR). In order to achieve that, two field researches have been executed - January and March - within two different regions - Salvaterra and Bragança - in the state of Pará which is located in the North of Brazil. Both quantitative and qualitative data have been collected through surveys conducted among 190 families.

Key words: local institutional arrangements, common pool resources, sustainability, cosmetics market.

Introduction

The cosmetic industry is one of the world's leading businesses whose growing market is responsible for generating incentives for Research & Development worldwide. However, at the same time, companies need to develop models in which the sustainability of the resources they rely on is guaranteed at the local level. Not only ecological systems are comprised of ecosystems - fauna and flora - but they are also built by human interactions. Researchers such as Elinor Ostrom have considered those as a social-ecological system (SES) framework which is a product of the Institutional Analysis and Development (IAD) framework.

Before furthering the discussions involving IAD and SES, it is important to think about hypotheses that shed light upon the relation between the cosmetics' supply chain and the local communities in the Amazon forest as well as the network of stakeholders which are directly or indirectly involved. This relation should be analyzed in the light of public-private partnerships (PPPs) and the role of state and non-state actors within the context of socioeconomic development and environmental sustainability. This article attempts to address these issues and to relate the debates regarding private governance to the local realm of institutional arrangements observed in the Amazonian communities.

First of all, it is highly important to mention how International Relations would deal with this kind of research in terms of theory. The international system has been heavily influenced by the realist theory for a long time. However, structural changes observed in the last decades and the emergence of the post-positivist theories have proved that state-centered approaches are insufficient and unable to deal with the complex agenda of international politics. Within this context, international regimes have been subjected to changes due to the broadening of themes and the inclusion of non-state actors. As a consequence, global governance rises and becomes a process that encompasses diverse issue areas as it conveys the idea that the global order is not only dictated by power relations, but also by issues that have been treated as low-politics, such as the environment, labor, human rights, gender and many other normative agendas whose actors operate in a multilevel and polycentric basis.

Along with the power shift in a global scale, it is possible to identify the increasing essentiality of local and regional realms to cope with demands from local to international scales. States are not impenetrable actors and its local realities reflect and determine regional and international scenarios and the possibilities of achieving more efficient and legitimate outcomes in a given area. The changing world highlights the central function of subnational arrangements and non-state actors in environmental governance, sustainability and development.

The local institutional arrangements and the “bottom-up” approach led by rational choices is an effective way to solve the so-called “tragedy of the commons” when dealing with the environment. This premise is well-known and many case studies have been done in order to prove the effectiveness of self-governance by local communities towards natural resources management⁴. Nevertheless, this article brings a new variable to the IAD and SES frameworks: the role of private actors and local extractives communities in natural resources management. In other words, this research captures the impact of the local cooperatives in Salvaterra and Bragança and tries to demonstrate how the human-nature relation has changed given the market incentive of a company that works with the families through the cooperatives.

The collective action of the local communities is being influenced by a market-driven activity and a network of international and national stakeholders. It means that the locals are capable of self-governing natural resources, but the company’s influence

⁴ Many publications and materials with case studies can be found at the Digital Library of the Commons.

has played a major role because it has contributed to the local income which affects people's socioeconomic development and their perceptions regarding their surroundings in terms of environmental sustainability. In other words, the local institutional arrangement is also being shaped by new elements which do not contradict Ostrom's literature on CPRs, but add "a new framework for analysis" that poses a challenge to scholars as natural resources governance is not being externally defined as Hardin suggests, but it is happening in a different way as new actors and variables become part of the process.

In 2012, the United Nations Development Programme in Brazil (UNDP), the Applied Economics Research Institute - IPEA - and the João Pinheiro Foundation adapted the global Human Development Index (HDI) methodology to calculate the HDI at municipality level (HDI-M) of 5.565 Brazilian municipalities using the 1991, 2000 and 2010 Demographic Census data. The Brazilian HDI-M is comprised of the same three dimensions of the Global HDI – life expectancy, education and income. But it goes beyond as it adapts the global methodology to the Brazilian context and to the availability of national indicators. Despite measuring the same phenomena, the indicators that are taken into consideration in the HDI-M are more adequate to evaluate the development of the Brazilian municipalities.

Therefore, the HDI-M and the three dimensions it encompasses tell a little bit of the history of the Brazilian municipalities in three important dimensions regarding human development during the last two decades of the Brazilian history. The creation of the HDI was an attempt to measure the development out of the capacities and the humans' liberties and has separated these from the GDP and the GDP per capita indicators.

The HDI allows researchers to comprehend the differences between the income sources and the well-being of the population. That is a result of the arithmetic mean of the three indicators: income, education and life expectancy. The index makes it possible to classify municipalities which are very rich, but with low rates of well-being and the opposite, that is, a population considered to be poor with a good quality of life though.

In the case of Salvaterra and Bragança, both HDI-Ms are found below the state of Pará's HDI that has gone from a low HDI to a medium HDI (0,646) in twenty years. Despite the increase in absolute terms, the other states from Brazil have proportionally increased more and that makes the state of Pará occupy the 24th position in the rank. Both municipalities have evolved in a quite similar way: they have gone from a low

HDI-M to a medium one in twenty years. However, it is necessary to disaggregate the indicator and examine the position of each municipality.

HDI M	PARÁ	Bragança (PA)	Salvaterra (PA)
1991	0,413 (17 out of 27)	0,325	0,391
2000	0,518 (19 out of 27)	0,458	0,478
2010	0,646 (24 out of 27)	0,600	0,608

Source: HDI-M (www.atlasbrasil.org.br)

Within the four groups proposed by Eli da Veiga (2005), Salvaterra and Bragança do not fit in any of the categories. The first group of municipalities has presented satisfactory rates in the three indicators: income, life expectancy and education (above 0,700 – see table 2). The second group represents the rich municipalities with a high income per capita rate, but with low education and/or low/medium life expectancy. There are still those which present medium/high life expectancy rates, but with low/medium income. There are municipalities with low rates in all the three indicators.

Municipalities with high levels of human development	Good rates in all the three indexes: medium > 0,700 – 0,799 (high); or 0,800 – 1,000 (very high)
Rich and underdeveloped municipalities	Income levels above 0,700 (high or very high), but with lower education and life expectancy indicators – medium or lower < 0,600 – 0,699 (medium); ou 0,500 – 0,599 (low)
“Healthy” municipalities, but with low; medium income rates.	Good education and life expectancy indicators (above 0,700), but with low or medium income (<0,699)
Municipalities with low/medium human development	Low/medium performance in the three indicators < 0,600

Source: Eli da Veiga (2005).

How is it possible to qualify municipalities with low levels of education and income, but with high levels of life expectancy? What is the relation between income and education in the case of the Amazonian municipalities? In both cases (see table 3), Salvaterra and Bragança. The life expectancy indicators are high, but the ones for income and education are low. This pattern does not match within the framework of rich municipalities with low social levels, and does not match to the profile of “healthy” municipalities with low/medium income levels due to the low levels of education. In the

case of education, there are municipalities with high percentages of the population living in the rural area where education services are not provided to the population. In the same manner, there are families that depend on agriculture, extractive activities and farming which provide many incentives for child labor, what makes access to education rather difficult.

TABLE 3 – COMPARATIVE INDICATORS HDI – M			
HDI	1991	2000	2010
	BRAGANÇA		
Income	0,463	0,522	0,589
Longevity	0,569	0,662	0,755
Education	0,130	0,278	0,486
	SALVATERRA		
Income	0,515	0,514	0,580
Longevity	0,677	0,745	0,793
Education	0,171	0,286	0,488

Source: HDI-M (www.atlasbrasil.org.br)

Regarding the income profile, these are the municipalities that offer few formal job opportunities. Families diversify their activities as a way to make their living such as seed and fruits collecting, fishing, charcoal and crab capturing. Families also produce “farinha” out of “mandioca” and farm (cattle and chicken).

Given that, the impact of seed collecting as a Common Pool Resource should be discussed. Families promote the collective action in a successful way in response to a market incentive as a company from the cosmetic industry buys the amount of collected seeds. The collective action happens through the cooperative of extractives (Salvaterra) as well as seed collecting, “farinha” production and farming (Bragança).

The core discussion is related to the fact that communities do not determine the unit of seeds extraction as they meet a market demand. The biodiversity use, in this case, is a result of the public regulation and the private regulation standards that oblige companies to guarantee that the levels of extraction are compatible with the nature resilience time. This is intimately related to the Access and Benefit Sharing (ABS) discussion that is based on an international public regulation: the Nagoya Protocol.

This means that CPRs in both municipalities are not only important to the discussions involving the IAD and the SESs frameworks, but they are also intimately related to the levels of development of the families as a complementary source of income and the possible hypothesis that the governmental programs might bring along an environmental variable due to the reduction of the dependence on CPRs.

Common Pool Resources (CPRs), the Design Principles and the Self-Governance Paradigm in Complex Environmental Systems

The Common Pool Resources (CPRs) management is mainly based on self-governance of local communities and involves institutional complexity since this kind of arrangement differs from the traditional institutionalism due to its local scope of analysis and governance. Both field researches that took place in local communities in the state of Pará in the municipalities of Salvaterra and Bragança were contextualized within what Elinor Ostrom (1990) regarded as a new institutionalist theory.

This theory discusses the fact that the local interdependence of communities is based on natural resources that are shared collectively and, for this reason, local collective action is demanded in order to successfully manage those resources in an attempt to avoid the “Tragedy of the Commons” (HARDIN, 1968). Therefore, some variables play a vital role in determining the possibilities of achieving successful outcomes of the arrangement created at the local level. In this sense, it is necessary to understand how these variables interact with each other and (1) create incentives for self-organization, (2) guarantee the continuity of the institutional arrangement over time and (3) generates possibilities of self-governance without external support.

According to Ostrom (1990, P. 30) “The term “common-pool resource” refers to a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use”. Given that, seeds and fruits are collectively owned by communities visited in both trips as the areas in which the collecting process occurs are collectively owned or, in a few cases, privately owned, but without resistance from land owners who are also members of the community.

The Institutional Analysis Development (IAD) and the Social-Ecological Systems (SES) are frameworks that identify elements and their relation in the light of a certain theory. Ostrom (2011) states that (a) frameworks are necessary to understand institutional arrangements. The use of (b) theories enables the researcher to identify which elements form the framework can be used to explain a phenomenon and make general assumptions. (c) Models are derived from precise assumptions in combination with theories so that replication is possible. The IAD and SES frameworks help to identify an issue and how to analyze and develop possible solution. Empirical data is fundamental for a successful model. This indicates that the Brazilian rainforest products

as CPRs and the empirical data collected in the field research is necessary to understand the institutional processes in which the surveyed communities are involved as well as to identify the research problem which also copes with the limit of extraction issue and demonstrate a possible solution.

The amount of natural capital available for local communities is part of the *resource system* in which they dwell. The extraction rate in which seed collecting happens affects the *resource units* which are appropriated by individuals. Limiting and monitoring the extraction poses a challenge towards sustainability of the natural resources which are used for the cosmetics supply chain. An important question is introduced: who should determine the extraction limit?

The communities would be the intuitive and most appropriate answer. Nevertheless, the surveyed communities are subjected to the influence of the market through a local cooperative. There is an institutional arrangement created in the region, but is this the case of self-governance or the theory of the firm? Before answering those questions, it is important to list and match each of the eight design principles elaborated by Ostrom (2005) to the empirical evidence.

1) Well-defined boundaries

Seeds are a CPR because they can be collected at any place without public or private authorization in beaches, watersheds, and rainforests. These areas where seed collecting activities are held are collectively owned. There were just a few cases in which that took place in a private area. However, it belonged to the family. It is possible to claim that property rights is not a problem so far. There were no reports of conflicts among community members. Seeds collectors organize themselves in cooperatives in order to provide the supply of seeds. Free riders also collect but there's only one seeds buyer in both regions visited, which means there is no damage to the local institutional arrangement (cooperatives).

2) Congruence between appropriation and provision rules and local conditions

As the families do not depend heavily on seeds collecting and the value added comes from the market, the local institutional arrangement itself cannot define extraction units of seeds to be considered sustainable over time. This principle

involves the spatial conditions and/or the heterogeneity of the resource system. Families had to create rules in order to adapt their daily routines given the environmental conditions. In Salvaterra, families need to base their decisions regarding when to go the collecting fields (the beaches) according to the tide level and to the waves that bring “andiroba” seeds. They have also managed to organize their different activities upon the seasonality of the seeds they collect and have collectively decided what to produce during the off-season period.

3) Collective-choice arrangements

Choices are not only made by the communities and members themselves. Some of the families are coop members while some of them are not. Those who are coop members have the right to participate in the decision-making process during the meetings that are held in the cooperatives’ facilities. However, not all members are present when vital issues are discussed such as price determination (the amount of money families gets per kilo of the collected seeds), the composition of the board and the relation with the company. It means that there is a problem of information diffusion. The cooperative is an institution which contributes even more to the complexity of the ecological system. That highlights the institutional diversity which is present both in Salvaterra and Bragança. Since the cooperatives are directly and indirectly affected by the company and the stakeholders (national and international), it adds new actors and variables to the IAD and SES frameworks.

4) Monitoring

There is no monitoring regarding the extraction limit by the community members, even on the areas where collectors are used to collect the seeds. As there are differences between organic and non-organic seeds, representatives from the German Cooperation Agency (GIZ) monitor the process in which seeds are collected, stored and packed by the families. These practices which are transferred by the cooperative are in accordance to national and international principles and initiatives that are adopted by the stakeholders such as the Fórum Amazônia Sustentável, the United Nations Global Compact and the Union for Ethical BioTrade (UEBT, 2012). Since the company has supported those principles and

initiatives (such as human rights promotion, labour standards, environmental sustainability and anti-corruption), it is responsible for monitoring them along its supply chain. This is part of the company's program of social responsibility that involves socioeconomic development and environmental sustainability. In order to receive a certification, the company needs to check if seeds are organic or non-organic. The difference between both classifications is related to the process mentioned above (collecting, storage and packing) as well as to the principles and initiatives from the stakeholders.

5) Graduated sanctions

No sanctions have been reported by community members. Sanctions may be applied to the company in case it does not meet the stakeholders' principles and initiatives.

6) Conflict-resolution mechanisms

No conflicts have been reported among community members in relation to the resource units of extraction. However, conflicts of interest could be found in the cooperative, especially when dealing with decision-making. Collective action is not threatened by conflicts among families and this is an evidence that supports the survival of the institutional arrangement. This principle argues that conflicts are common in complex and traditional ecological systems. The local arrangements in Salvaterra and Bragança are not as old as those from the case studies done by Ostrom (1990). This might be a rational explanation for conflict non-existence.

7) Minimum recognition of rights

This principle asserts that the government should not interfere in the local rights to create their own institutions. In Salvaterra, the cooperative was created with the company, but there was a former association that was created by the families themselves, without prior external influence. In Bragança, the cooperative was created without the company which, in turn, had to join it in order to have a stronger

relation with the local communities. Evidence has showed that the families have collectively decided to create the first institutional arrangements in the region.

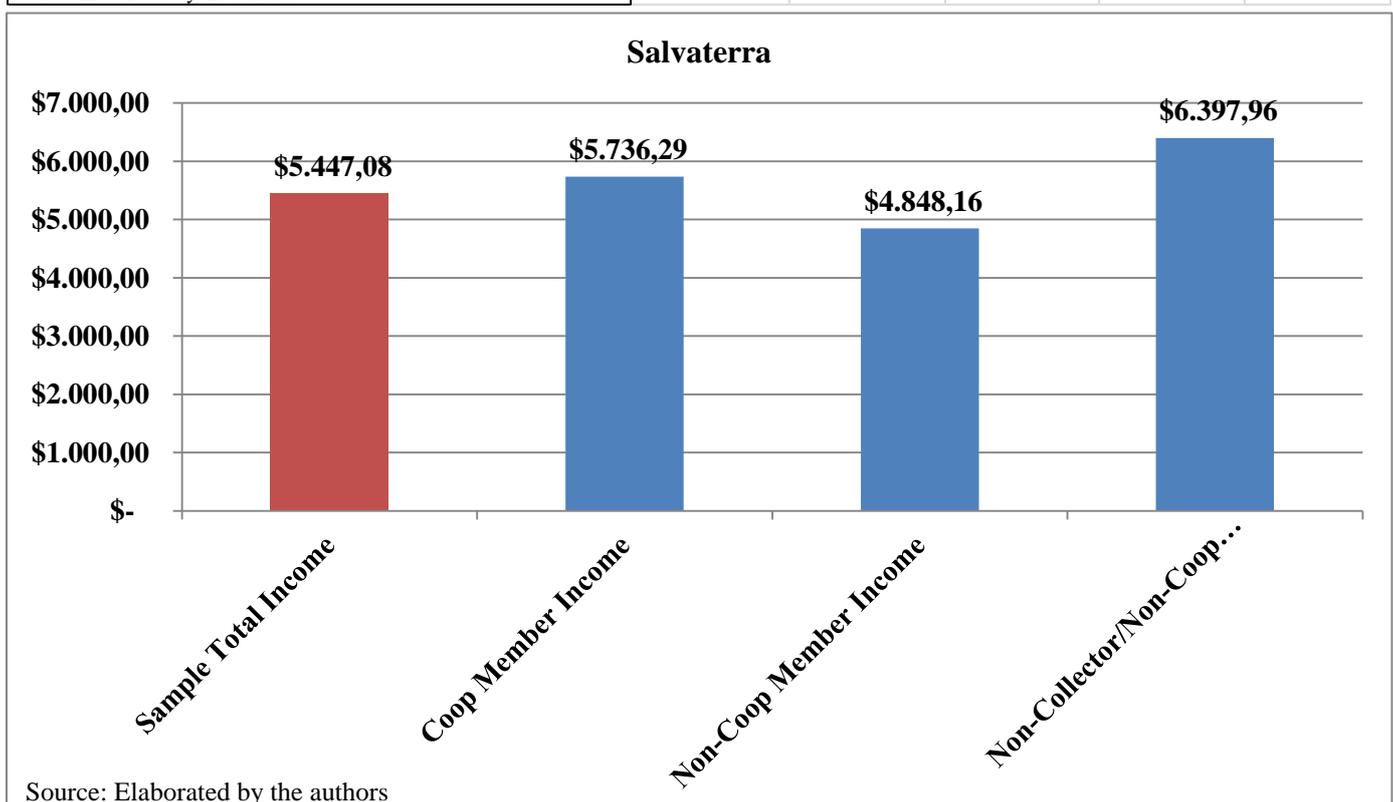
8) Nested enterprises

Institutional nesting is highly important as it recalls some of the previous principles and gives the chance for CPRs researchers to think about other forms of arrangements that differ from the traditional ones. This is mainly where both field researches find support to deal with a new kind of arrangement that involves new actors (the company and the network of national and international stakeholders), arenas (a more diffused bottom-up dynamic which also involves the international level) and processes (market-driven activity and local collective action).

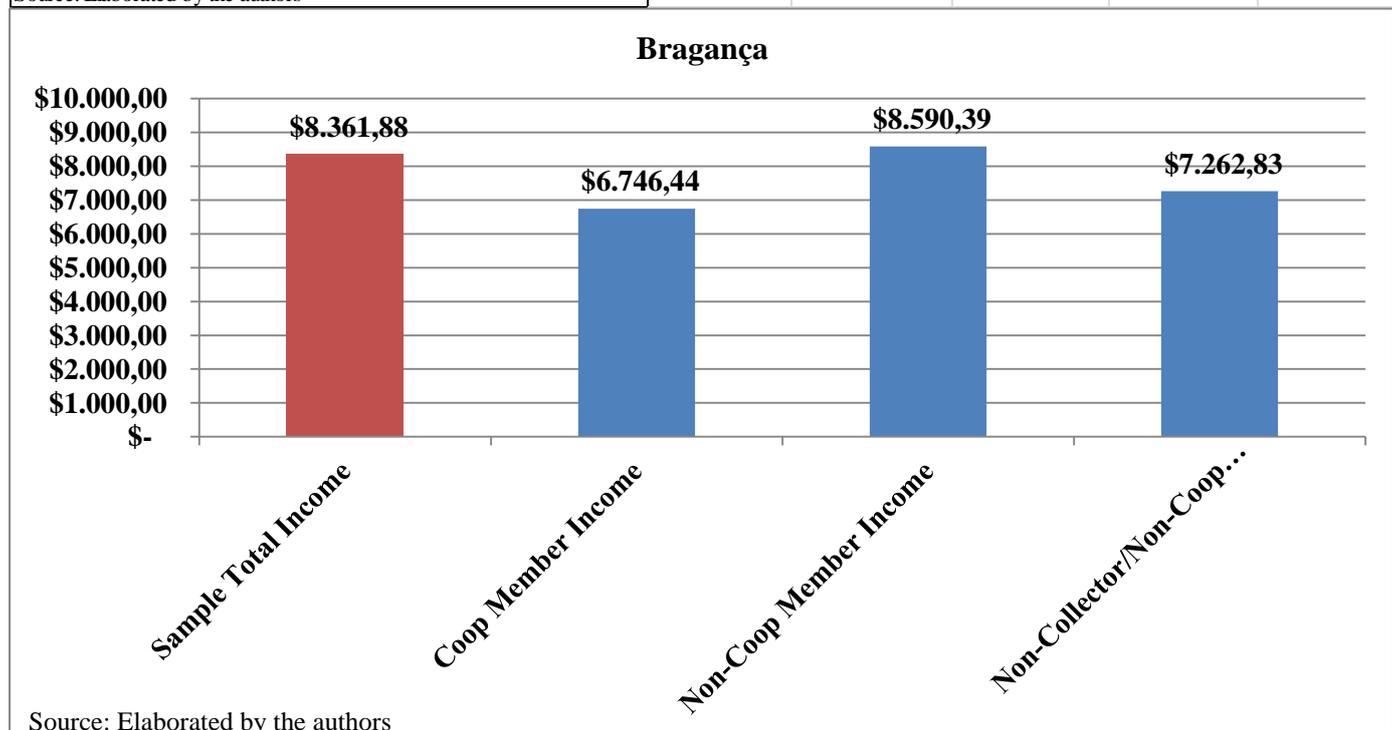
Even though some variations could be noticed in both case studies, the eight design principles could be identified in Salvaterra and Bragança. The central question that still remains unanswered regards the limit of extraction. What happens when the market is the one responsible for determining this limit? In other words, it does not mean that families are not capable of limiting the rate in which the extraction of seeds and fruits occurs, but how could actors converge and solve this issue?

The group could visit and interview a total of 190 families: 84 in Salvaterra and 106 in Bragança. The quantitative part of the questionnaires captured data regarding income levels of the surveyed families and showed the differences between coop and non-coop members which are one of the independent variables that explain the institutional arrangement and matches the company's goals regarding socioeconomic development and environmental sustainability as shown in the tables and graphs.

Salvaterra					
	%	R\$	US\$*	MEAN R\$	MEAN US\$*
Total Sample Income (Annual) (N=84)		R\$ 1.020.395,00	US\$ 457,576.23		
Sample Total Income Mean				R\$ 12.147,55	US\$ 5,447.08
Coop Member Total Income (Annual) (N=34)		R\$ 434.926,00	US\$ 195,034.08		
Coop Member Income Mean				R\$ 12.791,94	US\$ 5,736.29
Seeds		R\$ 38.956,00	US\$ 17,469.05	R\$ 1.145,76	US\$ 513.79
Fishing		R\$ 41.400,00	US\$ 18,565.02	R\$ 1.217,64	US\$ 546.03
Defeso		R\$ 54.240,00	US\$ 24,322.86	R\$ 1.595,29	US\$ 715.37
Bolsa Família		R\$ 49.440,00	US\$ 22,170.40	R\$ 145,41	US\$ 652.07
Seeds/Coop Member Total Income	0.089 (8.9%)				
Fishing/Coop Member Total Income	0.095 (9.5%)				
Defeso/Coop Member Total Income	0.12 (12.4%)				
Bolsa Família/Coop Member Total Income	0.113 (11.3%)				
Non-Coop Member Total Income (Annual) (N=37)		R\$ 400.022,00	US\$ 179,382.06		
Non-Coop Member Income Mean				R\$ 10.811,40	US\$ 4,848.16
Seeds		R\$ 31.342,00	US\$ 14,054.70	R\$ 847,08	US\$ 379.85
Fishing		R\$ 60.920,00	US\$ 27,318.38	R\$ 1.646,48	US\$ 738.33
Defeso		R\$ 62.376,00	US\$ 27,971.30	R\$ 1.685,83	US\$ 755.98
Bolsa Família		R\$ 87.780,00	US\$ 39,363.22	R\$ 2.372,43	US\$ 1,063.87
Seeds/Non-Coop Member Total Income	0.078 (7.8%)				
Fishing/Non-Coop Member Total Income	0.152 (15.2%)				
Defeso/Non-Coop Member Total Income	0.155 (15.5%)				
Bolsa Família/Non-Coop Member Total Income	0.219 (21.9%)				
Non-Collector/Non-Coop Member Total Income (Annual) (N=13)		R\$ 185.477,00	US\$ 83,173.54		
Non-Collector/Non-Coop Member Income Mean				R\$ 14.267,46	US\$ 6,397.96
Fishing		R\$ 27.500,00	US\$ 12,331.83	R\$ 2.115,38	US\$ 948.60
Defeso		R\$ 18.894,00	US\$ 8,472.64	R\$ 1.453,38	US\$ 651.74
Bolsa Família		R\$ 27.500,00	US\$ 12,331.83	R\$ 2.115,38	US\$ 948.60
Fishing/Non-Collector/Non-Coop Member Total Income	0.1482 (14.82%)				
Defeso/Non-Collector/Non-Coop Member Total Income	0.101 (10.1%)				
Bolsa Família/Non-Collector/Non-Coop Member Total Income	0.148 (14.8%)				
Coop Member Total Income/Total Sample Income	0.426 (42.6%)				
Non-Coop Member Total Income/Total Sample Income	0.392 (39.2%)				
Non-Collector/Non-Coop Member Total Income/Total Sample Income	0.181 (18.1%)				
*US\$ 1.00 = R\$ 2,23					
Source: Elaborated by the authors					



Bragança					
	%	R\$	US\$*	MEAN R\$	MEAN US\$*
Total Sample Income (Annual) (N=106)		R\$ 1.976.582,00	US\$ 886.359,64		
Sample Total Income Mean				R\$ 18.647,00	US\$ 8,361.88
Coop Member Total Income (Annual) (N=47)		R\$ 1.003.075,00	US\$ 449,809.41		
Coop Member Income Mean				R\$ 15.044,58	US\$ 6,746.44
Seeds		R\$ 116.862,00	US\$ 52,404.48	R\$ 2.486,42	US\$ 1,114.98
Farinha		R\$ 104.728,00	US\$ 46,963.22	R\$ 2.228,25	US\$ 999.21
Chicken		R\$ 135.487,00	US\$ 60,756.50	R\$ 2.882,70	US\$ 1,292.69
Agriculture		R\$ 179.427,00	US\$ 80,460.53	R\$ 3.817,59	US\$ 1,711.92
Bolsa Família		R\$ 61.097,00	US\$ 27,397.75	R\$ 1.299,93	US\$ 582.93
Seeds/Coop Member Total Income	0.116 (11.6%)				
Farinha/Coop Member Total Income	0.104 (10.4%)				
Chicken/Coop Member Total Income	0.135 (13.5%)				
Agriculture/Coop Member Total Income	0.178 (17.8%)				
Bolsa Família/Coop Member Total Income	0.060 (6.0%)				
Non-Coop Member Total Income (Annual) (N=18)		R\$ 325.662,00	US\$ 146,036.77		
Non-Coop Member Income Mean				R\$ 19.156,58	US\$ 8,590.39
Seeds		R\$ 27.532,00	US\$ 12,346.18	R\$ 1.529,55	US\$ 685.89
Farinha		R\$ 54.160,00	US\$ 24,286.99	R\$ 3.008,88	US\$ 1,349.27
Chicken		R\$ 40.860,00	US\$ 18,322.86	R\$ 2.270,00	US\$ 1,017.93
Agriculture		R\$ 32.690,00	US\$ 14,659.19	R\$ 1.816,11	US\$ 814.39
Bolsa Família		R\$ 48.992,00	US\$ 21,969.50	R\$ 2.721,77	US\$ 1,220.52
Seeds/Non-Coop Member Total Income	0.084 (8.4%)				
Farinha/Non-Coop Member Total Income	0.166 (16.6%)				
Chicken/Non-Coop Member Total Income	0.125 (12.5%)				
Agriculture/Non-Coop Member Total Income	0.100 (10%)				
Bolsa Família/Non-Coop Member Total Income	0.15 (15%)				
Non-Collector/Non-Coop Member Total Income (Annual) (N=41)		R\$ 647.845,00	US\$ 290,513.45		
Non-Collector/Non-Coop Member Income Mean				R\$ 16.196,12	US\$ 7,262.83
Farinha		R\$ 365.280,00	US\$ 163,802.69	R\$ 8.909,26	US\$ 3,995.18
Chicken		R\$ 17.600,00	US\$ 7,892.37	R\$ 429,26	US\$ 192.49
Agricultura		R\$ 90.090,00	US\$ 40,399.10	R\$ 2.197,31	US\$ 985.34
Bolsa Família		R\$ 47.844,00	US\$ 21,454.70	R\$ 1.166,92	US\$ 523.28
Farinha/Non-Collector/Non-Coop Member Total Income	0.563 (56.3%)				
Chicken/Non-Collector/Non-Coop Member Total Income	0.027 (2.7%)				
Agriculture/Non-Collector/Non-Coop Member Total Income	0.139 (13.9%)				
Bolsa Família/Non-Collector/Non-Coop Member Total Income	0.073 (7.3%)				
Coop Member Total Income/Total Sample Income	0.507 (50.7%)				
Non-Coop Member Total Income /Total Sample Income	0.164 (16.4%)				
Non-Collector/Non-Coop Member Total Income/Total Sample Income	0.327 (32.7%)				
*US\$ 1.00 = R\$ 2,23					
Source: Elaborated by the authors					



The interviewed families were separated in three groups: (1) coop members and collectors (treatment group), (2) non-coop members and collectors and (3) non-coop members and non-collectors. Groups 2 and 3 form the control group. The families were not randomly chosen.

Levels of income varied between Salvaterra and Bragança and this is explained by the level of institutionalization of the cooperative and the variety of income-generating activities and resources. The cooperative in Salvaterra works primarily with seed collecting and oil production, whereas the cooperative located in Bragança works with different activities beyond seed collecting such as chicken and “farinha” production and agriculture.

Due to the differences in the number of observations between the three groups, both the tables and the graphs were based on the means. The correlation between the resources could be measured through Stata⁵ using the income data. The strongest correlations were observed among coop members in Bragança: seeds -- 0.3669 -- and chicken -- 0.1950. The coefficients⁶ show that being a coop member is strongly related to seed collecting and chicken production in Bragança. In Salvaterra, the correlation among natural resources is weak and is not statistically significant. It means that income from the natural resources is independent. The strong correlation between seeds and chicken production in Bragança can be explained by the fact that almost all chicken producers collect seeds and that chicken producers are motivated by a governmental program called Pronaf⁷ that supports food production in the region. This program is not related to seeds and fruits collecting.

Being a coop member is statistically significant⁸ to seeds in Salvaterra and Bragança -- 3.75. Income from seeds and fruits are complementary to the families' main sources of income. In Salvaterra, seeds and fruits compete with fishing and the governmental programs such as Defeso⁹ and Bolsa Família¹⁰. In Bragança, seeds and fruits compete with “farinha”, agriculture, chicken production and Bolsa Família.

⁵ Stata is a software for statistical analysis.

⁶ The closer to 1.0000, the stronger is the correlation between the resources.

⁷ The government buys the food production and sends it to local schools.

⁸ Statistical significance is determined by the t value. The closer or higher than 2.00 means that the variables are statistically significant.

⁹ In this program, the government pays a minimum salary of R\$724,00 (US\$ 324,00) (2014) during four months that coincides with the reproduction period of the fisheries.

¹⁰ The government supports each children in a family whose monthly per capita income is lower than R\$70,00 (US\$ 31.00) with R\$ 32,00 to R\$ 38,00 (US\$ 14.00 to US\$ 17.00).

In Salvaterra, those who are coop members earn more money than those who are not, despite the equivalence of prices paid per kilo. In other words, coop membership does not interfere in the prices paid per kilo of seeds they collect and sell to the cooperative. Therefore, being a member is an incentive and influences families' collective action towards seed collecting. This might be explained by the cooperative as an institutional arrangement that shapes the behavior of the individuals who are engaged in the cooperative activities such as oil production.

Going back to the design principles and considering the empirical evidence, it is possible to say that there is still a gap between local communities and the resources in terms of monitoring which is intimately related to the limit of extraction. Who should determine this? The community or an external agent? According to Ostrom (1990) communities have the right of self-governance and this has proven to be more successful regarding environmental sustainability in some cases. However, the research has introduced a new element for the discussion of CPRs: private actors and a network of stakeholders. According to Ostrom (2009, P. 420), "A core challenge in diagnosing why some SESs are sustainable whereas others collapse is the identification and analysis of relationships among multiple levels of these complex systems at different spatial and temporal scales."

Throughout her academic career, Elinor Ostrom has done an extensive research on institutions of governance aimed at managing CPRs. She has been able to show cases in which these institutions are successful and cases in which they are either not successful or new types of arrangements are developed in order to solve the problem of collective action. This is the case of the communities in Salvaterra and Bragança. The purpose of collecting information based on quantitative data and its interpretation tends to approximate both cases to the theory of the firm in which an entrepreneur recognizes an opportunity to optimize its economic activity by voluntarily mobilizing a group of agents that are in an interdependent situation.

The agents (families) do self-organize themselves, but the incentive provided by the private actor reshapes the institutional arrangement that preexisted in the communities. Indeed, not only the influence of the private actor modelled the institutional arrangement, but it also determined what it has become. In these cases, the human-nature relation was considerably changed as many families who did not collect seeds and fruits became engaged in this activity. There was a prior use of these resources, but it was mainly for subsistence. Families have known how to collect and handle the seeds

and fruits for a long time and since the cooperatives were founded, this traditional knowledge has been very important. “Understanding a complex whole requires knowledge about specific variables and how their component parts are related” (OSTROM, 2009, P. 420).

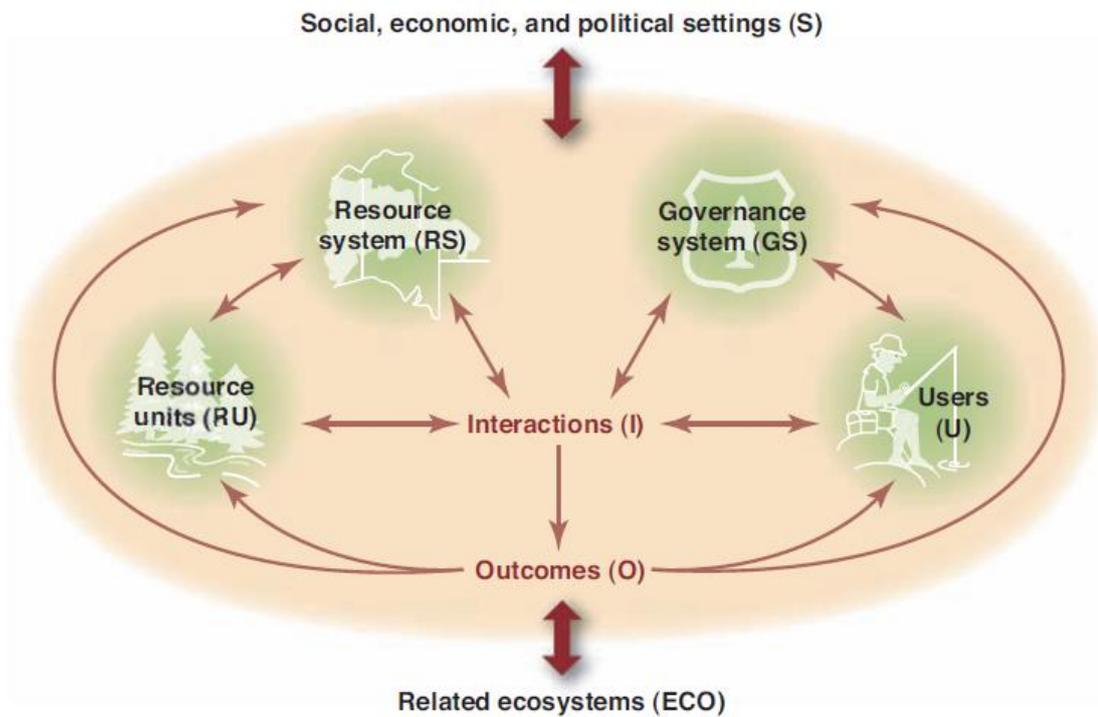


Figure 1: The core subsystems in a framework for analyzing social-ecological systems.
Source: Ostrom, 2009, p. 420.

The interactions portrayed within the framework of a complex social-ecological system represents a dynamics that is affected by social, economic and political settings as well as by other ecosystems. The figure clearly shows the multiplicity of actors, processes and arenas. The governance system can be compared to the cooperatives in the region of Salvaterra and Bragança. It is also possible to see how external factors are both influenced by the system and influence the system itself. It is a two-way process.

Given that, it is possible to discuss how international actors react to this kind of local (regulatory) demand of SESs. The natural capital is a valuable asset for the humanity and finding sustainable solutions on how to guarantee its existence to future generations is a challenge that the world needs to face. The Convention on Biological Diversity (CBD) was created in 1992 with the Nairobi Conference. This clearly shows how local processes such as the CPRs demand national and international coordination,

in other words a bottom-up process that involves multiple (state and non-state) actors and multiple levels of cooperation. This is one of the main issues of global environmental governance. The convention not only promotes biological diversity conservation, but it also emphasizes the sustainable use of its components and the fair and equitable sharing of benefits acquired from the genetic resources. More recently and in attention to the fair and equitable benefit sharing from the genetic resources, The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) was introduced in 2010 as a supplementary agreement to the CBD that attempts to create a legal framework for both providers and users of the genetic resources. Brazil is to ratify the Protocol until the end of 2014.

Would that be the answer to the limit of extraction issue that is present in Salvaterra and Bragança? Not only. Both CDB and the Nagoya Protocol highlight the importance of the traditional knowledge that is transferred throughout generations that belong to complex social-ecological systems (SESs). Hence, it is possible to claim that the relation between the families, the cooperative and the company ought to solve the monitoring problem and determine the extraction limit together. However, it must be clear that local communities play the central role in this monitoring and limiting process since they possess the traditional knowledge and are the ones that will be in direct contact to the ecological system. Someone may ask why the company should empower local people to determine the level of extraction provided that the natural resources are part of an international supply chain that is influenced by the market. The answer is that the unsustainable use of the natural resources and the lack of due regard to the role of local people ability to self-govern the institutional arrangement may threaten the whole supply chain in a mid-long term.

Final Remarks

This working paper aimed at providing the first impressions on both filed researches to the Amazon. It relates the empirical evidence and introduces the debates over Institutional Analysis and Development and Social-Ecological System frameworks regarding Common Pool Resources.

The institutional arrangement in the local communities in Salvaterra and Bragança has raised important issues regarding global environmental governance not

only from a local perspective, but also from the interaction of multiple actors and the influence of a market-driven activity that involves the cosmetics industry and a company that acts along with a network of stakeholders in the national and international levels in accordance to its corporate governance program regarding socioeconomic development and environmental sustainability.

Other variables such as the relation between the governmental programs, the HDI-M and the possible relief over natural resources need further research. In other words, the data has shown that there has been an increase in the indicators of HDI at municipality level. How are these indicators connected to the institutional arrangement created along with the cooperatives in terms of public policy?

Brazil's public regulation towards the environment is mainly focused on the management of forests and timber products. For this reason, laws such as *Lei nº 12.651, de 25 de maio de 2012* and the *Instrução Normativa nº 5 de 11/12/2006 / MMA - Ministério do Meio Ambiente* do not deal with the local realm. Given this gap in the public regulation, the transnational private regulation - UEBT - has attempted to limit the levels of extraction units at local level at the same time it calls attention to the need to respect the resilience time of the environment.

Further research is necessary to discuss how the Brazilian government will internalize and enforce the Nagoya Protocol without interfering the locals' right to self-govern the CPRs. This will also add a new challenge to the private actor in terms of accountability. To whom is this process accountable for? The intuitive answer would be to the local communities, to the government and to the international Protocol and Convention. The core point is how to create mechanisms that hold actors accountable for their actions and the extent to which the mechanisms of compliance and enforcement should be applied and in what level. The need for a public-private regulatory system is urgent and the local reality of CPRs play a vital role in shaping this process.

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