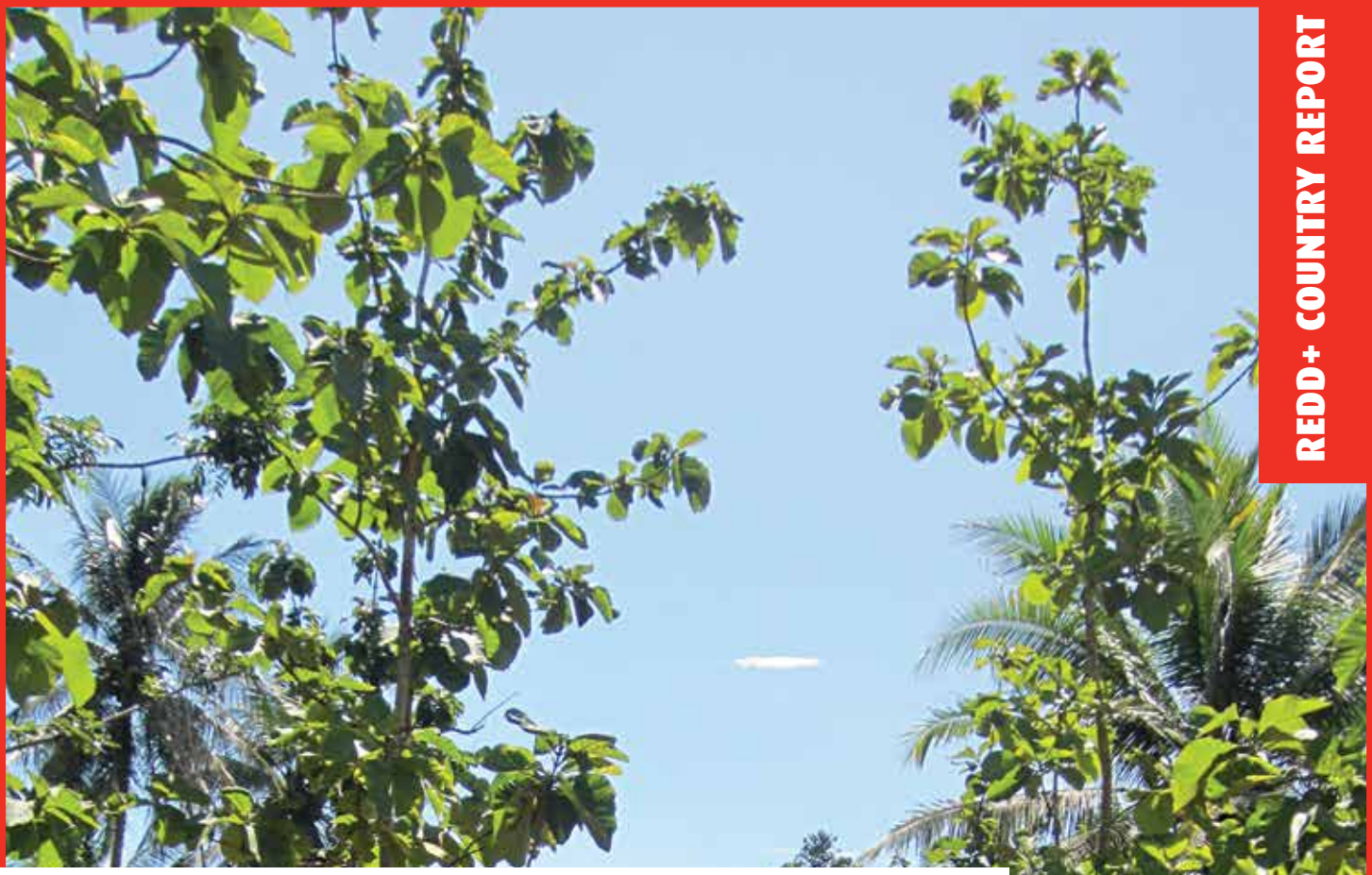
REDD+ COUNTRY REPORT



Results of a baseline study for a REDD+ pilot area in Brazil

The Rio Negro APA and the Bolsa Floresta Programme

Amazonas Sustainable Foundation – FAS

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Poverty and sustainable development impacts of REDD architecture; options for equity growth and the environment

About this project...

Poverty and sustainable development impacts of REDD architecture is a multi-country project led by the International Institute for Environment and Development (IIED, UK) and the University of Life Sciences (Aas, Norway). It started in July 2009 and will continue to December 2013. The project is funded by the Norwegian Agency for Development Cooperation (Norad) as part of the Norwegian Government's Climate and Forest Initiative. The partners in the project are Fundação Amazonas Sustentável (Brazil); Hamilton Resources and Consulting (Ghana); SNV (Viet Nam); Sokoine University of Agriculture, Faculty of Forestry and Nature Conservation (Tanzania); and Makerere University, Faculty of Forestry and Nature Conservation (Uganda).

The project aims to increase understanding of how different options for REDD design and policy at international, national and sub-national level will affect achievement of greenhouse gas emission reduction and co-benefits of sustainable development and poverty reduction. As well as examining the internal distribution and allocation of REDD payments under different design option scenarios at both international and national level, the project will work with selected REDD pilot projects in each of the five countries to generate evidence and improve understanding on the poverty impacts of REDD pilot activities, the relative merits of different types of payment mechanisms and the transaction costs.


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Executive summary

This study reports on a socioeconomic and resource-use survey carried out in a 586,422-hectare portion of the Rio Negro Area of Environmental Protection[1] (Rio Negro APA) in Amazonas State, Brazil. The survey provides a baseline against which this area's future implementation of the Bolsa Floresta Programme (BF), a payment for ecosystem services scheme that currently[2] benefits over 7,000 families in 14 other state protected areas[3] – will be measured. Data were collected from 150 out of 319 households distributed among 16 communities, a sample representing a total resident population of approximately 1,300 people. The Rio Negro pilot area was selected primarily because it was possible to conduct the survey before BF had begun, permitting a prior characterisation of local conditions. Another reason was the proximity of control areas where BF will not be implemented in the near future: the Rio Negro APA is located on the right bank of the Rio Negro river and the Rio Negro State Park. The relative ease of access from the Rio Negro APA to the state capital, Manaus (70 km downriver), facilitated the implementation of the survey.

The results revealed an average family size of five people, with 47 per cent younger than 16 years old and only three per cent older than 60 years, in the pilot area (where BF will be implemented) and the control areas (similar areas with no BF implementation, far away enough to avoid spillover of effects). Levels of education were low, with 64 per cent of household heads in the pilot area having attended only up to elementary school. About half of the population were involved in small-scale agriculture (generally <1.0 ha per household). Most agricultural production was focused on subsistence, and only three crops were produced primarily for market: sugarcane, bitter manioc used to make flour, and yams. Livestock production (poultry, pigs and cattle, in order of frequency) is incipient, with livestock kept by 66 per cent of the total interviewed households in both pilot and control areas.

Off-farm incomes were characterised as the second most important occupation by 26 per cent of household heads and 33 per cent of wives in both pilot and control areas. Although the vast majority of households do not have formal jobs, 61 per cent received funds amounting to at least Brazil's standard minimum wage (around US$320/month) from state support or remittances. Because agriculture was primarily geared to subsistence, state support or remittances, commonly distributed to the low-income population in Brazil, probably represented the main source of cash income. In the pilot area, 68 per cent of households felt that their financial status had improved in the past five years, whereas only nine per cent felt that it had worsened. Income from activities related to environmental services over the past year was minimal, with only ten families reporting revenues for activities related to tourism, averaging US$36 per year.

Only 21 per cent of household heads and 20 per cent of wives characterised their primary occupation as associated with natural resources use (that is, harvesting of forest products, hunting and fishing). Part of this low dependency might be due to the use of gas as the primary source of cooking fuel for 81 per cent of the households in the pilot area — facilitated by the proximity of this area to Manaus. Also, 55 per cent of households used rivers and lakes as their primary source of water for human consumption.

1. The term *Area of Environmental Protection (APA)* is a category of protected areas in Brazil according to the SNUC – Law Nº 9.985/2000, which establishes the National System of Protected Areas. APA allows various land uses defined by zoning.
2. August 2011
3. The term *State protected area* refers to all categories of protected areas defined by SNUC, under domain of the state. Such areas can have rules adapted to the local conditions, but never less restrictive than the national rules, they are complementary.

Most respondents (94 per cent) agreed either entirely or partially that a programme providing incentives to avoid deforestation in primary forest and through wood harvesting would be beneficial, and they would commit to zero deforestation in exchange for such incentives. The six per cent of respondents who disagreed were highly dependent on activities such as harvesting forest products and could experience restrictions under the programme's provisions.

Introduction

Rationale

This report presents the results of a baseline survey for the project 'Poverty and sustainable development impacts of REDD architecture: options for equity, growth and the environment', carried out in the Left Bank Rio Negro Environmental Protected Area (or 'Rio Negro APA', its Portuguese acronym), located on the Negro River in the municipality of Manaus, in Amazonas State, Brazil.

Questionnaires and interviews were conducted prior to the implementation of the 'Bolsa Floresta' Programme (BF) in this protected area. The purpose of this survey was to characterise the socioeconomic conditions of the local population and people's use of natural resources, providing a baseline against which the impacts of BF implementation on the wellbeing of the area's population can be measured in the future.

The project 'Poverty and sustainable development impacts of REDD architecture' is coordinated by the International Institute for Environment and Development (IIED), based in London, and the Department of International Environment and Development Studies at the Norwegian University of Life Sciences, based in Aas, Norway, in partnership with the Amazonas Sustainable Foundation (FAS, Brazil), Hamilton Resources (Ghana), SNV (Vietnam), Sokoine University of Agriculture, the Faculty of Forestry and Nature Conservation (Tanzania), and Makerere University, the Faculty of Forestry and Nature Conservation (Uganda).

The project aims to increase understanding of how different options for REDD architecture and policy at international, national and sub-national levels will affect the reduction of greenhouse gas emissions and co-benefits of sustainable development and poverty reduction. This will be explored through two closely linked outputs. In five countries, the project will look at the internal distribution and allocation of REDD payments under different design option scenarios at both international and national levels. The emphasis will be on understanding the likely impacts on poverty and opportunities for sustainable development, as well as the cost-effectiveness of pro-poor approaches to REDD payment mechanisms. Simultaneously, the project will work with selected REDD pilot projects in each of the five countries to generate evidence that sheds light on the poverty impacts of REDD pilot activities, the relative merits of different types of payment mechanisms, and the transaction costs involved. The Rio Negro APA was chosen by FAS, the project's partner institution from Brazil, as one of the REDD pilot sites to be studied.

Bolsa Floresta Programme

The Bolsa Floresta Programme offers rewards to forest stewards committed to environmental conservation and sustainable development in the Amazonas Conservation Units. BF is a state policy, established by Amazonas in 2007[4] to conserve forest resources in state protected areas and enhance livelihood opportunities for people living in these areas. A few months after the law was enacted, FAS – an organisation created through a partnership between the State of Amazonas and Bradesco Bank – signed a cooperation agreement with the Amazonas State government to implement BF. The main justification for this agreement is FAS's competence to implement long-term activities in an efficient and transparent way, independently from political party interests. The institutional stability and credibility of FAS opens new opportunities for financing BF through partnerships with institutions and enterprises committed to socio-environmental engagement.

BF is divided into four components, including three community-based investment funds as well as a family-based funding mechanism. The community-based elements – Bolsa Floresta Income, Bolsa Floresta Social, and Bolsa Floresta Association – are aimed at organising benefited communities to improve basic

4. Law no. 3.135, 5 June 2007.

services such as education, transportation and health. Purposes for the investments are decided together with the communities through periodic workshops. The family-based component, Bolsa Floresta Family, is a direct reward to families committed to zero deforestation in pristine forested areas.

The details of the four BF components are as follows:
Bolsa Floresta Income: Annual payment of BRL 396 (ca. US$220) per family for supporting sustainable production, including fishing and harvesting of vegetable oils, fruits, and native honey, among other activities. Investments are decided by the community, as long as the chosen applications are legal.

Bolsa Floresta Social: Annual payments of BRL 350 (ca. US$200) per family, aimed at improving education, sanitation and health conditions, communication and transportation – basic services to improve living conditions among forest stewards. Relevant government bodies and collaborating institutions participate in these projects.

Bolsa Floresta Family: Monthly payment, totalling BRL 600 annually (US$335), to mothers and wives of families living inside the protected areas, who have committed to environmental conservation. This component is an important way to get local people involved in halting deforestation and forest degradation. It is not intended to be a main source of income for these families.

Bolsa Floresta Association: Forwarded to local associations in the State Conservation Units, the annual payment from this component (BRL 60 or US$33 per family) corresponds to 10 per cent of the amount paid to the community through Bolsa Floresta Family. Its purpose is to strengthen communities' organisation and the social enforcement of rules and agreements under BF. This is one of the most important initiatives in the history of the Amazon in terms of strengthening community-based organisations.

In addition to these four components, five Support Programmes are also implemented. FAS collaborates to define the strategy, organise the deployment and set up the necessary partnerships for each programme. The five support programmes target (i) sustainable production, (ii) health and education, (iii) supervision and monitoring of deforestation, (iv) management of protected areas, and (v) technological development.

In contrast with other social initiatives, BF has clear objectives and compensation mechanisms. These include both BF's commitment to zero net deforestation and its support towards implementing state protected area restrictions.

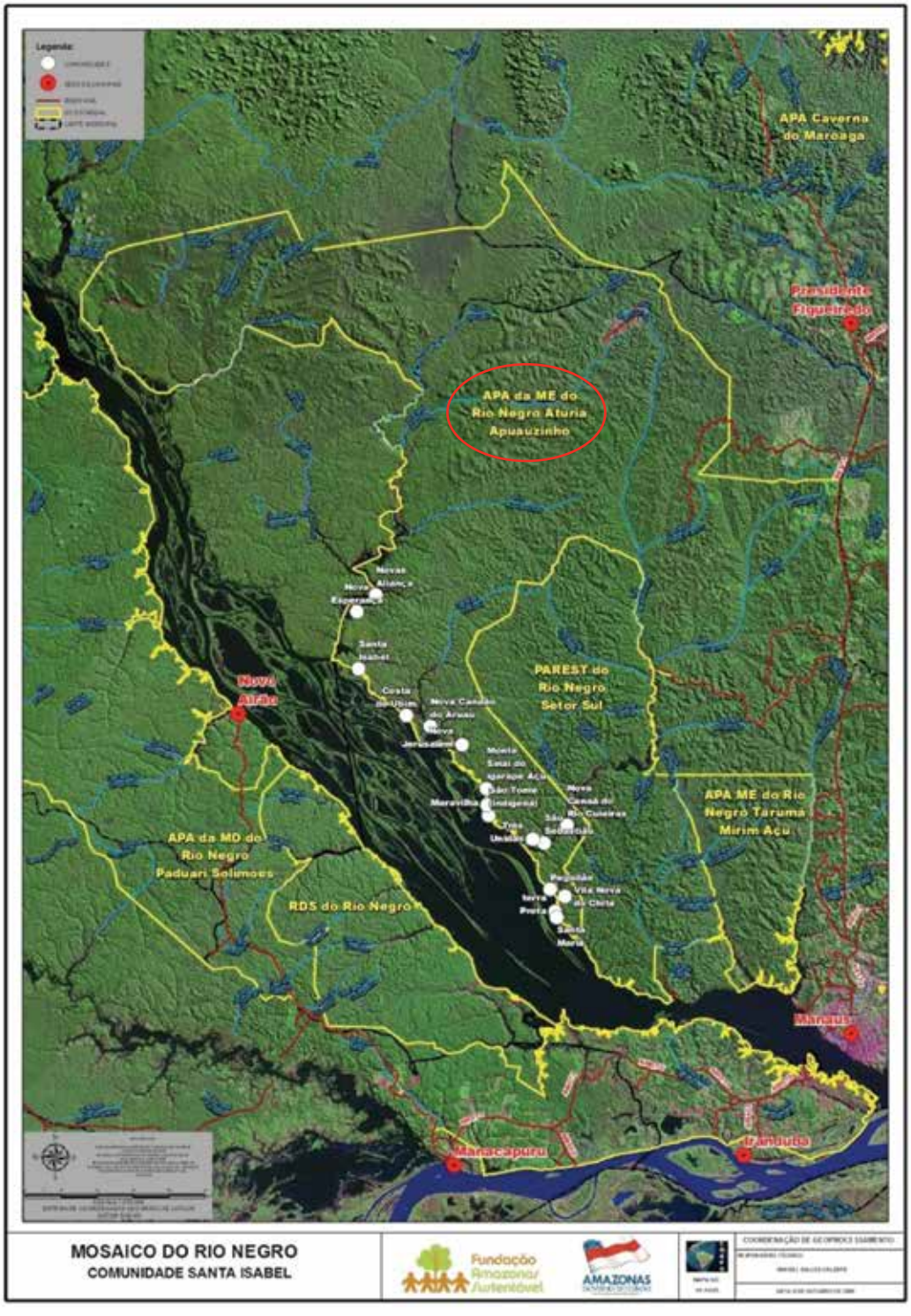
According to BF's strategy, the main source of income for the families in the programme is not the Family component, but the Income component. From a social perspective, the main outcome is support for better education, health conditions, communication and transportation, via Bolsa Floresta Social. From a governance and participation standpoint, the Bolsa Floresta Association is the main tool for empowering local communities.

Overview of the pilot area and village selection

The Rio Negro APA is the fifteenth state protected area in Amazonas to benefit from the Bolsa Floresta Programme. This area was selected for our baseline survey primarily because it was possible to conduct the survey before BF had begun, and so to obtain a prior overview of local conditions. It is relatively close to the state capital, Manaus (70 km downriver), which also facilitated the implementation of the survey. Two other protected areas located near the pilot site served as control areas for this survey: a part of the Rio Negro APA that does not expect to receive Bolsa Floresta in the future and Rio Negro State Park.[5] These control areas were chosen due to their proximity and similarity to the Rio Negro APA (Figure 1). Furthermore, BF is not expected to be implemented in these areas in the near future, and thus they can serve as control areas for the future.

5. Rio Negro State Park is a category of protected area referred to as a 'State Park', defined by law Nº 9.985/2000 (SNUC). This category is under state domain and refers to an ecological ecosystem and area of scenic beauty designated for scientific research and educational activities. It is equivalent to a National Park under national domain.

Figure 1. Map of the pilot area, with the locations of the communities represented by white dots



Box 1. Protected areas in Brazil

There are different kinds of protected areas in Brazil, divided into two major categories: 'integral protection', in which only indirect uses of natural resources are allowed; and 'sustainable use', which permits some direct uses, with restrictions, and seeks to reconcile nature conservation with sustainable use of natural resources. In general, these are extensive areas that have human occupants as well as natural or cultural attributes important for human well-being. The main goals of these areas are to protect biodiversity, regulate the process of land occupation, and achieve sustainable use of natural resources. By law, there must be an advisory council for management of each area, chaired by the agency responsible and including representatives of public agencies, civil society organisations and local residents.

An Environmental Protected Area (APA) is a category of protected area from this second group. APAs seek to reconcile nature conservation with sustainable use of a portion of their natural resources. The law describes this type of protected area as comprised of either public or private lands, generally covering 'a large area, with some degree of human occupation, endowed with abiotic, biotic, aesthetic or cultural attributes especially important for the quality of life and well-being of human populations,' and states that its objectives are to 'protect biological diversity, control the process of human settlement and ensure the sustainable use of natural resources.'

Federal and state legislation concerning protected areas require a management plan, establishing rules of use. Unfortunately, protected areas in Brazil often do not have finished plans, and this is true for both the pilot and control areas in this study.

As discussed below, although private landownership is legally allowed inside an Environmental Protected Area, the Rio Negro APA residents who will be the beneficiaries of BF are not the owners of the land where they live and where they access forest resources. The land belongs to the State of Amazonas, which recognises the right of traditional communities to inhabit these areas and use the resources there. The state is in the process of providing a more formalised document on 'right to use', but to date not all the families in Rio Negro APA have received this document.

The portion of the Rio Negro APA located on the left bank of the Rio Negro river was established in 1995. Its original area was reduced in 2001, and it now covers 586,422 hectares. The area has a population estimated at about 1,300 people, distributed among 16 communities (Figure 2).

Figure 2. 'Três Unidos,' one of the 16 communities within the pilot area

The economic activities within the Rio Negro APA are agriculture, hunting, fishing and extraction of non-timber forest products (NTFPs) either for subsistence or manufacture of handicrafts, such as basketry and roasting spits (Figures 3 and 4).[6] The region has a high potential for ecotourism due to its scenic beauty and proximity to Manaus. More information on the economic activities, obtained through questionnaires and focus group discussions, is detailed in the following sections.

Figure 3. Production of roasting spits

Figure 4. Handcrafts and canoe for subsistence at pilot and control areas

According to the Amazonas State Secretariat of Environment and Sustainable Development Annual Management Report,[7] previously high rates of logging have declined substantially in recent years due to government agencies' increased monitoring and enforcement of penalties and sanctions against illegal wood removal and transport.

6. Cardoso, T. 2010. Deposition: the lower Negro river mosaic. 'Protected Areas of the State of Amazonas' website. See http://uc.socioambiental.org/en/territ%C3%B3rio/deposition-the-lower-negro-river-mosaic
7. Amazonas State Secretariat of Environment and Sustainable Development (SDS). 2007. Protected Areas of the State of Amazonas (SEAP). Annual Management Report.

This perception was also highlighted during the focus group discussions we conducted (described in more detail in the next section). A participant stated: 'The major changes that happened in the last five years were the decrease of logging and marketing of wood, increase of sanctions and surveillance by the responsible governmental agencies, increase of fishing and agriculture and increase of government subsidies.'[8]

Sampling

We sought to survey all 15 communities in the pilot area. However, we were unable to apply the questionnaire in two of them, *Costa do Ubim* and *Maravilha* where the houses are not concentrated in one location but are highly dispersed. It proved to be too difficult logistically to find sufficient families at home to make up the sample size needed. We divided the 15 communities into four groups of three to five adjacent settlements, representing different socio-economic profiles. Within each group, we randomly selected 40 households for interviews based on a list of families of each community.

As some families were not available at the time of the interviews, however, and as a result of other logistical issues, it was not possible to apply 40 questionnaires in three of the four groups. Some questionnaires also had to be discarded because of a misunderstanding of what was required. The total sample size in the end was 150. Data on the sampling of households in each community are displayed in Figure 5 and presented below (Table 1). Since all households were found to be occupied by single family units in both the pilot and control areas, the terms 'household' and family are used interchangeably in this study.

Figure 5. Distribution of questionnaires within groups of adjacent communities

8. Excerpt from transcript of a focus group discussion conducted at the Santa Maria community on 11 May 2011.

Table 1. Community sizes and number and percentage of families interviewed in the pilot area

Community name	Families		
	Total number	Number sampled	% sampled
Santa Maria	28	9	32%
Pagodão	34	14	41%
Terra Preta	18	7	39%
Vila Nova do Chita	22	8	36%
Três Unidos	11	10	91%
Nova Canaã do Rio Cuieiras	15	10	67%
São Sebastião do Rio Cuieiras	40	17	43%
São Tomé	13	8	62%
Monte Sinai	36	21	58%
Nova Jerusalém	22	11	50%
Nova Canaã do Aruaú	36	16	44%
Nova Esperança	18	11	61%
Costa do Ubim	2	0	0%
Maravilha	11	0	0%
Santa Izabel	13	8	62%
TOTAL	**319**	**150**	**47%**

Table 2. Community sizes and number and percentage of families interviewed in the control area

Community name in Rio Negro APA RB	Families		
	Total number	Number sampled	% sampled
Sobrado	25	11	44%
Aracari	25	9	36%
Mirapinima	15	3	20%
Madadá	1	0	0%
Bom Jesus do Padoari	40	14	32%
Total Rio Negro APA RB	**106**	**37**	**35%**
Community name in Rio Negro State Park	**Families**		
	Total number	Number sampled	% sampled
São Pedro	11	3	27%
Mirituba	3	0	0%
Castanho	10	4	40%
Santo Elias	6	3	50%
Airão Velho	6	3	50%
Total Rio Negro State Park	**36**	**13**	**39%**
TOTAL	**142**	**50**	**36%**

Focus group discussions were conducted both in the pilot and control areas, at *Santa Maria* and *Bom Jesus do Padoari* communities. In these meetings, we gained more detailed information about the local economy, the difficulties and changes experienced over recent years, and the impact of these on livelihoods and people's perceptions of the importance of forest conservation and management.

The main criterion in choosing communities to participate in focus group discussions was the need to represent diversity in both the pilot and control areas. The two chosen villages differed from each other and represented a variety of local realities, in terms of the number of families, social infrastructure, organisation and leadership structure, presence of community organisations and changes in the local situation over the past five years.

The results of the survey are presented below in five sections. The first two sections, 'Household structure and livelihoods' and 'Resource use, income and constraints' give an overview of socioeconomic aspects of the households and how their livelihoods depend on natural resources, agriculture and livestock production. The third section, 'Property rights, use rights and management' assesses land tenure issues, people's rights to forest resources, and use and management practices. The section 'Perceptions, attitudes and norms concerning resource conservation' offers insights on people's perceptions related to rules that restrict access and use of forest resources. The last section, 'Pre-REDD analysis', discusses households' level of knowledge prior to REDD implementation on issues related to climate change and forest conservation, and examines people's willingness to contain or stop deforestation if they receive compensation.

Household structure and livelihoods

1.1. Household characteristics and composition

In the pilot area, family size averaged 5.0 people, of which 53 per cent were male. In the control area, the average family size was slightly smaller (4.7 people), and the proportion of males was the same. As shown in Table 3, these populations are clearly growing, with a high proportion of individuals between 0 and 15 years old both in the pilot and control area. The proportion of elderly people in both areas was low (≤5 per cent). This age structure reflects that in Amazonas State.[9] The family structure is predominantly paternalistic: 72 per cent of household heads were male in the pilot area and 82 per cent in the control area.

Table 3. Age brackets in interviewed households in the pilot and control areas (% of population)

	0–15 yrs	16–45 yrs	46–60 yrs	>60
Pilot	48%	40%	9%	3%
Control	43%	37%	15%	5%

Education within the pilot area is deficient, with 64 per cent of household heads having attended only up to elementary school (Table 4). Just one head-of-household respondent had higher education. In the control area, the situation is even more critical: 34 per cent of the population had no access to any formal education, 56 per cent had primary education, only 10 per cent went to secondary school, and no one had higher education.

Table 4. Education levels in the pilot and control areas (% of household heads)

	No formal education	Primary	Secondary	Higher education
Pilot	18%	64%	17%	1%
Control	34%	56%	10%	0%
Combined areas	22%	62%	15%	1%

Social structures are similar in the pilot and control areas. In the pilot areas, there are five community health agents, one agent dealing with endemic diseases and one health clinic, while in the control area there are two community health agents and one school, which offers classes in elementary education, technical education and supplementary education for youth and adults. Once a month, a boat from the municipality passes through the area to sell and exchange products. Every year, a ship from the International Presbyterian Church provides medical care, piped water, maintenance of electric power generators and other basic services.

The majority of the households (87 per cent) do not belong to indigenous groups and are classified as '*ribeirinhos*,' that is, communities who live alongside rivers in tropical rainforests; settlers of mixed descent, not indigenous people living in traditional ways. These settlers usually migrate to the rainforest seeking to escape rural (and to a lesser extent urban) poverty, sometimes as part of government programmes to develop areas of natural vegetation, and at

9. Brazilian Institute of Geography and Statistics. 2010. Census 2010. See: http://www.censo2010.ibge.gov.br/sinopse/webservice/frm_piramide.php?codigo=13

other times following roads created by forest developers. When they arrive, colonists may know little of cultivation techniques in the tropical rainforest and sometimes mimic those of local indigenous people who are no longer living in their traditional ways. Thus the people come to rely on manioc (cassava) as the basic ingredient in most meals and obtain protein through hunting and fishing. Subsistence farming using slash-and-burn techniques and sometimes agroforestry methods generally produces food for consumption (especially manioc, yams or potatoes, and plantains) and some cash crops (black pepper, fruit). Income is derived from the sale of cash crops, charcoal, lumber and various forest products and is used to purchase some foods and manufactured goods.

The history of Amazon colonisation had important phases, such as the so-called 'rubber boom',[10] when many people came from the Brazilian northeast to work in rubber extraction. When this activity declined, many moved to the cities or to other river areas, whereas others stayed where they were. This process has given rise to a population of mixed origins and features but with similar habits and dependence on natural resources for their survival. These communities are mostly made up of *caboclos*, who are of mixed Amerindian and European descent, and there are not many different ethnic groups within the communities. Rather than ethnic groups, a more relevant category to consider is religion. The vast majority of community members are protestant Christians from the Assembly of God church. Among those present at the focus group discussions, the majority were from this group.

A minority group, composed of 13 per cent of the surveyed families, identified themselves as belonging to indigenous groups. All of these were from the pilot area; no families identified themselves as indigenous in the control area. The ethnic distribution of the 25 families identifying themselves as belonging to indigenous groups is shown in Table 5. Although members of indigenous groups, they do not live in isolation. These families do make an effort to maintain traditional and culturally specific aspects of their lives and social organisation, but despite this effort, the mixing of cultures has contributed to the incorporation of some non-traditional habits.

Table 5. Number of families identifying as members of indigenous ethnic groups within four communities located in the pilot area

Community	Indigenous group					Total
	Kambeba	Baniwa	Baré	Nemgatu	Tukano	
Nova Canaã	-	-	-	-	1	1
São Tomé	-	-	7	-	-	7
Terra Preta	-	1	5	1	-	7
Três Unidos	10	-	-	-	-	10
Total	**10**	**1**	**12**	**1**	**1**	**25**

When asked about their main activities, both men and women in the pilot area most often said their main occupation was agriculture (Table 6). Off-farm activities constitute the second most important form of occupation for both heads of households and wives; these include, for example, bricklaying, commerce, wage labour and jobs as health agents. Other forms of land and resource use (fishing, hunting and forestry, including harvesting of non-timber forest products) are less important.

10. The rubber boom peaked between 1879 and 1912. There was a revival between 1942 and 1945 during World War II.

Table 6. Main occupations of household heads and wives in the pilot and control areas (% of all household heads and wives)

	Agriculture	Forestry/forest use (NTFPs)	Hunting	Fishing	Other
Pilot	53%	7%	6%	8%	26%
Control	54%	4%	0%	14%	28%

Focus group discussions in both pilot and control areas also revealed that income is earned primarily from agriculture, followed by fishing, government subsidies, public posts – as health agents, for example – and tourism. The principal marketplaces are the communities where people live, nearby communities and the Novo Airão municipality (located on the right bank of the Rio Negro river, 140 km from Manaus by river). Staple foods are mostly derived from fishing and agriculture but also include fruits from the forest and from gardens around the houses, bush meat, industrialised food, small flocks of chickens and pigs.

1.2. Land

The area reported per household for agriculture was usually one hectare or less (Figure 6). Only two families claimed that their main parcel of land[11] was larger than seven hectares. Eighteen per cent of households in the pilot area practice agriculture in two or more parcels of land with different tenure arrangements (details in section 3). In the control area, only one of the 50 families interviewed owned a second parcel, of 1.5 hectares.

Looking at land conversion, there is no strong trend of any particular type of conversion, but in the pilot area there is a slight predominance of land clearance that took place more than ten years ago. In the control area, land cleared in shifting cultivation and land opened in the last ten years are tied for the most common type of conversion (Table 7).

Figure 6. Area of farmland currently accessed by household heads

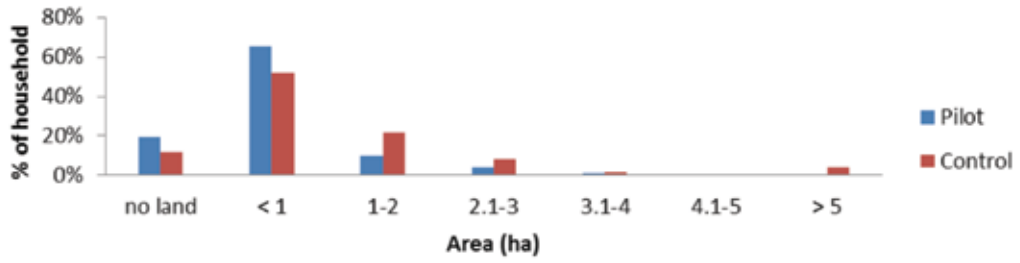


Table 7. Conversion of land use for agriculture in pilot and control areas (% of households)

Land conversion type	Pilot	Control
Permanent agricultural land (cleared more than 10 years ago)	43%	23%
Cleared land by shifting cultivation areas	34%	39%
Cleared forest in the last 10 years to become Permanent agricultural land	22%	39%
Others	1%	0%

11. In the questionnaires, if type of ownership, rental status and land conversion were the same for all land, it was treated as one 'parcel'. If there were different tenure arrangements for different parts of the farmland, these were recorded as separate parcels.

1.3 Assets and savings

Ninety-six per cent of the households in the control area and 84 per cent in the pilot area say they own the house where they live. In both the pilot and control areas, the predominant source of energy used for cooking by interviewed households was gas (Figure 7), usually delivered in 13-kg canisters. Eighty-one per cent of respondents in the pilot area and 72 per cent in the control area chose 'gas' as the first option when ranking energy sources. This can be explained by the proximity of the areas to Manaus, where gas is the main source of cooking energy, as is the case for Brazilian urban centres in general. Fuelwood gathered from their own properties was the second most important category in the pilot area, corresponding to nine per cent of responses; in the control area, charcoal came second, with 22 per cent of answers.

Table 8 presents the ranked results. In terms of drinking water sources, the main category was water from the river, followed by community wells (Table 9).

Figure 7. Cooking energy sources ranked most important by respondents in pilot and control areas (% of households)

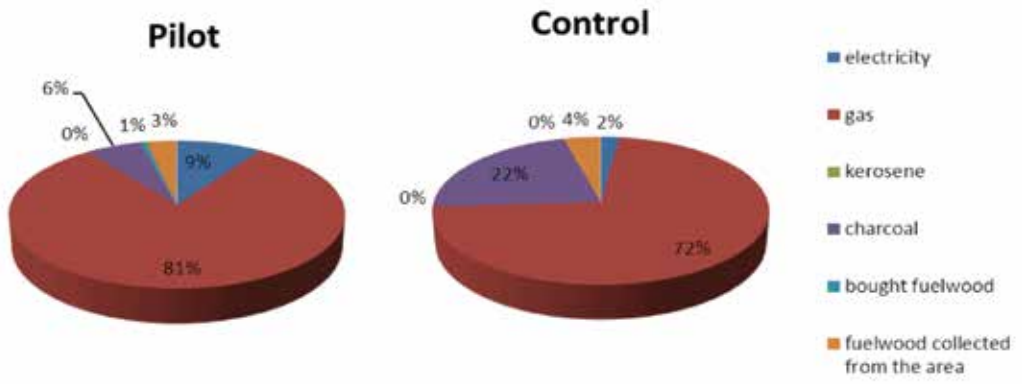


Table 8. Most important source(s) of energy for cooking

Cooking Energy Source	Pilot	Control
Gas	81%	72%
Charcoal	6%	22%
Electricity	9%	2%
Fuelwood collected from area that will become REDD pilot forest	3%	4%
Bought fuelwood	1%	0%
Total	100%	100%

Table 9. Sources of water for human consumption in the pilot and control areas (% of households)

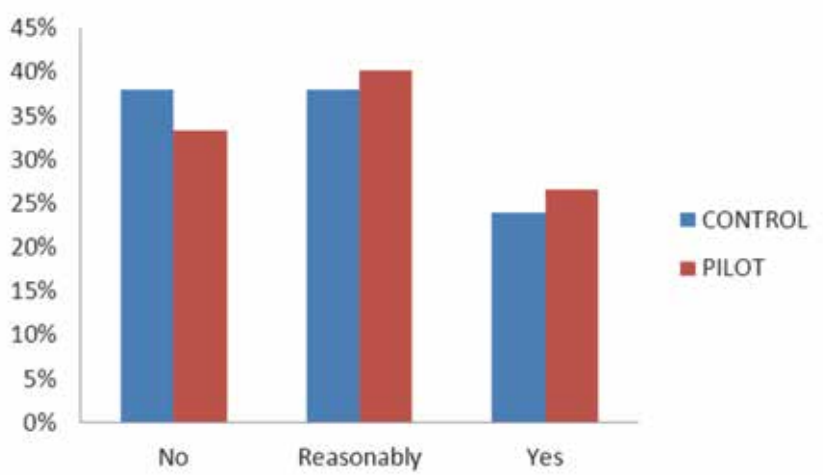
	Personal tap	Public tap	Improved well/spring	Traditional well	Surface water (river/ lake/pond, etc.)	Other
Pilot	9%	1%	3%	31%	55%	1%
Control	2%	4%	0%	28%	64%	2%

The Rio Negro and its tributaries have low pH and are relatively uncontaminated. The study areas, in particular, are upstream of Manaus, so they are free of contamination from the largest urban centre in the state. Nevertheless, the consumption of water directly from the river, without treatment, is not recommended, especially because of the chance of ingestion of organic waste and particles; this is a key cause of disease.

1.4 Social assets

When asked 'Do you consider your village/community a good place to live?', 83 per cent of respondents in the pilot area responded positively, 16 per cent believed conditions to be 'Ok' and only one per cent disliked living there. In the control area, the result was similar: 86 per cent responded positively, the rest responded 'Ok' and the option 'dislike' was not mentioned. Regarding family income, the majority of respondents in the pilot area believe that the family's income over the past 12 months has been 'reasonably' sufficient to cover what they consider as needed (Figure 8).

Figure 8. Responses to the question 'Has household income over the past year been sufficient to cover your needs?' (% of households)



With respect to trends in living conditions, 68 per cent of households in the pilot area responded that they are currently living in better conditions than five years ago, 22 per cent said they are living in about the same circumstances as before, and only nine per cent said that their current living conditions are inferior to their situation five years ago. In the control area, the findings are slightly different: while 38 per cent state that they are living in a better situation than five years ago, 36 per cent consider themselves to be in worse conditions now (Table 10).

Table 10. Responses to the question 'How well-off is your household today compared to the situation 5 years ago?' (% of households)*

	Less well-off now	About the same	Better off now
Pilot	9%	22%	68%
Control	36%	26%	38%

*"single-choice" format of questions

Regarding how well-off people considered themselves to be relative to others in the community, 60 per cent of respondents from the pilot area believed their financial conditions were similar to those of other families from their community, and 32 per cent believed they were better off. Results from the control area were quite similar: for 67 per cent, the situation was similar and for 29 per cent their situation was better off compared to other families from the community.

In terms of income shortfalls, 34 per cent of households in the pilot area and 41 per cent in the control area experienced a reduction in income or a significant increase in costs in the previous year (Table 11). These respondents were asked to choose among several events that could have caused such loss in purchasing power. For shortfalls described as 'severe' or 'very

severe', the main reason given in the pilot area was the loss of wage labour by a family member (29 per cent), followed by price changes on goods (25 per cent) and the establishment of the protected area (20 per cent), which brought some new restrictions on land use and access to resources (Table 12). We note that there is interdependence between income generation and the development of activities not directly related to land use, such as fishery and aviculture. As already mentioned, although agriculture is the main occupation in these areas, it is first and foremost for subsistence purposes.

In the control area, however, the most commonly cited reasons for reduced income in the previous year were death or illness of family member (35 per cent) and climatic events such as droughts or floods (25 per cent); the establishment of the protected area and serious crop failure were tied in the third rank (15 per cent). These results indicate a greater dependence on land use activities.

Table 11. Has your household faced any major income shortfalls or unexpectedly large expenditures during the past 12 months? (% of households)*

	Yes	No
Pilot	34%	66%
Control	41%	59%

*"single-choice" format of questions

Table 12. Reasons for 'severe' or 'very severe' shortfalls in income over the last 12 months (% of households)

Serious event	Pilot	Control
Loss of waged employment	29%	5%
Price changes on products and consumer goods	25%	10%
Protected area establishment	20%	15%
Serious crop failure	18%	15%
Climate/drought/floods	16%	25%
Death/serious illness in family (productive age-group/adult)	14%	35%
Loss of land	2%	10%
Major livestock loss (drought, disease, etc.)	2%	0

In fact, the region was affected by a major drought in 2010, reported in the focus group discussions. The principal means of transport in the region are the rivers and streams. Canoes, motorised canoes known as *rabeta*, and other watercraft are used for access to crops, transport between villages and households, and the sale of agricultural products in the city. Therefore, accessibility, transportation, sales of produce and thus also income generation were severely damaged by the drought. The water shortage also affected agricultural productivity. In addition, the focus groups reported a major flood in 2009, the largest flood ever measured. The area where houses were located was flooded, forcing the villagers to retreat to their relatives' homes in Novo Airão.

It is important to mention that droughts and floods are common in the Amazon; such events are a regular pattern for the region's rivers, and the year is divided into flood and drought seasons. However, recent events along the Rio Negro such as large floods (in 2009) and severe droughts (in 2010).[12]

12. For further information: http://www.jpl.nasa.gov/m/news/index.cfm?release=2013-025

Resource use, income and constraints

2.1 Agricultural production over the past 12 months

Table 13 lists the pilot area's six most important agricultural crops, in terms of contribution to income. Cassava and banana are the first and second most common crops, respectively. There are only slight differences in the average area per family devoted to each crop, ranging from 0.19 hectares for sweet cassava to 0.56 hectares for bitter cassava. A total of thirty-eight different crops were listed during the interviews in both areas, 29 of them within the pilot area. The predominant source of agricultural labour is the households themselves. Except for sugarcane, cassava (flour) and yam, production is primarily used for subsistence.
It is important to note here that many interviewed households had huge difficulties in measuring their own production, reinforcing the impression that most production is for subsistence rather than for sale. One of the difficulties for the study was to convert local measuring units to kilograms. Conversions and averages were nevertheless estimated from the numbers provided, and are presented in Table 13.

Table 13. Agricultural crops reported as most important by interviewed families in the pilot area

Product	Household heads engaged in production	Avg. area per household (ha)	Total output in pilot area (kg)	Avg. output per household (kg)	Total sold in pilot area (kg)	Avg. sold per household (kg)	% of output sold
Bitter cassava (flour)	93	0.56	37457	402.8	21757	229	57%
Banana	49	0.46	14534	296.6	1495	30.5	10%
Yam	25	0.34	1280	51.2	650	26	51%
Sugarcane	19	0.32	11410	600	10060	529.4	88%
Sweet cassava	17	0.19	2500	147	500	29.4	20%
Pineapple	17	0.32	1672	98.3	42	3.8	4%

Frequent difficulties with agricultural production were reported by 51 per cent of households in the pilot area and 82 per cent in the control area. Unfavourable soil conditions – the soil is very sandy in the region – was the main problem that limited production, followed by transportation to markets in the pilot area (Figure 9) and health problems in households in the control area (Figure 10).

Figure 9. Problems affecting crop production cited by respondents in the pilot area (% of households)

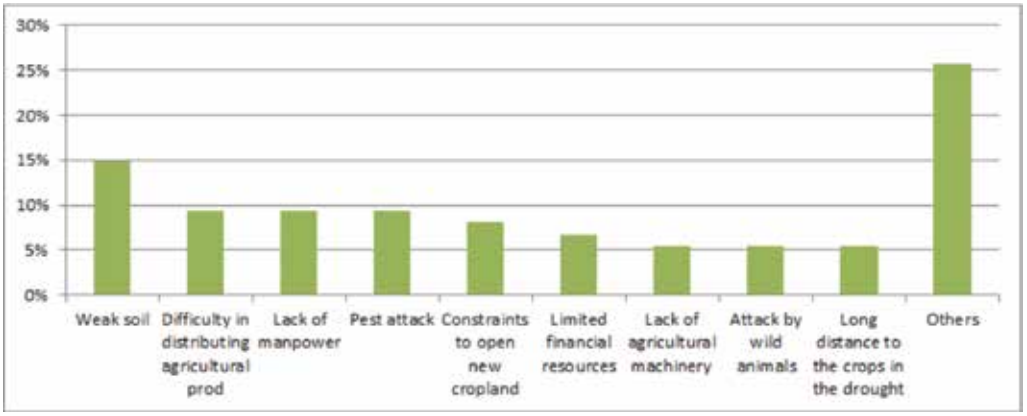
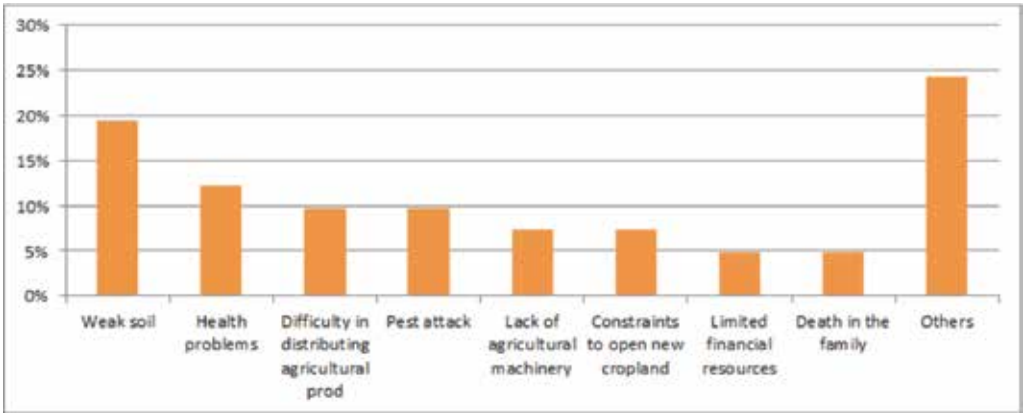


Figure 10. Problems affecting crop production cited by respondents in the control area (% of households)



Although the 'constraints to open new cropland' option was cited by only a small number of respondents (six in the pilot area and three in the control area), when asked specifically about their degree of dependence on opening new areas for agriculture, only 33 per cent of respondents from the pilot area considered themselves 'not dependent at all' (Table 14). This could indicate one of two things: either it attests to the ability of local people to manage their agricultural lands without having to open new areas, or else they are not dependent on land use activities. However, the latter possibility is contradicted by the results presented in Table 6, which shows that agriculture is a mainstay of communities. Adding up the 'quite dependent' and 'very dependent' categories reveals that almost half of households are dependent on clearing new areas.

Table 14. Dependence on clearing new areas to increase crop production (% of households)

	Not dependent at all	A bit dependent	Quite dependent	Very dependent
Pilot	33%	22%	22%	24%
Control	38%	14%	6%	42%

2.2. Livestock production for the past 12 months

Livestock production is in an incipient stage within the pilot area. Poultry is the first type of livestock to spread and most production appears to be geared towards home consumption rather than sale (see table 15). A total of 61 families (41 per cent of total) have at least one poultry animal, and some have up to 200 animals, representing an average of 22.8 animals per family. In terms of selling, only 10 families (7 per cent) reported selling an animal in the previous year, with an average rate of 22.6 animals (varying from 2 up to 150) sold per family in the last year.

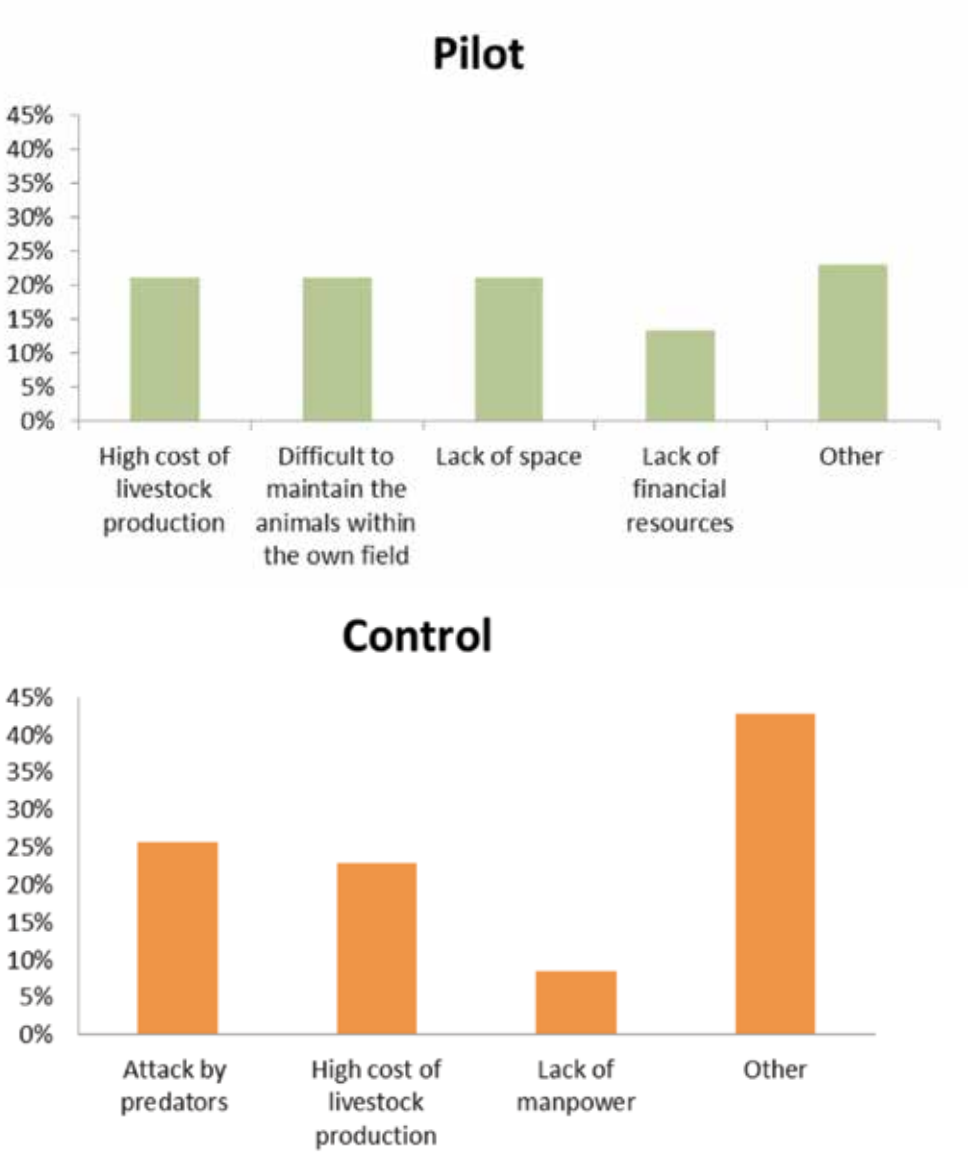
Table 15. Livestock and associated products produced by interviewed families during the last 12 months in the pilot area

Livestock	Product	Families who have sold	Total amount sold (incl. barter)	Families who own for household use	Total amount owned
Cattle	Live animal	2	31 animals	6	43 animals
	Dung	0	0	2	750 kg
Sheep	Live animal	0	0	1	16 animals
Buffalo	Live animal	0	0	1	1 animal
Pig	Live animal	4	27 animals	12	59 animals
	Meat	1	100 kg	2	40 kg
Poultry	Live animal	10	226 animals	61	1396 animals
	Egg	0	0	8	692 kg
	Meat	0	0	6	214 kg

Despite low livestock production, only 35 per cent of the families in the pilot area reported difficulties that reduce their production of livestock. This may point to a low interest in and need of livestock for families' livelihood and income generation. However, in the control area, 70 per cent of the families interviewed said they had difficulties raising livestock.

The families in both areas who faced difficulties were asked what was the most limiting factor. The graphs below show the main problems faced in both areas (Figure 11).

Figure 11. Most important problem limiting livestock production in pilot and control areas (% of households)



2.3. Forest resource use

The next part of the survey examined access to forests and use of forest resources. The distance to forested areas used by households was not cited as a difficulty in either the pilot or the control areas. More than 80 per cent of the interviewees could walk to the forested areas that they usually use in 20 minutes or less (Table 16).

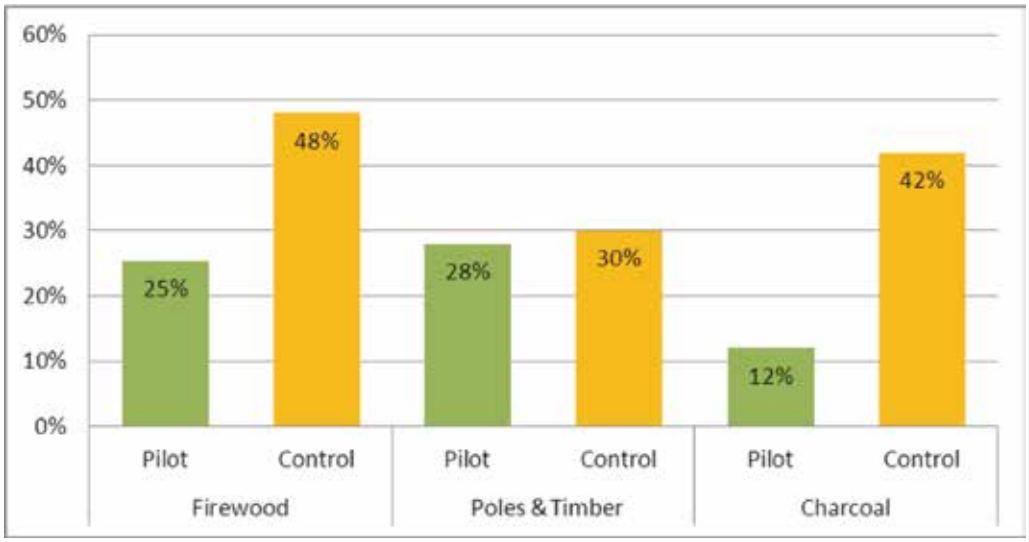
Table 16. Time required to walk from the house to the edge of the nearest forest usually used (% of households)

	Time (minutes)				
	1–10	11–20	21–30	31–40	≥ 41
Pilot	58%	19%	6%	1%	15%
Control	69%	10%	8%	2%	10%

In the pilot area, the most important use of the wood collected is for timber and poles (28 per cent of the households interviewed collect it for this use) followed by firewood (25 per cent) and charcoal production third (12 per cent). In the control area, the situation is quite different. The proportion of families collecting wood for fuel is considerably higher at 48 per cent. Charcoal appears as the second most common use (42 per cent), and timber and poles as the third (30 per cent; Figure 12).

It is interesting that, besides the difference in usage patterns, the control area has higher percentages of families collecting wood for all three purposes, compared with the pilot area; indeed, the most common use of wood in the pilot area was less prevalent than the least common use in the control area. This shows greater dependence on use of the forest in the control area.

Figure 12. Most common purposes for collecting wood in pilot and control areas (% of households)



Although there is a high proportion of households harvesting timber for firewood and charcoal, especially in the control area, we found that wood for these purposes is less often harvested from primary forest, compared with harvesting patterns for production of poles and timber (Table 17). Of the households collecting wood for poles and timber, 88 per cent in the pilot area and 93 per cent in the control area harvest from primary forests. Table 17 also presents the portions of wood that are sold or used to meet the household's own needs. Use of wood for firewood and charcoal, the primary purposes in the control area, is mainly geared towards households' own consumption. In the pilot area, on the other hand, a greater proportion of wood collected for poles and timber is intended for sale.

Table 17. Wood exploitation in the pilot and control areas

Use of wood	% of wood collection from primary forest		Collection for own use (no. households)		Total collected for own use (kg) (Range, kg)		Collection for sale (no. households)		Total collected for sale (kg) (Range, kg)	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
Firewood	42	17	14	23	251.6 (3–360)	5,786 (1–3,000)	1	0	60 (0-60)	0
Poles and timber	88	93	11	9	3,046 (18–1,404)	9,040 (30–4,000)	21	2	5,792.4 (14.4–1,000)	1,060 (500–560)
Charcoal	56	57	7	21	1,760.4 (9–900)	1,264 (8–312)	2	0	1,500 (350–1,150)	0

In 2008, the State of Amazonas approved a resolution[13] that permits traditional communities to collect wood legally for their own consumption without a license. A license is required to collect wood with the aim of selling it to other communities or regions. The process of obtaining these licenses is expensive and time-consuming, and few communities have benefited yet. None of the areas in question have gone through the licensing process, and the selling of wood in any form – except for handicrafts – is illegal.

Examining the importance of non-timber forest products for households' livelihoods, we found they play a negligible role. Despite the many options provided on the questionnaire, most interviewees did not report collecting any non-forest timber products at all (Table 18).

In total, 13 per cent of families in the pilot area and 32 per cent in the control area reported selling some of the products listed above. Table 19 presents the contribution of these sales to monthly income, considering only those respondents who indicated selling any NTFPs.

Table 18. Importance of NTFPs for household's livelihood (% of households)

	Do not collect		Somewhat important		Important		Very important	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
Fodder (collected or grazed)	100%	92%	0%	6%	0%	2%	0%	0%
Bamboo	100%	96%	0%	4%	0%	0%	0%	0%
Rattan	99%	84%	1%	8%	0%	4%	1%	4%
Medicinal plants	85%	72%	5%	10%	4%	18%	6%	0%
Wild fruits and leaves	79%	34%	5%	28%	7%	36%	9%	2%
Nuts	85%	46%	6%	20%	4%	34%	5%	0%
Bush meat	85%	32%	11%	34%	1%	24%	3%	10%
Mushrooms	99%	98%	1%	0%	0%	2%	0%	0%

In total, 13 per cent of families in the pilot area and 32 per cent in the control area reported selling some of the products listed above. Table 19 presents the contribution of these sales to monthly income, considering only those respondents who indicated selling any NTFPs.

Table 19. Monthly income from sale of NTFPs (% of sellers)

	Monthly income (US$)				
	0–100	101–200	201–500	501–1000	>1001
Pilot	65%	0%	15%	0%	0%
Control	56%	38%	6%	0%	5%

When asked about their satisfaction with forest management, 75 per cent of families in the pilot area and 88 per cent in the control area said they are 'very satisfied' with how their community's forests are managed. In the pilot area, 12 per cent did not know how to answer this question and only 11 per cent were very dissatisfied or somewhat dissatisfied; in the control area the rate of dissatisfaction was also low (Table 20).

Fifty-one per cent of those interviewed from the pilot area and 70 per cent from the control area had planted trees over the last five years. Those who planted reported that the trees were mainly for their own use, although commercial use was also often cited in the control area (Table 21).

13. Resolution no. 3, 29 October 2008.

When interviewees were asked about the clearing of new forest areas, the results differed considerably between the pilot and control areas. Whereas 78 per cent of the control area's households indicated that they had cleared at least 'some' forest in the last five years, only 29 per cent from the pilot area responded that they had done so. Table 22 presents the average size of cleared forest areas in the last five years, per household, per year.

Table 20. Responses to the question 'How satisfied are you with how the forests of your community are managed?' (% of households)

	Very dissatisfied	Somewhat dissatisfied	Somewhat satisfied	Very satisfied	No response
Pilot	5%	7%	1%	75%	12%
Control	4%	8%	0%	88%	0%

Table 21. Reasons for planting trees in the last five years (% of tree-planting households)

Purpose	Pilot	Control
For own use	91%	94%
For commercial use	22%	66%
Carbon sequestration	6%	20%
Other environmental services	6%	17%

Table 22. Areas of forest cleared in the last five years (% of households)

	Average area cleared (hectares/year/household)			
	0–1	1.1–2	2.1–3	3.1–4
Pilot	79.5%	11.5%	4.5%	4.5%
Control	67.5%	27.5%	2.5%	2.5%

For the majority of households in both pilot and control areas, the forest cleared does not exceed one hectare per year per household. In addition, in both areas the land use change was primarily for cropping, as reported by 98 per cent of households in each area (Table 23). The difference between pilot and control areas concerns the type of forest cleared: in the pilot area, 64 per cent of households have cleared primary forest, whereas in the control area, households have opened areas of secondary forest to expand cultivation (Table 23). It will be interesting to evaluate the changes in people's behaviour after three years of BF implementation and assess the extent to which communities have assumed a commitment not to deforest areas of primary forest.

Table 23. Most common uses for clearings, and types of forest cleared in the last five years

	Most common use for clearings/pilot and control areas				
	What was the cleared forest (land) used for?			What type of forest did you clear?	
	Cropping	Tree plantation	Other	Primary	Secondary
Pilot	98%	7%	0%	64%*	10%
Control	98%	36%	3%	0%	87%

*Cleared area for cropping.

The questionnaire also addressed one other land use category: previously cleared areas that in the last five years have been fallow or been left to natural re-vegetation. Sixty per cent of families in the pilot area and 72 per cent in the control area said that they have abandoned some area in the last five years.

Families in general had not received cash, in-kind payment or any other type of reward related to environmental services over the past 12 months, with the exception of some families (seven per cent in the pilot area and four per cent in the control area) who reported income from tourism between 2009 and 2010. Among the families who received tourism income, the average amount received per family in one year was US$36.7 in the pilot area and US$13.68 in the control area.

To further explore income generation, we asked about families' monthly income from formal jobs, autonomous businesses and government remittances. It is interesting that the percentage of families receiving remittances is greater than that of families receiving income from paid work (Table 24). To clarify, families receive these remittances not because they live inside protected areas, but rather because they live under conditions of poverty.

Table 24. Income generation through paid work and remittances

	Paid work			Remittances		
	No. households	% of households respondents	Average income (US$/month)	No. households respondents	% of households	Average income (US$/month)
Pilot	86	57%	378.25	97	68%	319.64
Control	25	50%	328.92	34	65%	154.00

The average monthly income per household from paid work was low: 43 per cent of families in the pilot area did not engage in paid work. Also, 45 per cent of families, whose income comes from paid work receive less than Brazil's standard minimum wage (US$320/month). Although many did not have formal jobs, 61 per cent of families with paid but not formal job received state support or remittances amounting to at least the minimum wage in the last year.

Property rights, use rights and management

As mentioned above, all the lands in the pilot and control areas are owned by the state, but the communities themselves manage the areas where they live and use the forest, and the state recognises their right to live there and use these resources, as they had done before the protected areas were designated. In legal terms, the state is supposed to regulate this situation, providing families with a legal document (CDRU) as proof of such recognition. The government is working on this documentation but to date only a few families have received a CDRU.

Despite the lack of formal land use rights, families apparently do not fear being evicted from the area. Moreover, the majority do not seem very concerned about following the rules governing forest access (defined by the law Nº 9.985/200, which establishes the National System of Protected Areas, SNUC, and by the Management Plan when it was already developed for the individual protected areas in consideration of local conditions): 65 per cent in the pilot area said they do not feel bound by restrictions on using forest resources within their lands.

Land tenure is a complex issue in Brazil. There are differences among the communities in how land and land use rights are divided, related to their social organisation. In most of the communities, we found that each family has the right to use a specific plot of forest land for subsistence agriculture and other uses; we termed this type of right 'individual'. In this model of organisation, each family's landholding is defined informally within the community (that is, without legal title in most cases). The second type of land distribution was termed 'community-based forestry management' (CBFM) In CBFM state-owned land is leased to the local population and used in common by the whole community, with no sense of individual land or rights.

For both individual land rights and CBFM, formal regulation of land tenure is incipient. Each family's landholding can be assigned a title that legitimises the use of the land, called a Grant of Real Right Usage (CDRU), giving the right to housing and use of resources as use plan. The land still under state domain and CDRU can either have a predetermined expiration date, or the expiration can be indeterminate. This, however, does not secure property rights, as the land cannot be sold and transfer can only occur through inheritance. Although most families in the areas studied do not have a title to land, there is defined 'zoning' in the villages establishing use boundaries for each family. In the pilot area, all land is state-owned and leased to communities, whereas 16 per cent of the land in the control area is under CBFM.

An 'individual' model of land rights was identified by all households in the control area and 84 per cent in the pilot area; the other 16 per cent of households in the pilot area were in indigenous communities practicing CBFM. As only 16 per cent of the pilot area and none of the control area is characterised by CBFM, the rest of this section deals with answers from only those households reporting individual use rights.

Different levels of satisfaction with the government rules for forest use are fairly evenly distributed (Table 25). This, together with the high frequency of 'no response', may show a lack of clarity concerning rights and restrictions on forest access and management.

Table 25. Satisfaction with state-established rules for forest management and use

	Very dissatisfied	Somewhat dissatisfied	Somewhat satisfied	Very satisfied	No response
Pilot	7%	15%	27%	31%	19%
Control	16%	32%	32%	20%	0%

Those who expressed satisfaction or dissatisfaction were questioned further about their reasons. Table 26 presents results from those who said they are 'very dissatisfied' or 'somewhat dissatisfied' with state rules, and Table 27 presents the answers of those who said they are very or somewhat satisfied.

Two important issues for these households are lack of involvement and participation in the process of making rules, and the feeling that their interests are not taken into account. Unclear boundaries and unequal distribution of benefits are also frequently cited as reasons for dissatisfaction in the pilot area.

Table 26. Reasons for dissatisfaction with state rules on forest use and management (% of 'very dissatisfied' and 'somewhat dissatisfied' households)

	Disagree		Disagree somewhat		Agree somewhat		Agree	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
My/our interests are not taken into account	5.9%	0%	0%	4%	20.6%	12%	73.5%	84%
No setting limits/outsiders are intruding	24%	38.1%	3%	9.5%	9%	28.6%	64%	23.8%
Unequal distribution of use and benefits	24%	12%	6%	4%	6%	36%	64%	48%
Limits on access to resources are too strong	13%	0%	7%	16%	7%	48%	73%	36%
Rules are not followed	20%	21%	10%	38%	17%	33%	53%	8%
The local community is not involved enough in making rules	10%	12%	10%	12%	21%	20%	59%	56%
Conflict resolution mechanisms are inappropriate	31%	10%	4%	19%	15%	43%	50%	29%
Enforcement of rules/sanctions is too weak	48%	46%	7%	25%	11%	21%	33%	8%
Creates opportunities for corruption	35%	21%	8%	8%	8%	25%	50%	46%
Bad management/lack of coordination	22%	9%	7%	9%	7%	30%	63%	52%

Table 27. Reasons for satisfaction with state rules on forest use and management (% of 'very satisfied' and 'somewhat satisfied' households)

	Disagree		Disagree somewhat		Agree somewhat		Agree	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
My/our interests are well taken into account	16%	8%	2%	8%	13%	52%	70%	32%
Setting limits/outsiders are kept out	5%	8%	2%	0%	7%	12%	87%	80%
Equal distribution of use and benefits	16%	20%	2%	12%	10%	28%	72%	40%
Good access to resources	10%	4%	5%	17%	12%	21%	72%	58%
Rules are followed	16%	12%	14%	12%	7%	44%	64%	32%
The local community is involved in making rules	20%	40%	3%	12%	5%	28%	72%	20%
Conflict resolution mechanisms are appropriate	37%	9%	2%	18%	9%	27%	52%	45%
Proper enforcement of rules/sanctions	34%	17%	4%	25%	7%	29%	55%	29%
Good administration and coordination	53%	48%	6%	4%	8%	20%	33%	28%

It is interesting to note differences in perception on the same subject between the two groups of households. Some of the factors that commonly led to dissatisfaction (Table 26), such as access to resources and distribution of benefits are the same ones that produced satisfaction in the other group (Table 27).

Seventy-eight per cent of households interviewed in the control area and 45 per cent in the pilot area said there have been changes in the state-established rules for forest management and use over the last five years. These changes are felt to different degrees and in different ways, in terms of their impacts on livelihoods (Table 28).

Table 28. Impacts of rule changes on household livelihood (% of households)*

	It has worsened my livelihood a lot	It has worsened my livelihood to some extent	It did not have any effect on my livelihood	It has improved my livelihood to some extent	It has improved my livelihood a lot
Pilot	27%	22%	42%	9%	0%
Control	24%	37%	27%	10%	2%

*"single-choice" format of questions

Perceptions, attitudes and norms concerning resource conservation

As mentioned above, both the pilot and control areas are protected areas managed by the state of Amazonas and have specific rules concerning land use rights and use of forest resources. When asked their feelings about the implementation of the protected area, respondents generally expressed support, although at low rates in the control area (Table 29).

Table 29. Opinions on protection of forests (% of households)

	Against	Somewhat against	Somewhat supportive	Supportive
Pilot	6%	5%	29%	60%
Control	18%	12%	37%	33%

We sought the reasons for these opinions from respondents who viewed the protected area positively ('somewhat supportive' and 'supportive'; 89 per cent in the pilot area and 70 per cent in the control area) or negatively ('against' or 'somewhat against'; 11 per cent in the pilot area and 30 per cent in the control area). Tables 30 and 31 show the answers of those supportive of or against protection, respectively.

Table 30. Reasons for supporting the protected area (% of 'somewhat supportive' and 'supportive' households)

Reason	Disagree		Disagree somewhat		Agree somewhat		Agree	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
Protection is important	2%	0%	0%	0%	4%	15%	94%	85%
Protection increases long-term access to forest resources	3%	0%	3%	0%	6%	12%	89%	88%
Receive compensation for reduced use	36%	85%	3%	6%	7%	0%	55%	9%
Secures access to income from tourists	15%	35%	3%	15%	10%	15%	73%	35%

Table 31. Reasons for not supporting the protected area (% of 'somewhat against' and 'against' households)

Reason	Agree		Agree somewhat		Disagree somewhat		Disagree	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
It restricts my access to forests	69%	80%	0%	20%	15%	0%	15%	0%
No compensation for losses	83%	93%	0%	0%	17%	0%	0%	7%
No access to benefits from tourists	83%	47%	8%	33%	8%	7%	0%	13%

We asked about conservation measures developed by communities. Such initiatives have been developed in the communities of only 36 per cent of the households interviewed, both in the pilot and control areas. The most commonly cited measure in both areas was controlling the harvest of forest products (Table 32).

Table 32. Locally developed forest conservation measures in pilot and control areas (% of households reporting local conservation initiatives)

Measure taken	Pilot	Control
Controlling harvest of forest products	92%	83%
Limiting farmland in the forest	79%	50%
Protecting some areas in the forest	87%	67%
Placing guards to control illegal use of the forest	88%	39%

Pre-REDD analysis

This section of the questionnaire sought to assess people's knowledge of the relationship between climate change and forest conservation and to explore the attitudes of communities towards a potential REDD project. In the particular case of this research in Brazil, the REDD project is the Bolsa Floresta Programme, which will be implemented in the pilot area as refered in this study.

Even though the areas under study have been legally classified as protected lands, this is not enough to prevent deforestation. Both pilot and control areas, around 70 km and 140 km from Manaus, respectively, suffer small-scale deforestation and forest degradation. Thus there is a clear rationale for implementing a REDD project in addition to demarcating areas as protected, given the lack of law enforcement and of effective forest management practices – as well as the lack of positive incentives, which it is hoped the REDD project will provide.

Among the households surveyed, 37 per cent in the pilot area and 48 per cent in the control area are aware of the role of forests in climate change. Considering the education levels of the interviewed households, this represents fairly high awareness.

When asked if different types of incentives would induce them to stop deforestation or harvesting of wood, most households interviewed in the pilot area answered positively, for all types of incentives presented (Table 33). We note that only six per cent of the households from the pilot area answered 'disagree' to all of the options in Table 33, showing widespread acceptance of incentives.

Table 33. Levels of agreement to stop deforestation and harvesting of wood, given different types of incentives (% of households)*

Type of incentive	Agree		Agree somewhat		Disagree somewhat		Disagree	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
Payments	79%	82%	10%	18%	1%	0%	10%	0%
Increasing job opportunities	82%	70%	7%	26%	1%	0%	9%	4%
Alternative sources of livelihood	75%	56%	10%	38%	3%	4%	12%	2%
Improved social services	83%	68%	5%	26%	4%	2%	9%	4%

*"single-choice" format of questions

Those who would agree with compensation measures (94 per cent in the pilot area and 100 per cent in the control area) were asked what the main factors are that would drive them to accept compensation. The two most common motives cited for accepting incentives to stop deforestation and harvesting of wood were, in both areas, improving community conditions and contributing to forest conservation (Table 34).

Table 34. Reasons why households would accept incentives to stop deforestation and harvesting of wood (% of households who would accept incentives)

Reasons for acceptance	Agree		Agree somewhat		Disagree somewhat		Disagree	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
The incentives will make me equally well off or better off	88%	78%	12%	22%	1%	0%	0%	0%
Forest protection is important	92%	84%	8%	16%	0%	0%	0%	0%
The incentives will improve our environmental conditions	86%	57%	12%	43%	0%	0%	0%	2%
I need more income	87%	80%	9%	18%	1%	2%	3%	0%
The incentives will improve the conditions of our village/community	94%	86%	6%	14%	0%	0%	0%	0%

We also asked about what conservation commitments households would make. Among those who would accept incentives, the vast majority would agree to stop all forms of deforestation and harvesting of wood (Table 35).

Table 35. Agreement to different commitments to stop deforestation and harvesting of wood, if incentives were provided for a specific activity (% of households who would accept incentives)

Commitment in return for incentives	Agree		Agree somewhat		Disagree somewhat		Disagree	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
Stop expansion of farming activity in forests	72%	76%	1%	8%	18%	14%	9%	2%
Reduce wildfires in forest	86%	71%	2%	8%	8%	20%	5%	0%
Stop harvesting fuelwood	87%	67%	1%	6%	6%	27%	6%	0%
Stop harvesting poles/timber	89%	53%	0%	10%	5%	35%	6%	2%
Stop producing charcoal	88%	70%	1%	4%	5%	24%	6%	2%

In addition, households were asked what or who would be the best institution or person to manage an incentive programme against deforestation such as BF. Government officials, village leaders and specially elected village committees were the representatives most frequently cited as good options to manage such a programme (Table 36). It will be interesting to compare responses to this question after three years of the BF programme – which is implemented by an NGO, FAS – to see if there is any change in perceptions.

Table 36. Agreement to different managers for an incentive programme to avoid deforestation and harvesting of wood (% of households)

Proposed manager of incentive programme	Agree		Partially agree/ disagree		Disagree		Don't know	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
Government officials	66%	64%	14%	32%	11%	2%	9%	2%
The village leader(s)	59%	48%	19%	48%	13%	2%	9%	2%
Specially elected village committee	63%	58%	17%	40%	12%	0%	8%	2%
NGOs	58%	36%	16%	34%	13%	14%	13%	16%

Table 37 shows that respondents have favourable expectations regarding the outcomes of an incentive programme to avoid deforestation and harvesting of wood. The vast majority believed that the community's overall income situation would improve and many believed that such a programme would reduce community conflicts and not result in unequal distribution of payments. In response to the possibilities that payments would go only to landowners or that the extent of private lands would increase, interviewees indicated more heterogeneous responses but also higher levels of uncertainty.

Here it is important to highlight that, to obtain benefits from the BF programme, a family must live in the protected area for at least two years. Communities can accept new families into the programme but they usually pass through an acceptance process by those who already live there. After the implementation of BF, we will be able to assess whether there has been an increase or decrease in the number of families within the pilot area. This could perhaps be the main aspect to be analysed in the future, to see both positive and negative impacts of a payment for ecosystem services programme in this region.

Table 37. Expected outcomes of an incentive programme to avoid deforestation and harvesting of wood (% of households)*

Potential outcomes of an incentive programme	Agree		Partially agree/ disagree		Disagree		Don't know	
	Pilot	Control	Pilot	Control	Pilot	Control	Pilot	Control
The overall income situation in the village/ community will be better	75%	88%	8%	10%	0%	0%	17%	2%
It will result in corruption	21%	16%	16%	46%	44%	38%	19%	0%
Unequal distribution of payments	17%	14%	11%	36%	53%	48%	19%	2%
Payments will go only to landholders	24%	16%	11%	66%	41%	14%	24%	4%
There will be fewer conflicts in the village/ community	51%	48%	11%	26%	18%	26%	19%	0%
It will increase privatisation of land	36%	10%	8%	48%	24%	34%	32%	8%

*"single-choice" format of questions

Conclusion

The purpose of this survey was to map the socioeconomic conditions of the local population in the Rio Negro APA and its use of natural resources, providing a baseline against which to measure, in future, the impacts of implementation of the Bolsa Floresta programme on the wellbeing of this population. The main challenge of eliciting valuable information from local communities via an objective questionnaire was addressed by using simple language adapted to the local reality. This required a highly qualified survey team who were familiar with the theme and the study area. While it is important to develop scientific methods for assessment, there is also a need to involve people in the project to secure their cooperation with the survey.

The results pertaining to household structure and livelihoods reflected low levels of education and predominance of agriculture as the main livelihood activity, carried out in small areas (generally <1 ha). Crop production focused mainly on subsistence, with only three crops produced primarily for market. With respect to the level of acceptance and agreement with the implementation of the protected area, the majority of interviewees supported it. The most common reasons for this support were the perceived importance of forests, as well as the belief that protection would contribute to long-term access to forest resources. Among the minority who did not support the protected area, the main reasons cited were that they received no compensation for the reduction of access to forest resources, and no benefits from tourists as a result of conservation.

Nevertheless, both the support and lack of support for the protected area could have positive implications for the REDD project that was about to be implemented. The REDD project could be seen as alleviating the perceived problems of lack of compensation or as reinforcing the perceived benefits of protecting forests. A perception of the importance of forest conservation is crucial to sustain people's involvement and commitment to reducing deforestation. After a period of running the BF programme, a follow-up survey will reveal whether views have changed among those who did not believe that compensation would alleviate the impacts of restrictions. The extent of such changes in perceptions will indicate the degree to which REDD can be considered a success; after all, one of the goals of REDD is to financially compensate forest people for their efforts to protect the forest.

Although respondents seem relatively positive towards the idea of protected forest areas, they appear less positive when asked specifically about the rules established by the state for forest management and use. This could indicate that people do not completely understand these rules or are confused about what the rules actually are. Although a management plan for the protected area was supposed to be developed, it has never been completed, and the rules have never been clearly specified for residents of these areas.

This lack of knowledge was reflected in the reasons interviewees gave for supporting or not supporting the rules set out by the state. It was notable that two important issues were the lack of community involvement and participation in the process of making rules, and the feeling that their interests are not taken into account. Unclear boundaries and unequal distribution of benefits were also frequently cited. It is interesting to note that some of the more common reasons for dissatisfaction, including the access to resources and distribution of benefits, are the same factors that led others to feel satisfied. There were also indications that people thought their access had become more restricted as a consequence of the establishment of protected areas.

The majority of respondents were positive towards a programme that would provide incentives to stop deforestation and wood harvesting. Only a small proportion did not believe that such a programme would generate benefits and most of these respondents were highly dependent on the forest for their livelihood and could experience restrictions under the programme. A high proportion of households perceive an incentive programme as beneficial, indicating willingness for commitment to zero deforestation within their forest areas in exchange for the incentives provided by the programme.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