

The Carbon Credit Market In Amazonas As An Instrument For Change In Riverside Communities.

Markilze Alves Pereira; Paola Souto Campos

Institute Of Technology And Education Galileo Da Amazônia-Manaus-AM, Brazil

E-Mail: Kilze.Pereira@Hotmail.Com

Institute Of Technology And Education Galileo Da Amazônia-Manaus-AM, Brazil

Abstract:

Background: Various initiatives have emerged with the aim of reducing greenhouse gas emissions and among them is the commercialization of carbon credits. In this market, companies and institutions can buy carbon credits to offset the pollution they cause. These credits are sold by those who sequester or produce gases in the atmosphere within pre-established rules or on a voluntary basis. Brazil, especially the Amazon, has great potential in this market due to the amount of forest areas. Amazonas, in turn, with 97% of its native forest intact, has a great chance of becoming a benchmark in the adoption of practices and projects that generate carbon and in their commercialization. As far as the sale of credits is concerned, the big problem is that a lot is discussed, but few initiatives come to fruition while entire communities working in environmental conservation are in the dark, without electricity, a basic and essential need today. In this context, the main objective of this study is to analyze a way of investing funds from the carbon credit market, so that it can be a tool for change in riverside communities where there is no electricity.

Materials and Methods: Through observational research in the communities chosen for this research and a review of bibliographic material, the aim is to prove that this is an efficient way of compensating the main actor in the fight for the standing forest: those who live in it. The Sustainable Development Reserve chosen for this approach was the Rio Negro, located near Manaus, which has areas of mature forest with significant carbon stocks and can result in improvements in quality of life.

Results: It is too early to say that REDD+ projects are, in fact, a mechanism to stop climate change. A lot of evidence is still needed to affirm that the commercialization of the carbon stored in the Rio Negro Sustainable Development Reserve will change the quality of life of those who live there. Furthermore, it is clear that there is a need to consult the communities, to present details of what is intended to be done and this includes obtaining the agreement of the populations living in the granted areas on the implementation of REDD+ projects. On the other hand, another important finding is that in the state of Amazonas payment for maintaining the forest standing has been treated as an essential part of climate finance, despite being a major challenge.

Key Word: Carbon credit; energy; sustainable development; compensation; Amazon

Date of Submission: 19-09-2024

Date of Acceptance: 29-09-2024

I. Introduction

The carbon credit market, currently present all over the world, has been an important mechanism created to help nations meet their targets for reducing polluting gases.

Throughout history, Brazil has been present at all the discussions and is undoubtedly one of the countries with the potential to sell carbon credits, as it has huge areas of tropical forest and large areas of rural production. Amazonas, for its part, is the Brazilian state that has 97% of its native forest maintained and is one of the first states in the country to implement a carbon credit sales policy, according to Inpe. [1]

In this context of the carbon credit market, this paper aims to update the status of this mechanism in Amazonas and analyze it as a tool for transformation in the riverside communities of the Rio Negro Sustainable Development Reserves (RSS), where the electricity service has not yet arrived, but despite this, the communities are dedicated to forest conservation activities. How can the sale of carbon credits improve the quality of life of river dwellers in communities where there is no electricity? Is it possible to have a renewable energy system? That's what this research aims to answer.

While the world is discussing renewable energy generation and cutting-edge technologies, entire communities are still searching for their first light, especially in the Legal Amazon, which, in addition to the states of the Northern region, also includes Mato Grosso and Maranhão. In the region, around 1 million people still live in the dark or resort to unsustainable sources of electricity for a maximum of 3 hours a day, according to a report by the Institute for Energy and the Environment [2].

One way to solve this problem would be the Jurisdictional REDD+ Program, which creates and defines mechanisms for selling carbon credits. The Program was implemented in 2023 and this year proposals were approved to generate R\$3.3 billion in new carbon credits in Amazonas. The winning companies will build projects related to the recovery and conservation of protected areas, in order to boost community empowerment and sustainability. All of this will be done together with the residents, who will be included in the stages of this action plan, as detailed in the public notice issued by the Amazonas Environment Secretariat.

The projects must include activities in areas such as forest restoration, community-based tourism, bioeconomy and incentives for local production chains (pirarucu management, oil extraction, timber and non-timber management, among others). The positive results of reducing deforestation obtained through the initiatives will be transformed into carbon credits, which will be sold by the company that wins the bid. This research set out to analyze a way of implementing improvements in access to electricity in riverside communities in the Rio Negro Sustainable Development Reserve, Amazonas, using the resources acquired through the implementation of REDD+ projects.

This article considers that sustainable development has three indispensable components: economic, social and environmental sustainability, all of which need to be taken into account and harmonized. When one of them is not present, development is not sustainable, according to Goldemberg [3]. Therefore, there is no way to guarantee sustainable development in communities where the people who work to keep the forest standing face basic difficulties such as a lack of electricity.

II. Material And Methods

This research required six months of work, starting with the collection and analysis of bibliographic and documentary data and then a visit to the communities so that it would be possible to analyze a way of implementing improvements in access to electricity, using resources from the sale of carbon stored in the region and analyzing the Payment for Environmental Services policy implemented in the state of Amazonas, as well as the mixed REDD+ mechanism set up to attract private investment within Conservation Units.

Study Design: The inductive method was used to gain a practical understanding of the impacts of the creation of the reserve on the Tiririca, Marajá and Santo Antônio communities, as well as the implementation of the Mixed REDD+ System.

Study Location: The Rio Negro Sustainable Development Reserve, chosen for this research, was created in 2008 by law 3.355, has a total area of 103,086 and covers the municipalities of Manacapuru, Iranduba and Novo Airão, in Amazonas. It can be accessed by river via the Rio Negro, from Novo Airão or Manaus, or by road. The communities chosen for this research were Santo Antônio, Tiririca and Marajá, in the municipality of Novo Airão. The choice was based on the fact that these three communities do not have access to electricity and are within a conservation unit.

Subjects & selection method: the following instruments were used for data collection and subsequent analysis: bibliographical research, documentary research in view of the consultation of the reserve's creation and regulation documents, collection of information on video and websites, as well as observational research during visits to the communities.

Procedure methodology

Authors specialized in climate change, the carbon credit and energy market and documents from the Amazonas State Government were consulted, as well as scientific articles already published on the subject. Subsequently, it was decided to apply the inductive method, considering observational research, and for this it was necessary to do fieldwork. To get to the chosen region, it was a 2.5-hour drive from Manaus to Novo Airão, followed by another 30 minutes in a 115hp motorboat to the first community, Tiririca, on the other side of the river, and another 30 minutes to the community of Santo Antônio. Finally, the community of Marajá, 45 minutes upriver from Novo Airão.

The visit to the communities lasted two days and was accompanied and authorized by the Amazonas Department of the Environment, which is responsible for managing the Conservation Unit, by the associations of each community, as well as the photographic records.

Methodological and ethical issues were observed during the research. There was no need to apply a questionnaire or interview community members. The aim of this observational method was to get to know the reality of the electricity issue. The other data collected for this research was taken from documents and bibliographies, as already mentioned.

We looked at issues such as: the routine of residents in relation to the use of electricity, the use of diesel generators, the use of lamps at night, the difficulty of obtaining drinking water and the maintenance of forest areas.

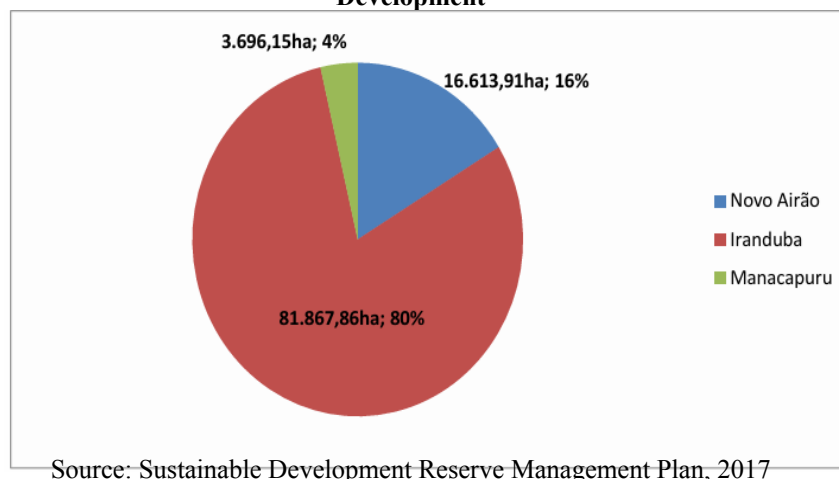
Statistical analysis

After collecting the observational data in the communities, all the material was read and organized, where all the main information was compiled. The data collected was tabulated in Microsoft Excel spreadsheets, where it was possible to make a graphical comparison between the communities. Subsequently, a descriptive analysis was carried out using graphs and photos of the communities studied, in an attempt to establish an understanding and greater knowledge of the proposed objective.

III. Result And Discussion

In all, 19 communities are distributed in the area covering the municipalities of Manacapuru, Iranduba and Novo Airão, in Amazonas, as shown in Graph 1. Most of the communities are concentrated in Iranduba, the municipality closest to the capital Manaus.

Graph 1 - Distribution Of Communities In The Municipalities That Make Up The Rio Negro Sustainable Development



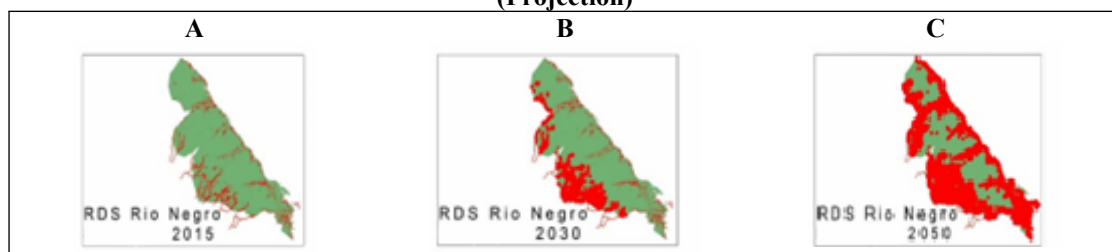
According to the management plan, access was mainly by river using boats (voadeira or recreational type), departing from the capital Manaus at the São Raimundo or Manaus Moderna port in the direction of the municipality of Novo Airão via the Rio Negro until the Rio Negro bridge was built. Previously, speedboats and ferries were the most common means of transportation, leaving Manaus on Sundays and Thursdays and arriving on Wednesdays and Fridays. The estimated travel time from Manaus to cover the entire Sustainable Development Reserve is 6 hours by rowboat, 3 hours by motorboat with a 40 hp engine and 1 hour and 30 minutes by 115 hp engine [4].

Currently, with access facilitated by the bridge over the Rio Negro, it takes 20 minutes by car to reach the reserve areas in Iranduba. It takes about 1 hour to get to Manacapuru and 2 hours to get to Novo Airão by road.

According to the management plan for the Rio Negro Sustainable Development Reserve, the main drivers of deforestation are scattered along the unit's branches, with real estate speculation and activities advancing into the forest areas.

Between 2010 and 2014, the rates in the branches remained constant (average 4.8%) and with high incidences of deforestation (average 218ha per year), with an approximate increase of 4% in 2015 and 34% in 2016. As a whole, the opening of branches was responsible for 4.3% of the deforestation observed in the PA [5].

Figure 1: a) Deforestation in 2015; b) Deforestation in 2030 (Projection); c) Deforestation in 2050 (Projection)



Source: Sema, 2016

The maps above show the deforestation situation in 2015 in the areas of influence of the ramais and make a projection for 2030 and 2050: if no investment is made and if communities are not strengthened, the risk of deforestation increasing is clear.

Compared to the ramais, the communities showed low rates of deforestation per year. This is equivalent to 1.6% of the total deforestation in the Rio Negro Sustainable Development Reserve up to 2016, which shows that the conservation work carried out within the communities is, in turn, effective, to the detriment of the branch areas where there are no conservation actions or monitoring.

Conservation work within the Sustainable Development Reserve has been productive to the point of being one of the areas with the greatest amount of carbon stored over the years. Future Carbon estimates that the Rio Negro Sustainable Development Reserve has approximately 1,134,585 tCO_e. If this stock was sold at an average price of USD 10, the carbon credit, which is equivalent to one ton, would result in around USD 11,345.85.

In the Santo Antônio, Marajá and Tiririca communities, if it weren't for community-based tourism there would be no source of income. Many of the families depend on the visits of tourists staying in hotels in Novo Airão to earn an income and make ends meet, as was observed during a visit to the communities.

Community members work as guides, canoeists, cooks, chambermaids and artisans. Community tourism reconciles the needs of tourists with those of the community. In the case of the Marajá and Santo Antônio communities, [6] points out that the community can solve many of its problems without interference from others, as long as it is given the tools to transform them.

The communities of Marajá, Santo Antônio and Tiririca, which are the subject of this research, are not yet part of the Light for All program. They depend on community generators that are turned on for three to four hours at night and run on diesel oil, while there are still residents who use lamps or candles.

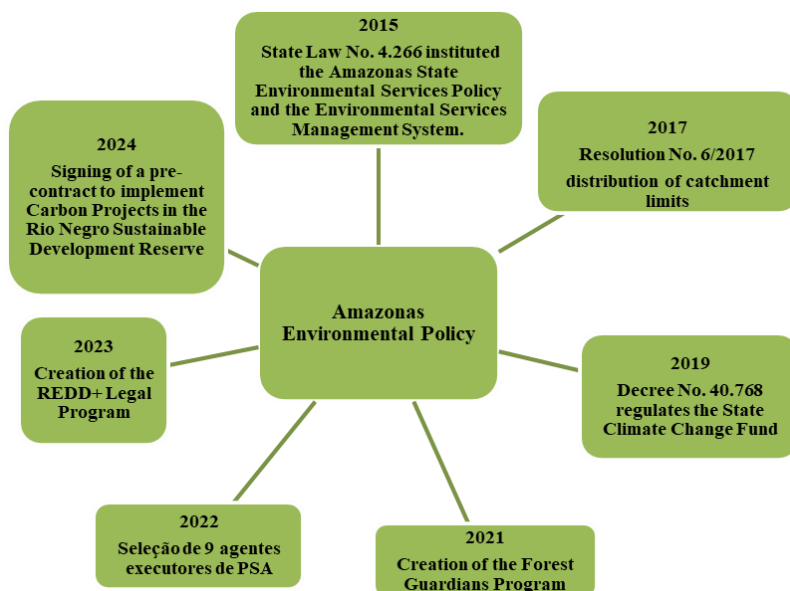
During a visit to the three communities of Tiririca, Marajá and Santo Antônio, it was possible to see that the residents depend on energy generated from diesel oil during the night, for only 3 hours on average, and the absence of this service hinders handicraft activities, community-based tourism and domestic activities.

Amazonas Environmental Policy

The economic, social and environmental development policy of the last decade shows that the government of Amazonas has worked to build a legal framework aimed at enabling, for example, the implementation of the carbon credit market, the exploitation of sodium chloride and natural gas. At the same time, it has strengthened mechanisms such as PES - Payment for Environmental Services - and the bioeconomy in the state. Flowchart 1 summarizes the chronology of Amazonas' environmental policy.

In order to understand how Amazonas arrived at 2024 with a carbon trading program, it is necessary to take a chronological look at the legislation. Initially, State Law No. 4.266/2015 instituted the Amazonas State Environmental Services Policy and the Environmental Services Management System on December 1, 2015. One of its objectives is to protect and conserve natural environments, enabling the maintenance of environmental services while promoting the socio-economic development of human populations in the Amazon and the well-being of the general population [7].

Flowchart 1- Chronological evolution of environmental policy in Amazonas



Source: author, 2024

Amazonas became the first state in Brazil to have a mixed REDD+ system, which means that it has made a legal mix. There is both a Jurisdictional REDD+ System, focused on the commercialization of historical credits from the results of reduced deforestation between 2006 and 2015, and a System for implementing private REDD+ projects in Conservation Unit (UC) areas.

The Amazonas government expects the REDD+ projects to generate more than 28.5 tons of carbon credits over 30 years, with the prospect of raising more than R\$3.3 billion from the sale of the assets. Adding up all 21 proposals received by the state, the amount could reach 163 million tons of carbon generated and more than R\$8 billion in estimated gross revenue, according to SEMA.

In addition to initiating REDD+ projects in PAs, the next steps are aimed at expanding negotiations and raising funds already generated and financing actions such as reducing deforestation; as well as implementing the Amazonas 2030 Program in collaboration with society organizations, municipalities and the private sector.

The Amazonas government hopes that the sale of the credits will improve the quality of life of the communities in social terms, for example, with access to sustainable energy.

IV. Conclusion

The lack of access to electricity in communities where the Light for All program has not yet arrived is a significant barrier to local development and improved quality of life. Installing electricity in these regions would not only diversify economic and social activities, making health centers and evening events possible, but would also represent an essential step towards guaranteeing dignity to families who have long become accustomed to darkness. Investing in electricity in these communities is therefore a matter of social justice and promoting human development.

Although it is still too early to categorically state that REDD+ projects are the definitive solution to climate change, or that the commercialization of the carbon stored in the Rio Negro Sustainable Development Reserve will bring significant changes to the quality of life of the residents, it is undeniable that the absence of investment and the lack of implementation of initiatives jeopardize any possibility of progress towards sustainable development. A joint effort by governments, organizations and local communities is therefore needed if these mechanisms are to reach their potential, promoting both environmental conservation and social well-being.

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