

Mendubim Project Environmental and Social Impact Assessment

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1 - PRESENTATION

This report presents the social and environmental assessment of the Mendubim Photovoltaic Complex (UFV Mendubim), object of analysis for investment by Scatec and its partners.

The project is already at an advanced stage of development and, therefore, the objective of this work is to identify any non-compliances in the work done so far that may represent a significant risk to the project from an environmental or social point of view.

The work was divided into 2 phases. Phase 1 has as its deliverables a Preliminary Environmental and Social Risk Analysis (presented in Chapter 8 with the Action Plan) and a Site Visit Plan (**Appendix 2**).

The deliverables of phase 2 are this Environmental and Social Impact Assessment Report, which provides a description of the project's environmental and social risks and impacts, as well as recommended mitigation measures related to the project, the Action Plan (**Chapter 8 - Environmental and Social Action Plan**), and a Preliminary Stakeholder Mapping and Analysis (**Appendix 3**).

The present study was then based on the documentation received (existing permits, licenses, and studies), on the current environmental legislation, and on the field visits carried out.

The study began with the analysis of the permits and environmental studies already issued/prepared for the project, namely: LP (Preliminary License) and LI (Installation License), RAS (Simplified Environmental Report), RDPA (Environmental program Detailing Report), Forest Activity Report, Fauna Management Project, Archeological Research Report, Basic Engineering Project, and Report on Compliance with Constraints. Next, an analysis of the environmental legal aspects of the project was performed (**Chapter 4**). After field visits and analysis of secondary data, a brief diagnosis of the site where the project will be implemented was made (**Chapter 5**), identifying the possible impacts of the project (**Chapter 6**) and the appropriate mitigation measures (**Chapter 7**). And finally, an action plan was developed for the points identified as project risks (**Chapter 8**) based on the International Finance Corporation (IFC) Standards, Equator Principles (EP) and Environmental and Social Impact Assessment (ESIA).

2 - INTRODUCTION

Since the beginning of new industrial processes in the 18th and 19th centuries, the climate has been undergoing harmful changes due to activities with greenhouse gas (GHG) emissions, mainly those with fossil fuel burning and industrial processes, responsible for 65% of GHG emissions (IPCC, 2014). For developed countries, the energy sector accounts for 90% of GHG emissions (UNFCCC, 2021). Thus, the entire world has sought to invest in a transition to a low-carbon economy.

This transition occurs through the use of energy sources and industrial processes with low or no carbon emissions, stimulating the more efficient use of energy resources and renewable energy sources in the primary energy matrix (MME/EPE, 2020), such as the use of photovoltaic radiation as a primary energy source, replacing fossil fuel-based economies (BNDES, 2021).

Studies show that, although photovoltaic energy today represents only 1.7% of the entire national energy matrix, due to its numerous economic and environmental benefits, the photovoltaic systems installed in Brazilian territory have grown considerably (Portal Solar, 2021).

It can be said that solar energy is currently the source with the fastest growing installed capacity in the world (IRENA, 2020), although there is still uncertainty about its long-term development (MME/EPE, 2020). However, it is certain that Brazil has a large supply of this and other renewable energy resources due to its natural conditions throughout its territory, allowing the development of viable photovoltaic projects in different regions (MME/EPE, 2020), as shown in **Figure 1**.

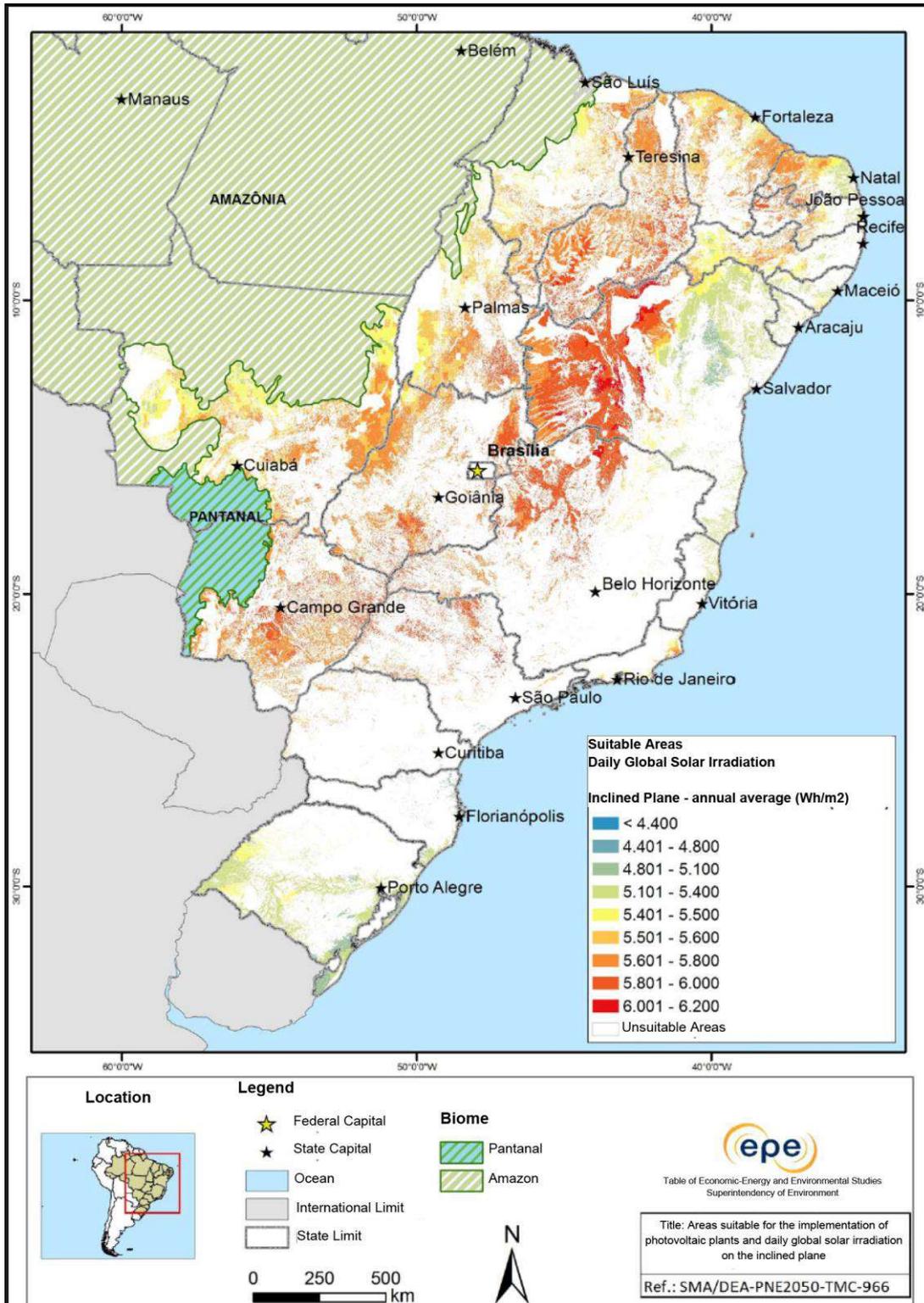


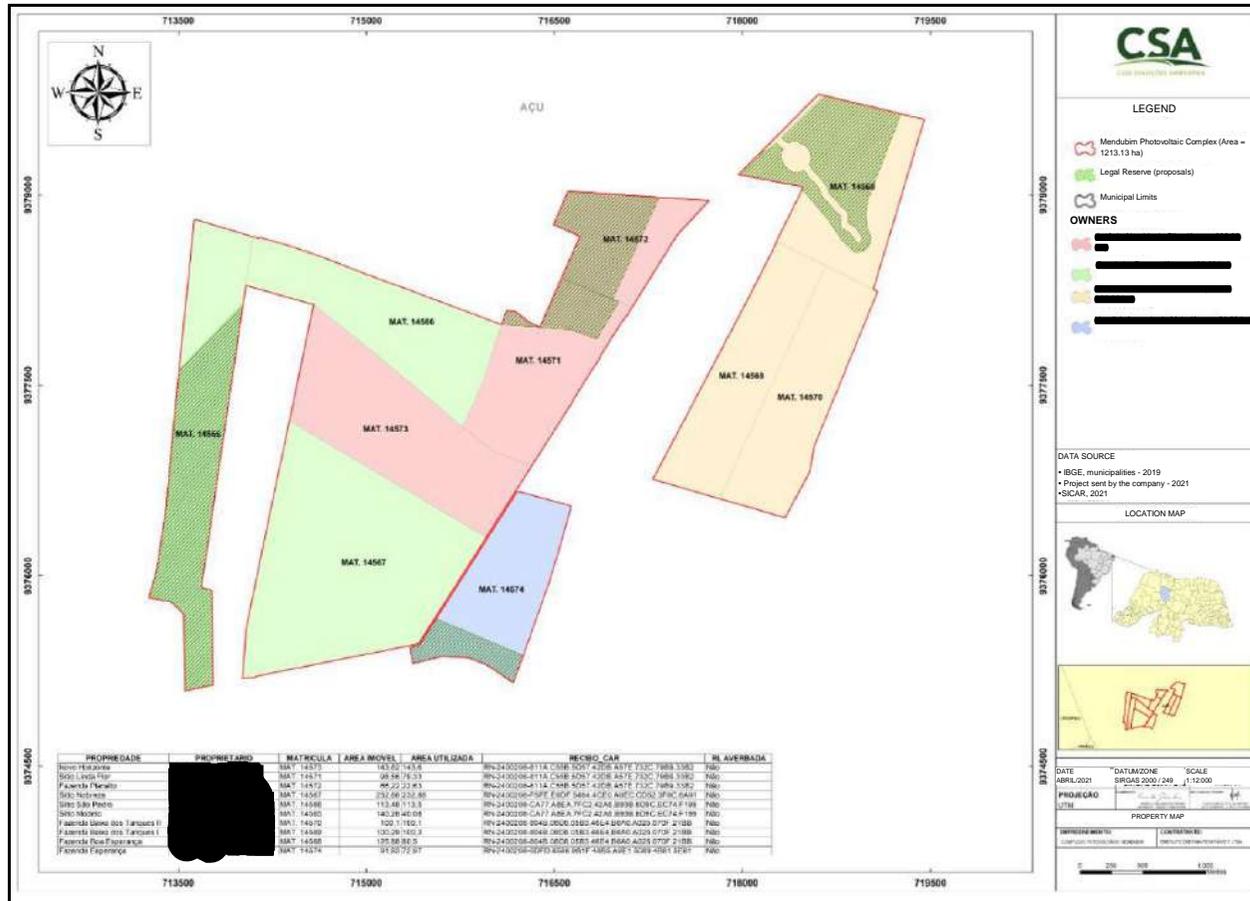
Figure 1 - Areas suitable for the installation of photovoltaic plants.

In addition to the country's natural conditions, solar power plant technology is becoming increasingly competitive in terms of renewable energy generation in the country, becoming important for economic, social and environmental development and diversification of the electricity matrix (SAUAIA and KOLOSZUK, 2020).

Given this scenario of renewable energy development and the long-term potential of the solar market in Brazil, Scatec Solar has been actively participating in the development of solar projects in the country, such as the Mendubim Photovoltaic Complex - UFV Mendubim I - XIII, the object of this work.

3 - PROJECT DESCRIPTION

The Mendubim Photovoltaic Complex consists, in all, of 13 Photovoltaic Plants and is located in the municipality of Açu, in the state of Rio Grande do Norte, according to **Figure 2**.



Source: Taken from CSA, 2021.

Figure 2 - Location map of the leased properties and Legal Reserve for the Mendubim Project.

The site where the Complex will be inserted is formed by 10 properties, according to **Chart 1**.

Chart 1 - Properties used in the implementation of the UFV Mendubim I-XIII

UFV Mendubim	Property Name	Owner	Registration	Total Area (ha)	Anthropized area (ha)	Area with vegetation (ha)	APP (ha)	Legal Reserve Area (ha)
X	Modelo Farm	██████████	14565	140.3	108.47	32.68	0	100.1994
IX, X and XI	São Pedro Farm	██████████	14566	113.5	1.58	112.61	0	
I, II, III and XI	Nobreza Farm	██████████	14567	232.9	69.15	174.18	0	
VII and VIII	Boa Esperança Farm	████████████████████	14568	125.9	124.99	1.67	6.58	65.4064
V, VI and VII	Baixa dos Tanques I Farm	████████████████████	14569	100.3	4.06	96.66	0	
V, VI and VII	Baixa dos Tanques II Farm	████████████████████	14570	100.1	1.24	99.68	3.36	
XIII	Linda-Flor Farm	████████████████████	14571	98.6	0	99.17	0	62.7152
XII	Planalto Farm	████████████████████	14572	66.2	0	66.63	0	
III, IX and XI	Novo Horizonte Farm	████████████████████	14573	143.6	5.96	138.56	0	
IV	Fazenda Esperança	████████████████████	14574	91.8	27.29	64.54	9.94	18.86
			TOTAL	1213.2	342.74	886.38	19.88	247.181

SOURCE: Taken from CSA, 2021.

The Mendubim Photovoltaic Complex will have a total of 453 MW of power and will be connected to the System by two single circuit transmission lines with, respectively, 5.6 and 5.3 km of extension. The Complex will also have an Elevating Substation, for a voltage of 230 kV.

4 - ENVIRONMENTAL LEGAL ASPECTS

4.1 - GENERAL COMMENTS AND LEGAL LANDSCAPE

From the environment perspective, under the current Brazilian environmental law, activities that are deemed to be pollutant or potentially pollutant or that use natural resources is subject to environmental licensing before one of the public bodies that comprise the National Environmental System (SISNAMA).

The environmental licensing is conducted at the federal, state or municipal level, depending on the particularities of the activities involved and taking into account the legal and regulatory provisions and the technical rules that apply to the case. Given the Project characteristics, the environmental licensing proceeding will be conducted at the State of Rio Grande do Norte level, according to the division of powers established in the Complementary Federal Law No. 140/2011 and its regulations. The major state regulations applicable are: (i) Complementary State Law n. 272/2004, which establishes the State Environmental Policy; and (ii) Normative Instruction IDEMA/RN No. 01/2018, which regulates the environmental licensing of solar power plants and their associated structures.

In general, the environmental licensing of solar power plants in the state of Rio Grande do Norte follows the standard procedure established at the federal level, based mainly on the three main obligatory licenses: Preliminary License (LP); Installation License (LI) and Operation License (LO).

- 1. Preliminary License.** The preliminary license is granted during the preliminary phase of planning a power plant project and functions to approve its location, attest to the environmental feasibility and set out the basic requirements to be met during the subsequent phases of the project implementation. The requirements established in the preliminary license shall be fulfilled by the developer as a condition for the issuance of the installation license.
- 2. Installation License.** The installation license authorizes the installation of the project according to specifications in the approved plans, programs and designs, including measures of environmental control and conditions.

3. **Operating License.** The operating license authorizes the operation of the activity or project, after effective compliance with all the requirements of the previous licenses and when the environmental control measures and conditions determined for the operation have been satisfied.

Failure to comply with the requirements set forth by the relevant environmental protection agency in environmental licenses may subject the developer to administrative sanctions, including fines, and also civil and criminal liability.

4.2 - APPLICABLE LEGAL FRAMEWORKS

The Brazilian environmental legal system establishes that only one federative entity is responsible for carrying out the licensing procedure of potentially polluting activities. Nevertheless, it is important to consider that regulations issued in different federative levels are also applicable. The main environmental legislation applicable to the Project is presented in Appendix 3.

4.2.1 - Federal Legislation

According to Federal Law No. 6,938/1981, all potential polluting activities are obligated to register under Federal Technical Registry ("CTF") and, depending on the classification of the activity, pay the Federal Environmental Control and Inspection Fee. These obligations are mandatory even if the Project is licensed under State Law.

It is also important to highlight that the federal regulations regarding forestry use and protection, notably the Federal Forestry Code - Federal Law No. 12,651/2012, are applicable due to the vast need of the Project to suppress vegetation and maintenance of Legal Reserves.

4.2.2 - State Legislation

The project is licensed by the State of Rio Grande do Norte. Therefore, all the state regulations regarding the environmental licensing procedure are applicable. In special, we can highlight the Complementary State Law n. 272/2004, which establishes the State Environmental Policy and Normative Instruction IDEMA/RN No. 01/2018, which regulates the environmental licensing of solar power plants and their associated structures.

4.2.3 - Municipal Legislation

Although the Municipality of Açú/RN has its local environmental regulations, there are no specific provisions which impact the Project due to the division of competencies established by the legal framework. However, compliance with municipal regulations regarding Land Use and Occupation is verified by the state environmental agency during the environmental licensing procedure.

A declaration attesting the conformity to the rules of land use and occupation of the Municipality of Açú/RN was obtained in Preliminary License phase and was updated in April, 2021 (Appendix 4).

4.3 - LEGAL ENVIRONMENTAL REQUIREMENTS APPLICABLE TO THE PROJECT

Based on the documentation available, we can understand that the environmental licensing of the Project comprises the individual licensing of four structures:

- (i) the Solar Power Plant;
- (ii) the Electricity Substation;
- (iii) the Transmission Line; and
- (iv) the Construction Site.

According to the regulations in force when the procedure had started, each of these structures will undergo a specific environmental licensing. Currently, the transmission line, the electricity substation and the construction site projects are being detailed to support the request for the necessary licenses.

4.3.1 - Solar Power Plant

Due to its technical characteristics, the Solar Power Plant undergoes the standard environmental licensing procedure, which requires the issuance of a Preliminary License, Installation License and Operating License, as established in the Complementary State Law n. 272/2004. Also, as it requires the removal of vegetation, the Developer must obtain a Deforestation License and a Fauna Management Authorization - obligations in the Installation License Phase.

Concerning this structure, we received the Preliminary and Installation Licenses, along with the Simplified Environmental Assessment (as required by the legislation in force at the time). We also received documents that indicate the Fauna Management Authorization and the Deforestation License are being provided. Although the Developer already has the Installation License, no implementation activities can start without these two authorizations.

As a requirement of the Deforestation License, the Developer will have to compensate the vegetation suppressed. According to Complementary Law No. 272/2004, this compensation may be through direct replanting of the same volume or by paying a specific amount calculated based on the suppressed vegetation volume. This last modality is still pending on specific regulation.

The specific terms of this compensation must be formalized through a signed commitment with the environmental agency as established by the CONEMA/RN Resolution No. 03/2011.

As stated in the Simplified Environmental Assessment Report, it was identified an archeological site in the area affected by the project. According to the terms and restrictions of the Installation License, a final approval from IPHAN is required to apply for the Operating License. However, according to the Archeological Assessment, during the specific procedure of the Solar Power Plant conducted before IPHAN, the previously identified archeological site was reassessed and considered a mere archeological occurrence. Consequently, the agency demanded the collection and guardianship of the material. Nevertheless, during the activities of implementation, the Developer must be aware of the potential occurrence of archeological material and proceed accordingly to the plans approved by IPHAN.

The Simplified Environmental Assessment states that there are no near quilombola communities, indigenous communities or nature conservation units.

Table 1 summarizes the list of permits applicable to PV licensing and the timing of application of each one.

Table 1 - List of permits applicable to the PV and the timing of application of each one.

Permit	Timing of Application
Deforestation License (ASV)	To be requested prior to installation activities, concomitantly with the LI. It must be issued prior any kind of intervention is carried out on vegetation.
Fauna Management Authorization	To be requested prior to installation activities, concomitantly with the LI and ASV. It must be issued prior to any kind of intervention is carried out on vegetation.
Final approval from IPHAN	Prior to obtaining the Operating License, the developer must obtain the final approval of IPHAN about the management of the archaeological heritage carried out in the implementation of the project. Besides being part of the normative framework, this obligation is expressed as a condition of the Installation License.
Operating License	To be requested in the final stage of installation activities, prior to operation activities.
Grant of water resource use (just in case of water resource use or effluents disposal into body of water)	This is an autonomous administrative procedure, not included in the scope of environmental licensing. However, if it is necessary to capture water or disposal of effluents into a body of water, the Grant must be issued prior to any intervention in body of water, and may occur in the installation or operation phase or both.

4.3.2 - Electricity Substation

Based on the information provided, the Project comprises the implementation of an Electricity Substation; however, the environmental licensing procedure regarding this structure has not started yet. It is also possible to request the license for the substation jointly with the transmission line¹.

The environmental licensing of an electricity substation will undergo the standard procedure, through the issuance of a Preliminary License, Installation License and Operating License. Currently, the Normative Instruction IDEMA/RN No. 01/2018 regulates the licensing of solar power plants related structures.

¹ It is a matter of workflow of the implementation of the project as a whole. There is a possibility of requesting the joint licensing of the Transmission Line and Substation structures due to the relationship that the structures have and the common practice of licensing transmission systems in Brazil. Nevertheless, in an individual assessment, the Transmission Line could be subject to simplified licensing - depending on its characteristics - and the substation would, in principle, be subject to three-phase licensing. In the event of agglutination of licenses, the most demanding rite between the two for both would follow - the three-phase licensing.

The complexity of the environmental assessment report needed to start the licensing procedure will depend on the specific characteristics of the substation. In general, as established by the regulations, a solar power structure will only be subject to Environmental Impact Assessment (“EIA” as per the Portuguese acronym) if it falls under one of the 13 conditions provided by article no. 4 of Normative Instruction IDEMA/RN No. 01/2018. If not, the environmental agency will demand only a Simplified Environmental Report.

In very specific cases, when the activity did not fall under any of the above-mentioned conditions prescribed by article no. 04 and can be classified as small or micro size, the environmental assessment can be dismissed by the environmental authority.

It is important to mention that if the implementation of the Electricity Substation demands deforestation and fauna management, the specific authorizations obtained for Solar Power Plant will also be needed for this structure. The Developer will also have to compensate the suppression of vegetation under the terms already mentioned above for the Solar Power Plant and regularize the Legal Reserves.

It is important to mention that the initial archeological assessment of the Project Mendubim only cover the Solar Power Plant area. Thus, the Developer will have to complement the studies and address this issue with IPHAN. According to the joint Ministerial Ordinance n. 60/2015, when a project under environmental licensing affects archeological heritage, IPHAN must intervene in the procedure. Therefore, eventual noncompliance in the procedure regarding the chances of impacts to cultural heritage can harm the environmental licensing procedure.

Table 2 summarizes the list of permits applicable to Electricity Substation licensing and the timing of application of each one.

Table 2 - List of permits applicable to the Electricity Substation licensing and the timing of application of each one.

Permit	Timing of Application
Previous License	To be requested in the preliminary planning stage, in order to obtain approval regarding the environmental viability of the activity.
Installation License	To be requested after compliance with the conditions established in the Previous License, prior to installation activities.
Deforestation License	To be requested prior to installation activities, concomitantly with the LI. It must be issued prior to any kind of intervention is carried out on vegetation.

Fauna Management Authorization	<p>To be requested prior to installation activities, concomitantly with the LI and ASV.</p> <p>It must be issued prior to the deforestation and installation activities are carried out.</p>
Operating License	<p>To be requested in the final stage of installation activities, prior to the operation activities.</p>
Anuence from IPHAN	<p>IPHAN will issue a conclusive statement to the environmental agency before each one of the licenses (LP, LI and LO) is issued.</p> <p>Prior to the LP, based on FCA, IPHAN will establish the studies/projects it considers pertinent and, after analyzing them, will issue a conclusive statement pointing out the possibility of proceeding with the environmental licensing or obstacles for which, if possible, it will point out mitigating/compensatory measures.</p> <p>Prior to the LI, IPHAN will analyze the environmental control measures foreseen in the PBA (or equivalent) for protecting the historic-cultural heritage, in light of the applicable rules and what was defined as necessary in the previous phase. IPHAN will issue a conclusive statement pointing out the possibility of proceeding with the environmental licensing or obstacles for which, if possible, it will point out mitigating/compensatory measures.</p> <p>Prior to the LO, IPHAN will analyze the execution of the programs foreseen in the previous phase (if necessary) and will issue a conclusive statement pointing out the possibility of proceeding with the environmental licensing or obstacles for which, if possible, it will point out mitigating/compensatory measures.</p>

4.3.3 - Transmission Line

Considering the regulations currently in force and the characteristics of the Project, the Transmission Line may be subject to a simplified licensing procedure, according to the special regime established in the Normative Instruction IDEMA/RN No. 01/2018 for solar power plants related structures and to the provisions of the Resolution CONEMA/RN No. 02/2014. Therefore, it will only be required the issuance of a Simplified License, which authorizes the localization, installation and operation of the transmission line.

It is important to highlight that the Transmission Line can only be subject to simplified licensing if it does not fall under one of the 13 conditions provided by article no. 4 of Normative Instruction IDEMA/RN No. 01/2018.

As previously exposed for other structures, if the implementation of the Transmission Line demands deforestation and fauna management, the specific authorizations obtained for Solar Power Plant will also be needed for this structure. The Developer will also have to compensate

the suppression of vegetation under the terms already mentioned above for the Solar Power Plant and regularize the Legal Reserves. **Table 3** summarizes the list of permits applicable to Transmission Line licensing and the timing of application of each one.

Table 3 - List of permits applicable to the TL licensing and the timing of application of each one (in case of simplified licensing procedure)

Permit	Timing of Application
Simplified License	A single act. To be requested at the beginning of the licensing process. <i>Note: As a rule, the Simplified License is a single act. However, at the discretion of the developer it may be divided into two stages: (i) Simplified Preliminary License, which approves the conception and location of the enterprise; and (ii) Simplified Installation and Operating License, which approves the installation and operation.</i>
Deforestation License	To be requested before any kind of intervention is carried out. Depending on the progress of the administrative process, it may be requested during the procedure of analysis of the Simplified License or after its issuance.
Fauna Management Authorization	To be requested prior to implementation concomitantly with the LI and ASV. It must be issued prior to deforestation and installation activities are carried out.
Anuence from IPHAN	There is no specific procedure for IPHAN's intervention in cases of single-phase licensing. It is understood that IPHAN must present a conclusive statement before the environmental agency issue the Simplified License. The conclusive statement will result from the analysis of the studies, plans and projects indicated as necessary by IPHAN.

For the Transmission Line, since February 22, 2021 a process is running at IPHAN under the number 01421.000031/2021-13. Based on the FCA assessment, IPHAN classified the Transmission Line as Level III. Subsequently, on March 16, 2021 the Specific Term of Reference n° 12/DIVTEC IPHAN-RN/IPHAN-RN was issued, in which was requested the preparation of the Archaeological Heritage Impact Assessment Project ("PAIPA" as per the Portuguese acronym) and the Archaeological Heritage Impact Assessment Report ("RAIPA" as per the Portuguese acronym).

It is important to mention that the developer has not presented the PAIPA (and the RAIPA) so far, and the last official communication from IPHAN occurred on March 25, 2021, when the agency requested adequacy and resubmission of the georeferenced files (shape file format) previously presented in the FCA.

Therefore, to obtain the anuence from IPHAN the developer must submit the information already requested in the process and wait for the conclusive statement of the agency regarding the non-obstacle for the issuing of the Simplified License.

4.3.4 - Construction Site

According to the regulation in force in the State of Rio Grande do Norte, the environmental licensing of the Construction Site must undergo a specific individual procedure.

The Complementary State Law n. 272/2004 establishes that construction sites must obtain a Special Authorization that will authorize its temporary operation.

The same rules for fauna management, deforestation and archeological assessment described before are applicable to the Construction Site licensing.

Table 4 summarizes the list of permits applicable to Construction Site licensing and the timing of application of each one.

Table 4 - List of permits applicable to the Construction Site licensing and the timing of application of each one.

Permit	Timing of Application
Special Authorization	A single act. To be requested at the beginning of the licensing process.
Deforestation License	To be requested prior to any kind of intervention is carried out. Depending on the progress of the administrative process, it may be requested during the procedure of analysis of the Simplified License or after its issuance.
Fauna Management Authorization	To be requested prior to implementation, concomitantly with the LI and ASV. It must be issued prior to deforestation and installation activities are carried out.
Anuence from IPHAN	There is no specific procedure for IPHAN's intervention in cases of single-phase licensing. It is understood that IPHAN must present a conclusive statement before the environmental agency issue the Simplified License. The conclusive statement will result from the analysis of the studies, plans and projects indicated as necessary by IPHAN.

4.3.5 - Closure Requirements for the Structures

According to the article 53 of the Complementary State Law n. 272/2004, the closure of any activities subject to environmental licensing will have to be informed to the environmental agency. When demanded, the Developer will also need to present a Closure Plan, on which there will be detailed measures for the restoration of the environmental assets.

The Installation License for the Solar Power Plant has already established the obligation to present a Closure Plan.

5 - EXISTING ENVIRONMENTAL AND SOCIAL CONDITIONS

Based on the environmental diagnosis of the areas of influence of the RAS, new analyses were made to determine the environmental conditions of the site where the Mendubim Photovoltaic Complex will be implemented, including field campaigns for the physical, biotic (fauna and flora), and socioeconomic environment.

This chapter presents a critical analysis of the information presented in the previous studies and updates the socio-environmental conditions in the area of the project. Appendix 5 presents the Methodological Aspects used to analyse Existing Environmental and Social Conditions.

5.1 - PHYSICAL ENVIRONMENT

5.1.1 - Results and Discussion

The aspects of the Physical Environment related to the existing environment in the Mendubim Photovoltaic Complex area can be evaluated from the individual analysis of its components, such as geology, geomorphology, soils, water resources, air quality, noise, among others, whose main aspects are described below.

5.1.1.1 - Climate and Weather Conditions

According to the Simplified Environmental Report (RAS) data, the rainfall is concentrated between the months of January and May, with March being the wettest month, with an average of 150 mm, while the months of June through December correspond to the dry period. The study also points out that the project should be installed in the period from August to December, because in this period there are lower precipitation rates and higher temperatures and solar incidence, thus reducing possible accidents from slippery roads and difficulties in the exercise of certain activities.

Additionally, it is important to point out that the rainy season is also critical from the point of view of soil erosion, since the removal of vegetation cover during construction activities can increase rainwater runoff, triggering the development of erosion gullies, even on low slope terrains.

According to the field investigations, the residents reported that the rainy season occurs from the end of March until June, in a period somewhat different from the one presented in the study, and that the rains occur in the form of torrents, with high intensity and short duration. In relation to rainfall, the residents also reported that the region endured 7 straight years without rain in the last decade.

Even with the divergence of the resident's report in relation to the rainy season, it is important to consider the statistical data of precipitation that indicate that the driest period occurs between August and December, more favorable to construction activities associated with interventions in the soil (movement/removal of the vegetation cover). Regarding the report of high intensity and short duration rainfalls, this information should be incorporated into the drainage project for the determination of its correct sizing.

5.1.1.2 - Geology

In the entire intervention area of the project, the RAS verified the occurrence of only one geological unit, the Barreiras Group, which was confirmed by field observations. The field walks carried out showed that the surface coverings associated with the weathering process of the Barreiras Group rocks predominate in the project area, as illustrated in **Figure 3** and **Figure 4**. It is worth mentioning that during the field work, Ecology Brasil's team did not identify any outcrop of the Barreiras Group sandstones in the area of the project.



Figure 3 - Aspect of the surface cover associated with the Barreiras Group. UTM: 716369m E / 9376192m S



Figure 4 - Aspect of the surface cover associated with the Barreiras Group. UTM: 716522m E / 9376186 m S

5.1.1.3 - Paleontology

According to the Simplified Environmental Report, the geological unit that occurs in the area of the project, the Barriers Group, is characterized by the absence of fossils. The Preliminary License (LP), however, requested the presentation of a paleontological diagnosis in conjunction with the presentation of the speleological diagnosis. The Installation License (LI), in turn, did not require the presentation of this study, or the execution of a program.

Because of the low paleontological potential associated with the Barriers Group, it is not expected that there will be an impact of the venture on paleontological heritage. However, it is worth mentioning that to the north of the area of indirect influence (All), there is the Açu Formation, which has associated fossil potential. Due to the mapping scales used in the RAS, it is not possible to specify the contact between the two units, but according to field observations, considering the thickness of the soils/weathering mantle, it is estimated that the activities associated with the installation of the project will not impact paleontological heritage.

5.1.1.4 - Mineral Resources

The Simplified Environmental Report did not present a specific study of mineral resources. However, the Preliminary License (LP) requested the company to present an authorization issued by the DNPM (currently the National Mining Agency - ANM) in the areas of intervention of the project. In response to the constraints, the company informed that no areas of mining processes were identified within the project's area of intervention or its areas of influence.

Complementarily, the company made the request for a mining blocking with ANM, which generated process number 48051.700039/2019-70. Regarding the blocking request, it is important to point out that the ANM is not analyzing blocking requests, as it is reviewing its regulations, in view of its transformation into a Regulatory Agency. Thus, the company must keep track of the status of the process with the ANM to verify compliance with the request to block the areas of the project.

The Installation License (LI), in turn, requested the company to present environmental licenses for the areas used for extraction of materials of mineral origin (sand, clay, etc.). Regarding the topic, it is important to highlight that, besides the environmental licenses for the areas used for the extraction of mineral materials, if the company uses a borrowed area, he will need to apply to the ANM for a mining title waiver.

5.1.1.5 - Geomorphology

According to the data in the RAS, the relief in the area of the project is predominantly flat, with a very gentle slope in the west-east direction, which was confirmed by observations made in the field, as illustrated in **Figure 5** and **Figure 6**.

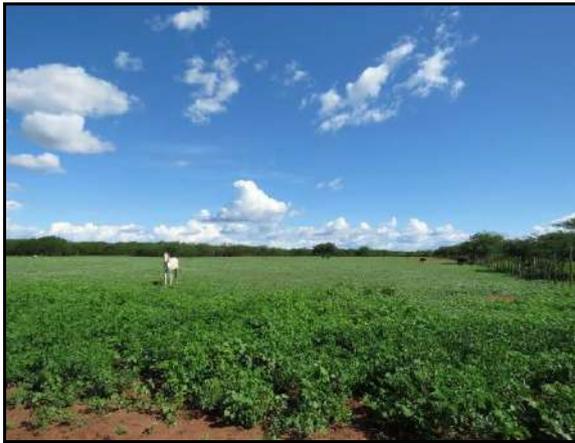


Figure 5 - Aspect of the predominantly flat terrain.
UTM: 716061m E / 9376711m S.



Figure 6 - Aspect of the relief with a gentle slope.
UTM: 714103m E / 9375346m S.

Regarding the geomorphological aspects, it is important to highlight that, despite the low slope of the terrain, the dynamics of sheet runoff, which originates from diffuse rainwater runoff, must be considered in the implementation/operation of the project. With the removal of the vegetation cover, the soil in the area of the development will be susceptible to this dynamic, which will require the developer to correctly size the drainage system to minimize laminar erosion and soil loss.

5.1.1.6 - Speleology

According to the data from the RAS, according to the CECAV database in Rio Grande do Norte, made available on the ICMBIO website, there are no registered natural caves in the areas of influence. The nearest natural cavity is more than 4 km away to the north of the intervention area, known as Gruta dos Pingos.

According to observations made in the field, no speleological feature was identified in the area of the project, corroborating the description made in the simplified environmental report.

Regarding the licensing process, it is important to highlight that Condition 13 of the Preliminary License (LP) requested the presentation of a speleological diagnosis of the project's influence areas, when applying for the Installation License (LI) of the Photovoltaic Complex. In response to this condition, the developer informed that the referred studies are not pertinent to the project in question, since the area is not suitable for cave formation.

5.1.1.7 - Soils

According to the RAS, there is a single soil type in the area of the project, the Red-Yellow Latosol (Figure 7). Field observations, however, identified other soil classes in association with the Red-Yellow Latosol, in smaller proportions, one being sandier (Quartz Neosol - Figure 8) and the other more clayish (Red-Yellow Argissol).



Figure 7 - Red-Yellow Latosol profile. UTM: 717166m E / 9378186m S.



Figure 8 - Quartz Neosol occurrence area. UTM: 718568m E / 9377269m S.

Although the soils in the area of the project have a low susceptibility to the development of erosive processes, it is important that the company adopt intervention measures on the terrain in a planned manner, in association with the implementation of a correctly sized drainage system.

To control the possibility of soil erosion during the implementation of the project, the Installation License (LI) requested the execution of the Program for Identification, Monitoring and Control of Erosive Processes.

5.1.1.8 - Surface Water Resources

According to the RAS data, the project is inserted in the Piranhas/Açu hydrographic basin and in its areas of influence there is no presence of intermittent watercourses and/or water bodies, and few ephemeral drainages have been verified. The RAS Water Resources map, however, illustrates an intermittent channel and ephemeral drainage.

Due to the divergence between the text and the RAS map, the field survey conducted by Ecology Brasil focused on verifying these locations. In the intermittent water course pointed out on the existing map in the RAS, it was possible to verify the presence of only one drainage channel dug by the landowner to drain the rainwater that accumulates on the access road. According to the owner's account, the water drains through the site only during rainfall, ephemerally. Thus, there are no natural drainages or springs at this site (**Figure 9**).

On the other hand, in the place pointed out on the RAS map with the presence of an ephemeral drainage, the presence of this drainage was not identified in the field. According to the owner's reports, there are no waterways, even ephemeral ones. There are only open channels for rainwater drainage (**Figure 10**).



Figure 9 - Artificially excavated drainage channel.
UTM: 718276m E / 9379475m S.



Figure 10 - Site pointed out with ephemeral drainage where there are only open channels for rainwater runoff. UTM: 718596m E/ 9377349m S.

Thus, according to the observations made by the field team, there are no natural intermittent or perennial drainages in the area of the project, which means that the project will not interfere with the Permanent Preservation Area (APP).

5.1.1.9 - Groundwater Resources

Regarding underground water resources, according to the RAS there are a few wells in the areas of influence of the project, especially well ps-0634, which has an average depth of 60 meters, with no static or dynamic level markings.

In research carried out on the Groundwater Information System (SIAGAS), maintained by CPRM (Geological Service of Brazil), it was possible to verify the presence of registered wells in the area of the project. However, the field investigations did not identify the presence of these wells and, according to the residents' report, there are no active wells in the area of the project. The residents also reported that there have already been attempts to dig deep wells in the area of the project development, over 130m, without success.

According to reports, the water used on the project's properties comes from a well located in the Novos Pingos settlement. There are two wells at this location, one with a flow rate of 10,000 l/h that is used for consumption and cultivation, and another to supply water to the properties, with a flow rate of 8,000 l/h. According to the reports of the residents, they are interested in forming a partnership with the developer to supply water to the project.

In the settlement Prof. Mauricio Oliveira, the field survey identified the presence of a well, whose flow rate is not enough to supply the entire community (5,000 l/h). Complementarily, water is collected in cisterns and supplied by pipelines.

Therefore, according to the observations and analysis of the field data, it is important to highlight that the area of the project is not favorable for the opening of tubular wells. Thus, if the project opts to use groundwater, it is important that specific hydrogeological studies be carried out in order to obtain the allocation. These studies must contain, besides the aspects required by the legislation, an evaluation of the influence on other existing wells in the region, which is marked by low water availability.

5.1.1.10 - Air Quality

The Simplified Environmental Report did not present a specific air quality study that evaluated the impacts during the construction and operation stages of the project. However, in the Installation License (LI), there is a requirement that the company must implement methods that result in the elimination and/or maximum reduction of dust particles in the atmosphere, coming from vehicle and machinery traffic, in order not to harm the health and well-being of the employees involved in the work and of the residents of the areas of direct and indirect influence of the project, and drinking water or gravel dust must not be used.

Due to the proximity of the settlement Prof. Mauricio Oliveira in relation to the access that will be used by the project, the emission of particulate material by vehicle circulation is an impact that will deserve the attention of the company regarding the use of mitigation measures.

5.1.1.11 - Noise

The Simplified Environmental Report did not present a specific noise assessment study. However, in the Installation License (LI) there is a requirement that the noise levels generated during the installation of the project must respect the limits recommended by the State Law 6.621/1994, which provides for the control of noise pollution and environmental conditions in the state of Rio Grande do Norte, and other provisions. To this end, the LI requested the execution of the Noise and Vibration Level Monitoring Program.

Due to the proximity of the settlement Prof. Mauricio Oliveira in relation to the access that will be used by the project, the alteration of the sound pressure levels by the circulation of vehicles, vegetal suppression and other constructive activities configures an impact that must be mitigated by the company.

5.1.1.12 - Vibrations

The Simplified Environmental Report did not present a study of vibrations that sought to evaluate the impact caused by vibrations on the buildings and residences located in the Prof. Maurício de Oliveira Settlement Project near the Complex access road during the construction phase of the project. The Installation License (LI), however, requested the execution of the Noise and Vibration Level Monitoring Program.

Due to the proximity of the settlement Prof. Mauricio Oliveira in relation to the access that will be used by the project, the company must pay attention to the possible impacts of vibrations caused by the circulation of heavy vehicles on the residences of the residents, especially the possibility of damage to existing structures in the settlement.

5.2 - FAUNA

5.2.1 - Results and Discussion

In the area of the project we observed areas of vegetation in a good state of conservation, which offer a good number of resources, especially for birds and reptiles, serving for shelter, refuge,

food, and reproduction. The surveys revealed the existence of five species of amphibians and 17 species of reptiles, 65 species of birds, and 18 species of mammals, as presented in Appendix 6 (List of priority species of fauna recorded by primary and secondary data for the Mendubim Photovoltaic Power Plant area of influence). Regarding threatened species, we highlight the record of two species, through secondary data, in the study by ESPERANZA/ECOLOGY BRAZIL (2015) and that may occur in the area of the Mendubim Photovoltaic Complex. They are: *Tolypeutes tricinctus* (three-banded armadillo) and *Myrmecophaga tridactyla* (giant anteater), recorded only by interviews with local residents. As for the endemic species, the highlights are *Eupisttula cactorum* (periquito-da-caatinga) and *Paroaria dominicana* (cardeal-do-nordeste), endemic to the Caatinga, and *Picumnus limae* (picau-pau-anão-da-Caatinga), *Pseudoseisura cristata* (casaca-de-couro) and *Tolypeutes tricinctus* (three-banded armadillo), endemic to the Northeast.

It is worth mentioning that no water body were recorded in the region of the project and many areas are already anthropized, mainly for animal farming. Other areas already have a well-conserved Caatinga, with dense understory.

The vast majority of fauna species recorded through primary and secondary data are considered to have a wide geographic distribution and to be common in already altered areas.

5.2.1.1 - Herpetofauna (Amphibians and Reptiles)

A total of eight species were recorded in the field during the survey, including one amphibian and seven reptile species. Adding to the secondary data, we have a total of 22 species, five amphibians and 17 reptiles.

Small lizards were commonly recorded in the area where the project is located, such as *Ameivula ocellifera* (calanginho) (**Figure 11**), *Ameiva* (calango-verde), and *Tropidurus hispidus* (calango) (**Figure 12**). The presence of these species as the most abundant is a result of the altered environment. However, there are places that are well preserved and with a very dense undergrowth, which is difficult to access.

Through conversations with local residents, it was possible to identify species such as *Bothrops* sp. (jararaca) and *Crotalus durissus* (rattlesnake), which they are used to hunting. These species are considered to be of medical interest, for the production of serums and drugs.

As mentioned in the RAS, no threatened or endemic species of Caatinga herpetofauna were recorded for the project area. The species recorded are of wide geographic distribution and generalist habits, being common in anthropized areas.

Three species of economic interest, *Salvator merianae* (Black and white tegu), was recorded as it is hunted for food and *Boa constrictor* (boa constrictor) and *Epicrates cenchria* (slender boa).

The herpetofauna in the area of the project, for this dry period, was considered to have low biodiversity, especially for amphibians. One of the factors that may have contributed to this low biodiversity is the absence of water bodies and the period when the survey was carried out (dry period).



Figure 11 - *Ameivula ocellifera* (small crab).
Author: Luiz Henrique Lyra. Date: 28/04/2021.



Figure 12 - *Tropidurushispidus* (calango). Author:
Luiz Henrique Lyra. Date: 29/04/2021.

5.2.1.2 - Avifauna

A total of 58 species were recorded during the field survey, distributed among 24 families, 12 of which were Passeriform and 12 were Non-Passeriform. Adding to the secondary data we have a total of 65 species.

It was common to find species that are more tolerant to anthropic disturbances, where they have a wide geographic distribution and can be found in more than one Biome. As well as, no migratory route of animals, and the presence of these species was recorded.

As mentioned in the RAS, no threatened species were recorded for the project area. Two Caatinga endemic species were recorded: *Eupisttula cactorum* (periquito-da-caatinga) and *Paroaria dominicana* (cardeal-do-nordeste) (Figure 13), and two endemic to the Northeast, *Pseudoseisura cristata* (casaca-de-couro) (Figure 14) and *Picumnus limae* (picau-anão-da-Caatinga), the latter, recorded only by secondary data.

The species of economic interest, recorded in the field, are representatives of the Families Accipitridae (hawks), Strigidae (owls), Trochilidae (hummingbirds), and Psittacidae (parakeets, parrots, and similar).



Figure 13 - *Paroaria dominicana* (northeastern cardinal), endemic to Caatinga. Author: Luiz Henrique Lyra. Date: 28/04/2021.



Figure 14 - *Pseudoseisura cristata* (casaca-de-couro), endemic to the Northeast. Author: Luiz Henrique Lyra. Date: 29/04/2021.

5.2.1.3 - Mastofauna

Thirteen seven species were recorded during the field survey, seven wild species and six domestic species, distributed in eight families. Adding to the secondary data, we have a total of 18 species.

Regarding threatened species, we highlight the record of two species, which were recorded only through secondary data, in the study by ESPERANZA/ECOLOGY BRAZIL (2015) and which may occur in the area of the Mendubim Photovoltaic Complex. They are: *Tolypeutes tricinctus* (three-banded armadillo) and *Myrmecophaga tridactyla* (giant anteater), recorded only by interviews with local residents. As for the endemic species, only *Tolypeutes tricinctus* (three-banded armadillo), endemic to the Northeast, stands out.

Among the mammals there was an emphasis on the presence of domestic animals, such as cattle, horses, goats (Figure 15), chickens, dogs, and cats. When present in natural areas, they contribute negatively to wildlife.

We highlight the presence of two species that arouse economic interest, including one that was recorded trapped for fattening: *Euphractus sexcinctus* (Six-banded armadillo) (Figure 16) and

Dasyus novemcinctus (armadillo). There have been reports from residents that hunting has caused many wild animals to disappear from the area.



Figure 15 - Anthropized area with goat raising.
Author: Luiz Henrique Lyra. Date: 28/04/2021.



Figure 16 - Record of three *Euphractus sexcinctus* (armadillo), trapped for fattening. Author: Luiz Henrique Lyra. Date: 29/04/2021.

Table 5 - List of priority species of fauna recorded by primary and secondary data for the Mendubim Photovoltaic Power Plant area of influence with their respective degrees of threat, according to the IUCN (2021), MMA (2014) and CITES (2021) lists, characteristics and habits.

Caption: Secondary data: 1 - CASE (2017); 2 - ESPERANZA/ECOLOGY BRASIL (2015). Threat Categories: LC = low concern; EN = endangered; VU = vulnerable. CITES (Appendix I, II and III). Feature: End-Caa - endemic to the Caatinga biome; End. NE - Endemic to the Northeast.

Taxonomic Classification	Common Name	Primary Data	Secondary Data	Relevance	MMA	IUCN	CITES	Occurrence	Migratory
AMPHIBIA									
ANURA									
<i>Salvator merianae</i>	Black and white tegu	x	1, 2	Economic		LC	AP. II		
REPTILES									
SERPENTS									
Boidae Family									
<i>Boa constrictor</i>	boa constrictor		1	Economic		LC	AP. II		
<i>Epicrates cenchria</i>	Slender boa		1	Economic		LC	AP. II		
Viperidae Family									
MAMMALIA									
PILOSA									
Myrmecophagidae Family									
<i>Myrmecophaga tridactyla</i>	Giant anteater		2	Threatened	VU	VU			
CINGULATA									
Dasypodidae Family									
<i>Tolypeutes tricinctus</i>	Three-banded armadillo		2	Threatened	EN	VU			
RODENTIA									
Cuniculidae Family									
<i>Cuniculus paca</i>	Low-land paca	x		Economic		LC	Ap. III		
CARNIVOROUS									

Taxonomic Classification	Common Name	Primary Data	Secondary Data	Relevance	MMA	IUCN	CITES	Occurrence	Migratory
Canidae Family									
<i>Cerdocyon thous</i>	bush dog, forrest fox, fox	x	1, 2	Economic		LC	Ap. II		
BIRDS									
ACCIPITRIFORMES									
Accipitridae Family									
<i>Heterospizias meridionalis</i>	Savanna hawk	x	1	Economic		LC	Ap. II		
<i>Rupornis magnirostris</i>	Roadside hawk	X	1	Economic		LC	Ap. II		
STRIGIFORMES									
Strigidae Family									
<i>Athene cunicularia</i>	Burrowing owl	X	1	Economic		LC	Ap. II		
PICIFORMES									
Picidae Family									
<i>Picumnus limae</i>	Caatinga piculet		2	Endemic		LC		End. NE	
APODIFORMES									
Trochilidae Family									
<i>Eupetomena macroura</i>	Scissor-tailed hummingbird	X		Economic		LC	Ap. II		
<i>Amazilia fimbriata</i>	Glittering-throated Hummingbird	X		Economic		LC	Ap. II		
FALCONIFORMES									
Falconidae Family									
<i>Caracara plancus</i>	Crested caracara	x	1	Economic		LC	Ap. II		
<i>Milvago chimachima</i>	Yellow-headed caracara	X	1	Economic		LC	Ap. II		
<i>Herpethotes cachinnans</i>	Laughing falcon	X		Economic		LC	Ap. II		
<i>Falco sparverius</i>	Sparrow hawk	X		Economic		LC	Ap. II		

Taxonomic Classification	Common Name	Primary Data	Secondary Data	Relevance	MMA	IUCN	CITES	Occurrence	Migratory
PSITTACIFORMES									
Psittacidae Family									
<i>Eupsittula cactorum</i>	Cactus parakeet	X	1	Economic/ Endemic		LC	Ap. II	End. Caa	
<i>Forpus xanthopterygius</i>	Blue-winged parrotlet	X	1	Economic		LC	Ap. II		
PASSERINES									
Thamnophilidae Family									
<i>Pseudoseisura cristata</i>	Caatinga cachelote	X	1	Endemic		LC		End. NE	
Hirundinidae Family									
<i>Pygochelidon cyanoleuca</i>	Blue and white swallow	X		Migratory		LC			VM
Thraupidae Family									
<i>Paroaria dominicana</i>	Red cowled cardinal	X	1	Endemic		LC		End. Caa	

5.2.1.4 - Species of Importance for Conservation

Most of the species recorded in the studies are considered common and have a wide distribution in the national territory. It is important to point out, however, that endangered species are recorded through secondary data. Thus, we highlight the recording of two species, through secondary data, in the study by ESPERANZA/ECOLOGY BRAZIL (2015) and that may occur in the area of the Mendubim Photovoltaic Complex. They are: *Tolypeutes tricinctus* (three-banded armadillo) and *Myrmecophaga tridactyla* (giant anteater), recorded only by interviews with local residents. As for the endemic species, the highlights are *Eupisttula cactorum* (cactus parakeet) and *Paroaria dominicana* (red-cowled cardinal), endemic to the Caatinga, and *Picumnus limae* (ochraceous piculet), *Pseudoseisura cristata* (Caatinga cachalote) and *Tolypeutes tricinctus* (three-banded armadillo), endemic to the Northeast.

5.2.1.5 - Conservation Units and Priority Areas for Biodiversity Conservation

According to the project's RAS, there is only one Conservation Unit in the municipality of Açú. The Açú National Forest (FLONA) is a Sustainable Use Federal UC (Conservation Unit), created by Decree 245/2001, and has an area of 500 ha. Its management is conducted by the Chico Mendes Institute for Biodiversity Protection (ICMBio). This Unit is located just over 7 km away from the development polygon and just over 12 km away from the planned Transmission Line route.

Although not listed in the project's RAS, the region has three Priority Areas for Biodiversity Conservation. Area CA054 (Carnaubal) is located just under 3 km away and is classified as High Importance and Extremely High Priority. Area CA057 (Açú National Forest) is approximately 2 km from the development and is also classified as High Importance and Extremely High Priority. Area CA058 (Unnamed) is less than 300 m from the photovoltaic complex polygon and is classified as Extremely High Importance and Priority. None of them will have their limits intercepted by the development.

5.3 - FLORA

5.3.1 - Results and Discussion

5.3.1.1 - Phytophysiognomy

The Forested Steppe Savanna, also known as wooded caatinga, a vegetational subgroup structured in two very distinct strata: a sparse, upper shrubby-arboreal area, generally with characteristics of the Forested Steppe Savanna, but with smaller individuals, predominates in the area of the project. The lower part is gramineous-woody, also of physiognomic importance. In this group the following ecotypes predominate: *Spondias tuberosa* (Anacardiaceae) a typical species of the Caatinga, popularly known as Umbuzeiro; *Commiphora leptophloeos* (Burseraceae) known as Imburana; and several species of the genus *Mimosa* (Fabaceae), characteristic of various areas of the Caatinga (IBGE, 2012).

Another important factor is that the Wooded Steppe Savannah has presented itself, in its great majority, highly anthropized, and the presence of individuals of catingueira (*Cenostigma pyramidale*), catanduva (*Pityrocarpa moniliformis*), quince tree (*Croton jacobinensis*), and black jurema (*Mimosa tenuiflora*) is common. However, it is worth mentioning that, in the rural properties intercepted by the project, many owners have reduced the management of their areas in the last five (5) years, due to the expectation of land commercialization. This reduction favored resilience processes in the local plant communities and the consequent advancement of the successional stage.

5.3.1.2 - Floristic Composition in the Study Region

The analysis of the studies mentioned above, for the preparation of the flora diagnosis, indicated the application of different sampling methodologies, as described below.

a) Floristic study

As part of the RAS (CASE, 2017), expeditions were carried out for botanical collection by applying the walk-through method, described by FILGUEIRAS (1994). For this purpose, five (5) imaginary lines (transects) were established in the study area and individuals of different life forms were collected. It is worth mentioning that in the item "4.2.1 Flora - Table 6 - Record of Plant Species for the Mendubim Photovoltaic Complex - Açu/RN" all 39 species presented were

given the threat status "of little concern". However, according to the Ministry of Environment's species list (MMA, 2014), none of the 39 species cited fall into any threat category.

b) Phytosociological study

Whereas for the RAF (CASE, 2019), 37 plots of 20 x 20 meters (400 m²) were installed, which totaled 14,800 m² of sampling. The diameter at breast height (DAP), considered for inclusion of the individuals was 2 cm, which were measured with the help of a probe.

c) Forest Inventory and volumetry

To calculate the forest inventory, a non-conventional methodology was used in studies aimed at environmental licensing of projects. This methodology is proposed by Technical Instructions that guide the Presentation of Projects for Forest Activities (IDEMA, 2016), and is characterized by the adoption of a technique for converting dendrometric variables into values of green weight, dry weight, actual volume, and stacked volume.

During the field campaigns, 50 species were identified, belonging to 20 families and 38 genders, distributed among tree, shrub, herbaceous, and lianas life forms.

Few studies are cited for the formation of Wooded Steppe Savannah in the state of Rio Grande do Norte, however, we highlight those conducted by ESPERANZA/ECOLOGY BRASIL (2015 and 2016), as part of the EIA/RIMA and Forest Survey for ASV Purposes, required for the licensing of L 500 kV Quixadá - Açú III Transmission Line and Associated Substations. These surveys used systematic sampling techniques (through the allocation of sampling units) and random sampling, and 143 species were identified in the field surveys, belonging to 47 families and 108 genders.

The floristic list compiled for the four (4) studies mentioned above, with 136 morphospecies, belonging to 41 botanical families and 102 genders, is presented in **Appendix 7**.

5.3.1.3 - Species of Importance for Conservation

Regarding the degree of threat, the list of threatened species of the Ministry of Environment (Portaria MMA N° 443/2014), *International Union for Conservation of Nature* (IUCN, 2021) and Botanical Garden of Rio de Janeiro - National Center for Flora Conservation (CNCFlora, 2021) were used; and consultation of State lists. All plants were classified according to the botanical nomenclature of the 2020 List of Species of the Flora of Brazil from the Rio de Janeiro Botanical Garden - (JBRJ, 2021) which adopts the *Angiosperm Phylogeny Group IV* (APG IV, 2016) classification system.

The plants surveyed are on the official lists of endangered species and state lists of immunity from cutting. According to MMA Ordinance No. 443/2014, the categories used in the species extinction risk assessment method must be in accordance with the International Union for Conservation of Nature (IUCN) criteria definitions, in accordance with national legislation and under the terms of the Convention on Biological Diversity-CDB, they are: Extinct (EX); Extinct in the Wild (EW); Critically Endangered (CR); Endangered (EN); Vulnerable (VU); Near Threatened (NT); Low Risk (LR); Least Concern/Safe (LC); Not Applicable (NA); Not assessed (NE) and Insufficient Data (DD).

According to MMA Ordinance No. 443/2014 (art. 2), the species on the List that are classified as Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) are fully protected, including prohibition of collection, cutting, transportation, storage, handling, processing and commercialization, among others.

Most of the species recorded in the studies are considered common and have a wide distribution in the national territory. It is important to emphasize, however, that there is a huge gap of knowledge regarding the flora of Rio Grande do Norte, being the only Brazilian state that has no known rare species and no key area for biodiversity, possibly due to the scarcity of floristic surveys in the state (OLIVEIRA, 2011).

As previously mentioned by OLIVEIRA (2011), the deficit of studies on the flora of the state also extends to the classification of species as to endemism, being verified by the author, in her studies in the Rio do Fogo region, only the species *Aspilia procumbens* Baker, as endemic to Rio Grande do Norte, and *Stilpnopappus cearensis* Hubber, as endemic to the northeastern region. In the list of species of flora of Brazil (2020), only *Aspilia procumbens* Baker is listed.

According to the 2020 List of Species of the Flora of Brazil from the Botanical Garden of Rio de Janeiro - (JBRJ, 2021), the species *Eugenia azeda* Sobral has confirmed occurrence in the state of Ceará and Rio Grande do Norte.

Regarding the degree of threat, the list of threatened species of the Ministry of Environment (Portaria MMA N° 443/2014), *International Union for Conservation of Nature* (IUCN, 2021) and Botanical Garden of Rio de Janeiro - National Center for Flora Conservation (CNCFlora, 2021) were used; and consultation of State lists, according to **Table 6**.

Table 6 - Threatened species identified in the project area.

Categories analyzed: Endangered (EN); Near Threatened (NT); Least Concern/Safe (LC); Not Applicable (NA) and Insufficient Data (DD).

Taxon	Vernacular	CNCFlora 2021	IUCN 2021	MMA 2014
<i>Astronium urundeuva</i>	aroeira-do-sertão	LC	DD	NA
<i>Spondias tuberosa</i>	umbuzeiro/umbu	NA	LC	NA
<i>Annona squamosa</i>	fruta-de-pinha	NA	LC	NA
<i>Aspidosperma pyriforme</i>	pereiro	NA	LC	NA
<i>Handroanthus impetiginosus</i>	ipê-roxo	NT	LC	NA
<i>Cochlospermum vitifolium</i>	-	NA	LC	NA
<i>Encholirium spectabile</i>	-	NA	LC	NA
<i>Commiphora leptophloeos</i>	imburana	NA	LC	NA
<i>Cereus jamacaru</i>	mandacaru	NA	LC	NA
<i>Xiquexique gounellei</i>	xique-xique	NA	LC	NA
<i>Pilosocereus pachycladus</i>	Tree cactus	NA	LC	NA
<i>Tacinga inamoena</i>	palminha	DD	LC	NA
<i>Cynophalla flexuosa</i>	falseteeth	NA	LC	NA
<i>Monteverdia rigida</i>	bom-nome	NA	LC	NA
<i>Combretum glaucocarpum</i>	combretum	NA	LC	NA
<i>Combretum leprosum</i>	mofumbo	NA	LC	NA
<i>Cnidoscolus quercifolius</i>	favela-de-cachorro	NA	LC	NA
<i>Cnidoscolus urens</i>	urtiga	NA	LC	NA
<i>Manihot carthagenensis</i>	-	LC	LC	NA
<i>Sapium glandulosum</i>	burra-leiteira	NA	LC	NA
<i>Amburana cearensis</i>	cumaru-de-cheiro	NT	EN	NA
<i>Anadenanthera colubrina</i>	angico	NA	LC	NA
<i>Bauhinia cheilantha</i>	-	NA	LC	NA
<i>Cenostigma pyramidale</i>	-	NA	LC	NA
<i>Calliandra spinosa</i>	-	NA	LC	NA
<i>Cenostigma macrophyllum</i>	caneleiro	NA	LC	NA
<i>Chamaecrista eitenorum</i>	-	NA	LC	NA
<i>Chloroleucon dumosum</i>	jurema-branca	NA	LC	NA
<i>Libidibia ferrea</i>	pau-ferro	NA	LC	NA

Taxon	Vernacular	CNCFlora 2021	IUCN 2021	MMA 2014
<i>Mimosa arenosa</i>	-	NA	LC	NA
<i>Mimosa tenuiflora</i>	jurema-preta	NA	LC	NA
<i>Complexinonia aculeata</i>	Jerusalem thorn	NA	LC	NA
<i>Pityrocarpa moniliformis</i>	catanduva	NA	LC	NA
<i>Pithecellobium diversifolium</i>	Jurema branca	NA	LC	NA
<i>Pityrocarpa moniliformis</i>	catanduva	NA	LC	NA
<i>Cenostigma pyramidale</i>	catingueira	NA	LC	NA
<i>Senegalia polyphylla</i>	monjoleiro	NA	LC	NA
<i>Senna obtusifolia</i>	mata-pasto-da-caatinga	NA	LC	NA
<i>Senna reticulata</i>	mata-pasto	NA	LC	NA
<i>Senna spectabilis</i>	-	NA	LC	NA
<i>Senna trachypus</i>	-	NA	LC	NA
<i>Trischidium molle</i>	brinquinho	NA	LC	NA
<i>Pseudobombax marginatum</i>	imbiratanha	LC	LC	NA
<i>Campomanesia velutina</i>	-	NA	LC	NA
<i>Eugenia puniceifolia</i>	myrtle	NA	LC	NA
<i>Ludwigia octovalvis</i>	-	NA	LC	NA
<i>Oeceoclades maculata</i>	-	NA	LC	NA
<i>Coccoloba ramosissima</i>	-	NA	LC	NA
<i>Alseis pickelii</i>	goiabinha	NA	LC	NA
<i>Guettarda angelica</i>	-	NA	LC	NA
<i>Randia armata</i>	indigoberry	NA	LC	NA
<i>Casearia luetzelburgii</i>	pau-vidro	NA	LC	NA
<i>Sideroxylon obtusifolium</i>	-	LC	LC	NA
<i>Ximenia americana</i>	-	NA	LC	NA

Of the mentioned plant species, *Amburana cearensis* (cumaru-de-cheiro) is classified as near threatened (CNCFlora, 2021) and endangered (IUCN, 2021). The *Handroanthus impetiginosus* (ipê-roxo) is classified by CNCFlora (2021) as near threatened.

As for the different uses and commercial/economic interest, 21 species are identified as being used for food, construction, carpentry, industrial, lumber, charcoal, firewood, ornamental, and medicinal purposes. The species *Myracrodruon urundeuva* and *Amburana cearensis* stand out for their recognized use in civil construction, carpentry, and furniture making, and especially for the species *Spondia tuberosa* (umbu), which currently represents the main source of income for the owners interviewed, with the production of umbu fruits destined for several regional consumer markets. Considering the importance of the species, an adequate financial compensation plan for producers is needed. **Table 7** presents the list of

species with information regarding their commercial/economic uses and interests, available in the literature.

Table 7 - list of species with information regarding their commercial/economic uses and interests, available in the literature.

Uses: Ali - Food; Med - Medicinal; Marc - Carpentry; Const - Civil Construction; Carp - Carpentry; Orn - Ornamental; Len - Firewood; Carv - Charcoal; Ind - Industry

Species	Form of life	Utilities
<i>Spondia tuberosa</i>	arboreal	There.
<i>Astronium urundeuva</i>	arboreal	Med. Const.
<i>Aspidosperma pyriforme</i>	arboreal	Const. Marc. Carp
<i>Copernicia prunifera</i>	arboreal	Ind. Med. Orn.
<i>Tabebuia aurea</i>	arboreal	Const. Orn.
<i>Handroanthus impetiginosus</i>	arboreal	Const.
<i>Commiphora leptophloeos</i>	herbaceous	Med. Orn.
<i>Combretum glaucocarpum</i>	arboreal	There. Len. Carv
<i>Combretum leprosum</i>	arboreal	Len. Carv.
<i>Erythroxylum rimosum</i>	arboreal	Ali. Len. Carv.
<i>Sapium glandulosum</i>	arboreal	Marc. Ind.
<i>Croton jacobinensis</i>	arboreal	Marc. Len. Car.
<i>Amburana cearensis</i>	arboreal	Mov. Carp. Marc. Orn.
<i>Anadenanthera colubrina</i>	arboreal	Ind. Const. Len. Carv.
<i>Cenostigma macrophyllum</i>	arboreal	Carv. Orn.
<i>Pityrocarpa moniliformis</i>	arboreal	Marc. Const. Len. Carv
<i>Cenostigma pyramidale</i>	arboreal	Const. Len. Carv
<i>Ximenia americana</i>	arboreal	Carp. Len. Carv.
<i>Sarcomphalus joazeiro</i>	arboreal	Marc. Const. Len. Carv. Ind.
<i>Sideroxylon obtusifolium</i>	arboreal	Carp. Orn.

The presence of three exotic species is worth mentioning: *Eucalyptus* sp., cultivated in Brazil for lumber supply, pulp production, and charcoal production; *Mangifera indica*, commonly cultivated for human consumption, and *Cocos nucifera*, also used for human consumption and probably the best known palm tree with the greatest economic importance in the world.

5.3.1.4 - Permanent Preservation Area (APP)

According to the RAS data, in the areas of influence of the project **there are no intermittent watercourses and water bodies**, and few ephemeral drainages were found. The water resources map, however, shows two water courses within the complex, Sítio Boa Esperança with 6.58 hectares and Sítio Baixa dos Taques II with 3.36 hectares, as illustrated in **Figure 17**.



Figure 17 - Mapped water resources in the area of the PV complex. The drainage channels are marked in black.

The northernmost watercourse is declared in the property's Rural Environmental Registry, but the southernmost watercourse is not. As reported in 5.1.1.8 - Surface Water Resources, the two sites were inspected in the field and it was verified that there are no such waterways. In the field, it was verified that one was an artificial drainage channel constructed manually by a local owner, and the other was classified as ephemeral drainage. Such conditions allow the rectification of the classification previously adopted for such APP areas, thus making it possible to increase the useful area of the project. Thus, according to the data from the RAS (CASE, 2017), field

inspection and interview with the owner of the Boa Esperança and Baixa dos Taques II farms, in the Directly Affected Area (ADA) of the development there is no presence of intermittent or perennial watercourses, with few ephemeral drainages verified.

The first drainage, located further north of the complex, was opened by the owner to bring water from the road to the property. The contact of the drainage with the road occurs at UTM coordinates 718280E/9379472S Zone 24S. The artificial drainage is georeferenced in the CAR, so it is suggested that the CAR be rectified. **Figure 18** illustrates the drainage in question.



Figure 18 - Artificial Drainage north of the Photovoltaic complex.

The second drainage has an ephemeral channel regime, located in the eastern portion of the PV complex, is represented by a longer channel that drains into the existing reservoir on the Piranhas-Açu river, at UTM coordinates 718595E/9377357S Zone 24S, according to **Figure 19**.



Figure 19 - Artificial drainage to the south of the Photovoltaic complex.

5.3.1.5 - Legal Reserve

The Legal Reserve is another type of specially protected territorial space, consisting of areas located within rural properties or possessions, varying in size according to criteria established in Law 12,651/2012 (New Forest Code), with the function of ensuring the sustainable economic use of the natural resources of the rural property, assisting in the conservation and rehabilitation of ecological processes and promoting biodiversity conservation, as well as the shelter and protection of wild fauna and native flora (art. 3, III).

Several provisions of the regime instituted by the mentioned Forest Law have had their constitutionality challenged before the Federal Supreme Court, including those exempting certain activities from the obligation to maintain the Legal Reserve area. Thus, in principle, the areas waived from the obligation above are only "areas acquired or expropriated by the holder of a concession, permission or authorization for exploiting *hydraulic energy* potential, in which electric energy generation undertakings, substations or electric energy transmission and distribution lines are installed" (art. 12, §7º).

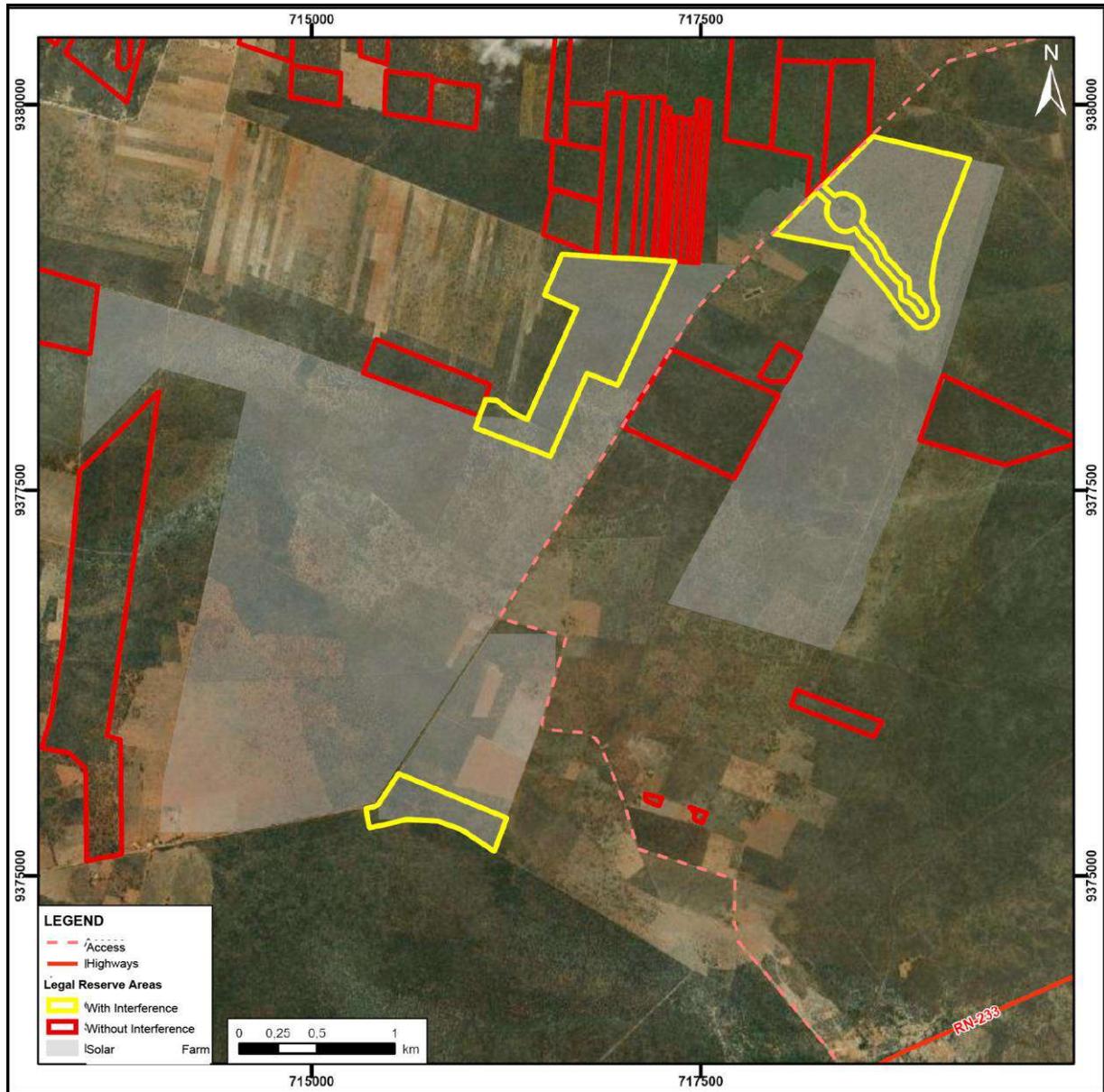
The Legal Reserve must be preserved with native vegetation cover by the owner of the rural property, possessor or occupant for any reason, individual or legal entity, public or private (article 17). Economic exploitation is allowed, in the legally foreseen hypotheses (art. 20) and the inclusion of Permanent Preservation Areas in the calculation of the property's Legal Reserve percentage (article 15).

It is worth noting that the location of the Legal Reserve area must take into consideration the watershed plan; the Ecological-Economic Zoning; the formation of ecological corridors with another Legal Reserve, Permanent Preservation Area, Conservation Unit or with another legally protected area; the areas of greatest importance for biodiversity conservation and those of greatest environmental fragility. Thus, the state environmental agency or an institution empowered by it must approve the location of the Legal Reserve after the property is included in the Rural Environmental Registry - CAR (art. 14, items I to V and sole paragraph).

According to the records of the public system of Rural Environmental Cadastre (CAR), the properties that make up the Mendubim Project have 05 (five) registrations, all of which have not yet been approved by IDEMA (RN) (Table 8 and Figure 20). The 05 registries encompass the entire area of the project, that is, the 10 (ten) properties/registries that make up the project area, and have the 20% of legal reserve area required by law.

Table 8 - Summary table of the declaration in the Rural Environmental Cadastre System. Source: SiCAR.

REGISTER		Property Area (ha)	Remaining native vegetation (ha)	Consolidated use (ha)	Legal reserve (ha)	% of Legal Reserve	APP (ha)
CAR 01	RN-2400208-CA77A8EA7FC242A6B93B8D9CEC74F199	254.8764	254.8761	0	100.1994	39%	0
CAR 02	RN-2400208-811AC55B5D5742DBA57E732C79B933B2	308.0143	148.7613	159.0064	62.7152	20%	0
CAR 03	RN-2400208-F5FEE6DF54644CE0A0ECCD523F8C6A91	232.88	130.9878	101.0917	0	0%	0
CAR 04	RN-2400208-5DFD85869B1F48B5A9E150894B815E61	91.832	82.2222	9.6016	18.8638	21%	0
CAR 05	RN-2400208-804B08D805B346E4B6A0A025070F21BB	326.3086	193.3346	132.719	65.4064	20%	0
Total		1213.9113	810.182		247.1848	20%	



Source: SiCAR. Adapted by Ecology Brasil.

Figure 20 - Legal Reserve Areas

For the implementation of the Photovoltaic Complex there is, therefore, interference in three polygons of legal reserve. The absence of formal approval from IDEMA in the mentioned CAR records makes the rectification simpler, as long as the adjustments are made in the CAR system and submitted for a new approval. It is worth pointing out that it is still mandatory to set aside a minimum percentage of 20% of the total area of the property for legal reserve purposes, either on the same property or through compensation.

The compensation consists of setting aside an area outside the rural property for conservation. It must be equivalent in extent and ecological standards to the area to be compensated, be located in the same biome and, in the case of being located in another Unit of the Federation, it must be an area identified as a priority for conservation by the Union or the States (priority areas were defined by Decree No. 8,235/2014).

It should be noted that, in the properties where the legal reserve areas are intercepted by the project, it will be up to the respective owners to relocate these areas according to the criteria mentioned above, being essential the support of the declarants by the company to facilitate and speed up the process.

5.3.2 - Photographic Report

Appendix 8 presents the photo report of the 2021 field activities

5.4 - SOCIOECONOMICS

5.4.1 - Results and Discussion

5.4.1.1 - Analysis of the Interviews with the Owners and Residents

Table 09 below describes the main points arising from the interviews carried out with the owners.

Table 9 - Points arising from interviews

Category	Autor	Question
Compensation	All owners	How will the owners be compensated for improvements at their properties? What values will be adopted? When will they receive?
Compensation	All owners	How will the owners be compensated for deforestation of the imbu plantation at the properties?
Compensation	All owners	How will the owners be compensated for deforested aera at their properties?
Project knowledge	All owners	How will the area be occupied by the project?
Project knowledge	All owners	Will the houses be destroyed?
Resettlement	██████████ representative	Will the residents really have to leave? How will their expropriation take place?

Category	Autor	Question
Communication	All owners	They expect the new companys to keep in constant contact, holding monthly meetings to pass on information and update the status of the complex.
Project knowledge	All owners	After 6 years, the owners still not kwon about the project, exactly which areas will be used and in what way.
Project conclusion	All owners	The owners expected the complex will be fully ready and operational at this point.
Project knowledge	██████████ representative and Cassimiro	The unknowledge of the project impacts on the communication of the owners with their rural workers, including their resettlement.
Leasing contracts	All owners	The leasing contracts with Martifer and Enerlife did not include a clause that guaranteed a monthly income for the owners during the period of bulding and installtion of the complex. Although the both companies made a verbal agreement with the owners: they would receive a monthly amount, unspecified, from the time of the handover of the farm until the project went into operation.
Leasing contracts	All owners	The landowners interviewed presented a negotiation proposal with the new developer: for every 100 hectares they would receive 2 minimum wages, from the moment they hand over the land, as a form of preliminary rent/lease of the land.
Leasing contracts	██████████ ██████████ ██████████ representative	They have great expectations about the value of the leasing contract based on conversations with the owners of others solar complex's already instaled at Assú.
Date	Company signed	
May 13, 2015	Martifer	According to the information obtained in the field, the first Private Instrument of Use Concession was signed with the company Martifer on May 13, 2015. On June 8, 2017, a termination was signed.
June 12, 2019	Enerlife	On June 12, 2019, the owners were informed by Enerlife about the technical feasibility of the project.
August 31, 2020		On August 31, 2020, they were notified that the usage concession contract was assigned to the Mendubim company. All the owners stated that the contract is in effect.
	Enerlife	They also reported that four years ago Enerlife registered existing improvements for compensation purposes and the owners have copies. So far, no payment has been made.

Table 10 presents the main questions, dissatisfaction and doubts of the couple [REDACTED] and [REDACTED] (residents of [REDACTED] properties).

Table 10 - Main questions, dissatisfaction and doubts of the couple [REDACTED] a

Category	Question
Resettlement	[REDACTED] (wife of [REDACTED] owner of the land) had informed them that they could continue living there as residents, that this had been agreed upon with the company that will build the complex.
Resettlement	[REDACTED] do not want to leave the place where they live as residents. They have no other land or house to live and farm on.
Communication	They reinforced their dissatisfaction with the lack of information and communication, they have never had contact with any employee of the companies and would like to be able to talk directly with the company that owns the project.
Communication	They live in anguish because they do not know if they will have to leave or not.
Communication	They complained about not being informed about their rights. The main negative point and that was emphasized several times during the field trip is that they need to leave.
Knowledge of another project	They are not aware of other similar developments that are already installed in the region.
Expectancy	They explained that their children are unemployed, and if they are hired by the company that owns the complex, this could be very positive.
Social and economic condition	This family lives in a situation of social and economic vulnerability
Relationship with the owners	There is little empathy from the land owners with the couple's situation and little willingness to find, together with them, a viable alternative for life outside the farm.
Labor law	They explicitly said that they will not resort to the justice system or any institution to claim their rights

Table 11 presents the main questions, dissatisfaction and doubts of the couple Antônio and Glicia (residents of Cassimiro's properties).

Table 11 - Main questions, dissatisfaction and doubts of the couple [REDACTED]

Category	Question
Project information	Antonio has known about the venture since 2014 or 2015, he was with the land owners when the representatives of the first company arrived.

Category	Question
Project information	From time to time someone appears conducting studies. A company employee who analyzed soils the week of April 19-23, 2021 informed the couple that they could stay in the houses, as they would not be torn down since it is a lease.
Project information	They only receive information from third parties, they have never been contacted directly by the company that owns the project and have no access to further explanations about what is going to happen in the area. The situation is aggravated by the pandemic.
Expectancy	They are certain that they will have to leave the farm, but they have not talked to the owners about compensation.
Expectancy	They do not expect to be kept as Cassimiro's workers on the farm, as there will be no work to be done.
Knowledge of another project in the region	They do not know the history of Engie's complex, but they have been there, they have seen what it is like.
Positive points	Generation of Jobs if they do not bring in workers from outside, "it will hurt a lot of people".
Positive points	It will be good for the land owner, who will receive the rent.
Positive points	Would be that energy might become cheaper
Positive points	As the company needs to access the area, it also believes that the rural access roads to the farms and complex will improve.
Negative points	They highlighted that a lot of people will come from outside, people they do not know and do not know what they are like (if they are good people).
Negative points	██████████ explained that energy panels further increase the temperature of the location, making it even hotter for those who are neighbors.
Other information	They informed that, in Açu, courses to work with energy have already taken place, but that they were paid courses.
Question for company	Will the venture really generate jobs?
Other information	They confirmed that they were unaware of any problems with the documentation of that land.

5.4.1.2 - Settlement Projects

Three agrarian reform settlements were visited between April 29 and May 2, 2021. On May 2, 2021, conversations were held with representatives of the neighborhood associations of the settlements Novos Pingos and Prof. Maurício de Oliveira together with representatives of the Association of the Quilombola Community of Bela Vista do Piató.

The Settlement Projects Description is presented in Appendix 9. Following we present our analysis.

5.4.1.2.1 - Settlement Prof. Maurício de Oliveira

5.4.1.2.1.1 - Impressions of the Complex

They evaluate as one of the negative points of the project the impacts generated by the use of the road that passes between the settlers' yards and plots. With shaking, walls, houses, and other structures can be damaged. In addition, the weight of the trucks could further sink the road, which is already quite deteriorated, they call these deep pits "big wells" - they have already submitted requests to all the companies that use the road asking them to fix it, but have had no response to date. The truck traffic will also raise dust, damaging the crops, they preventively rejected the use of stone dust for paving because it burns the plants. deforestation, but IDEMA always releases it. Companies always win more issues than communities. During implementation, they cut brackets, wires and fences and then do not fix it, do not put gates back in place. They are afraid of where the complex's transmission line will pass and if it will affect the collective area they use for farming; good area for farming is at the end of the street and the side of the road.

Among the positive points of the project, they highlighted that it could improve the quality of life in the settlement and region if they really hire local labor, generating jobs and income, but they affirm that, in general, this is just 'false news'. Likewise, the complex will be able to contribute to reduce the value of energy, which is considered very expensive.

5.4.1.2.1.2 - Settlement Projects, Wishes and Demands that could be presented as Offsets

The Association has plans to build an agro-industry and a collective industrial kitchen for the women, but has no money. They want to obtain photovoltaic panels to put in the well at the settlement and thus reduce the amount they spend on energy. As there is no leisure area in the community they would like a gym, square and/or sports court. There is no doctor's office,

consultations are held in a room attached to the association, and it is necessary to build an adequate place for the consultations. It requires a rights training course.

5.4.1.2.1.3 - History of Relationship with other Energy Companies

Engie's photovoltaic complex is located approximately 6 km away from the agrovillage and less than 2 km from the settlement's Legal Reserve area. Among the compensation measures adopted by the company the following were listed: incentives for the implementation of productive backyards and courses on recycling and the environment. As for the productive backyards, they received chicks.

Engie offered a training course on how to assemble panels, but no one from the AP who took the course was hired. They have already sent a letter to Engie requesting a photovoltaic energy panel, but it has never been answered. Engie has not hired any settlers. Engie indemnified INCRA, negotiations did not include settlers. The families received R\$1,900.00 each because the transmission line passes over a legal reserve. Part of the compensation paid to INCRA was reverted to the association that built its headquarters. In the PA, Engie offered only recycling and environment courses. Community had no interest. They saw no use in what was offered. Only 4 people from the community were invited to visit Engie's complex. ACM and Embaúba Ambiental, companies responsible for the reforestation of areas deforested by transmission lines, bought seedlings from Ana's nursery in Settlement. Engie has reforested approximately 4 ha of the Settlement. During the Covid-19 pandemic, Engie donated 80 food baskets to the settlement.

5.4.1.2.2 - Novos Pingos Settlement

Appropriate way to be communicated and consulted about the complex: contact the association and schedule a meeting to present the project to the entire settlement and answer their questions. The association is made up of a president, vice-president, treasurer, and two auditors. They meet frequently.

They do not know what good the project can bring, but they cited the example of Engie, which invested in the Quilombola Community of Bela Vista do Piató, setting up an agro-industry for the women of the community to make cakes, and built a headquarters for the association there.

Negative points: safety of the community and heating of the area where they cultivate.

Questions for the company: how will the hiring of workers be done, will they accept anyone to work or will they prepare people? Do they know who their workers are? Social welfare must accompany workers.

A transmission line cuts through the settlement; as compensation, the association received R\$8,000 through INCRA.

5.4.1.2.3 - Bom Lugar II Settlement

5.4.1.2.3.1 - Relevant Information

Negative points of the development: road gets bumpier. As roads become cleaner and new roads are opened, animal theft (goats, sheep, oxen) increases.

Positive points: generate jobs.

He knew about the development through his neighbors, he knows the owners. The association and the settlement have never been approached. The correct way to communicate is to contact the Association and schedule a meeting to present the project. A company has already come at night to do tests and verify if the line was working well, and the settlers called the police because they did not know what it was all about.

- Rains: the rainy season is from March to May, but it rains until June or July, which is called winter. March 19th is St. Joseph's day, marks the beginning of the rains, planting day.
- In Novos Pingos Settlement there are 2 artesian wells. One to feed the settlement itself, has a flow of 10 thousand L/h, the families receive approximately 200 L per day. This well is 100 meters deep. The other well has a flow of 7 thousand L/h, and its water is distributed (piped) to two regions: Baixa dos Galegos and Caatinga. This well is where the water that goes to Raimundo, Antônio and Vandick's farms comes from.
- On a farm neighboring Raimundo's there is a pit waste deposit.
- The side road that cuts through Prof. Maurício de Oliveira settlement is very dangerous at night, with many cases of robbery. Even during the day it is necessary to be careful.
- Well from Prof. Maurício de Oliveira settlement: flow rate of 5 thousand L/hour, 130 meters deep; next to the settlement they created a water source (company that distributed mineral water), they have a well with a higher flow rate than the settlement, but they do not know what the flow rate is
- Bom Lugar II settlement well: flow rate of 18,000 L/h, depth 98 meters

- They cannot communicate with companies, they send letters that are not answered, they refuse to receive them at their headquarters.
- The training courses to work with energy, when they exist in Açú, are offered by companies, but the city hall is the one who indicates who should or should not be hired. Settlers have never been hired. City Hall demands a number of vacancies and jobs, which are distributed under its indication.
- Engie opened direct registration from the quilombola community.
- They want training courses and infrastructure for the settlements (Datashow, computer).
- In its negotiations, the quilombola community received a tractor. Engie received money for a cistern, fodder and corn.
- Many women remain dependent on their husbands.

5.4.2 - Photographic Report

Appendix 5 10 presents the photo report of the 2021 field activities.

6 - IMPACT ASSESSMENT

After analyzing the impact assessment chapter, a new impact matrix was prepared, shown in **Table 12**, with the due exclusions, and the inclusion of the following impacts: Vibrations, Alteration and/or Loss of Habitats, Polarized Light Pollution - "Lake Effect", Increase in hunting and capture of fauna individuals, Disturbance to fauna by alteration in the levels of sound pressure, Alteration in the use and occupation of the soil, Pressure on public equipment and services, and Alteration in the daily life of the Prof. Mauricio de Oliveira Settlement. The following is a description of each of them. The methodology for this analysis and preparation of the new matrix is presented in Appendix 11.

▪ **Vibration Emission**

The emission of vibrations is a relevant environmental aspect, considering that routine activities in the implementation phase, such as the circulation of trucks and heavy machinery, produce this phenomenon, which has the potential to cause nuisance to the population in the vicinity of the project and its accesses, especially in the settlement Prof. Mauricio Oliveira, including damage to buildings and residences.

- **Habitat loss and/or alteration**

The suppression of vegetation leads to fragmentation, loss and alteration of habitat and causes edge effects that, in turn, cause changes in light levels, temperature, and humidity in the forest remnants, directly influencing the local microclimate and the development of the plant community as a whole, consequently affecting the associated fauna. In addition to vegetation suppression, construction activities that involve soil movement also promote relevant habitat alteration, directly affecting fossorial and cryptozoic species.

Disturbances in the environment can generate alterations in the communities, such as the predominance of less sensitive species and the decrease of those that are more sensitive (a common characteristic of forest interior species), resulting, in turn, in lower species richness and diversity. Studies indicate that the removal of vegetation cover is a major cause of loss of local amphibian and reptile diversity, and suggest that few species are able to adapt to altered and/or anthropized environments. Besides, habitat fragmentation can affect populations of endemic fauna.

- **Polarized light pollution - "Lake Effect"**

Winged wild animals with diurnal habits, particularly insects and birds, may mistake the image formed by the photovoltaic panels arranged in the Photovoltaic Complex area for that of a body of water. This optical illusion is caused by Polarized Light Pollution, that is, the reflectance of polarized light in the environment. Considering that photovoltaic complexes are generally installed in relatively dry regions, such as deserts and savannas, the association of the image of photovoltaic panels with that of water sources can considerably increase the attractiveness of the panels to the winged fauna. This scenario can lead to animal collisions with the panels, causing physical injuries such as fractures and burns from contact with the heated surface of the photovoltaic panels. There is also an increase in the predation of animals attracted to the panels.

The main group of animals that can be impacted from the lake effect is represented by birds. In particular, the species with the greatest potential to be affected are those associated with palustrine or aquatic environments, as many of these birds use water bodies as habitat, feeding grounds, and breeding sites. Additionally, insect predatory bird species may be attracted to the panels as a function of prey availability, as certain insect groups are attracted to the panels via the lake effect, as it acts in attracting bird species.

- **Increase in hunting and capture of fauna individuals**

The suppression of vegetation for the implementation of the project, such as the opening of accesses, installation of photovoltaic panels, elevator substation, construction site, and support areas, can promote the colonization of the remnants by exotic species, and can also facilitate the entrance of people into areas previously difficult to access. The possibility of accessing new areas provides greater coverage in the area of action of the pre-existing hunters in the region of the project, in addition to the construction workers.

During the field inspection, armadillos were observed trapped in the development area. This impact can be intensified by the number of workers in the area where the project is being implemented.

With the increased movement of people and vehicles, the demand for illegally bred wild animals such as marmosets, parakeets, and songbirds may be high, increasing the capture of individuals from these groups. Many birds are sought after for their singing or their exuberant appearance. Among these are the psittacidae (parrots and the like), represented by *Eupsittula cactorum* (Cactus parakeet), the corvids (crows and the like), represented by *Cyanocorax cyanopogon* (Canaanite crow), the turdids and mimids, representing the birds popularly called thrushes, such as *Mimus saturninus* (field thrush) and *Turdus rufiventris* (orange thrush), and especially the traupids (tanagers and the like), which form the group with the largest number of species associated with these interests and which were represented in the field.

In the field, game species were also identified in the region, such as birds of the Tinamidae, Columbidae, and Accipitridae families, as well as reptiles and mammals detected by direct records and interviews, such as *Salvator merianae* (teiú) and *Dasybus novemcinctus* (tatu-galinha).

- **Disturbance of fauna by alteration of sound pressure levels**

Fauna communities can be greatly affected by construction activities, even in areas that are already highly anthropized. Environmental degradation factors, such as altered sound quality, are threats to the quality of life of species, affecting the characteristics of ecosystems. Although it does not leave residues, like other forms of pollution, intense exposure to sound pressure, in a repeated and prolonged manner, can cause permanent and deleterious changes.

During the construction stage, the sound pressure, directly or indirectly, due to the activities inherent to the work, can promote the scaring of animals to adjacent areas or even away from their area of origin. In general, wildlife avoids places with high levels of sound pressure, which can have a repulsive effect. More mobile species, such as some medium and large mammals (*Cercopithecus thous* - bush dog) and long-flying birds (Accipitriformes, Falconiformes, or large Piciformes, among others), are more likely to move away from environments where there is noise pressure generated by construction activities.

These escape processes can lead to the occupation of areas already inhabited by other individuals, leading to disputes over territory and also to increased contact with humans, which, in turn, can lead to a higher risk of being run over by cars due to crossing roads, with an increased risk of death for the animals.

In addition, the sound pressure produced during the construction phase has the potential to interfere with wildlife activities, especially for those species that use vocalization for communication, reproduction, and territory defense, such as birds and amphibians, as well as interfering with the success of predator-prey relationships.

- **Alteration of land use and occupation**

The implementation of the project will alter the use and occupation of the soil in the project's Directly Affected Area, due to the installation of all the project's structures, whether permanent or temporary.

- **Direct Interference in the Settlement Prof. Maurício Oliveira**

The expected interferences in the settlement Prof. Maurício Oliveira are related to the use of the existing access in this territory, which will be adapted for the implementation of the project. The emission of particulate material, vibrations, and alteration of sound pressure levels by the circulation of machinery, equipment, and heavy vehicles in this access, in addition to vegetal suppression and other construction activities present the potential to cause nuisance, including damage to improvements, residences, and other existing structures in the settlement.

- **Pressure on the Public Services Infrastructure**

The implementation of large projects has the potential to attract population in search of alternative work and income, and may cause an increase in demand for basic goods and services, essential for the local population, causing pressure on the infrastructure of health, social assistance, housing, sanitation, energy, and security.

Table 12 - Environmental Impacts (Ecology Proposal)

Means	Impacts		Generating Actions	Phase		
				Planning	Implementation	Operation
Physical	1	Landscape Alteration	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Buildings, Construction of the Substation, Assembling the Base Structures and Placing the Panels			
	2	Air Quality Alteration	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Assembling the Base Structures and Placing the Panels, Demobilization and General Cleaning of the Site			
	3	Alteration of the Sonority	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Electrical Cabling, Demobilization and General Cleaning of the Site			
	4	Emergence/Erosive Processes Aggravation	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Operation and Maintenance of the Photovoltaic Complex			
	5	Alteration in Surface Water Runoff	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Buildings, Construction of the Substation, Assembling the Base Structures and Placing of the Panels			
	6	Vibrations	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Electrical Cabling, Demobilization and General Cleaning of the Site			
	7	Soil Contamination	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Assembling the Base Structures and Placing the Panels, Demobilization and General Cleaning of the Site			
	8	Water Contamination	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Assembling the Base Structures and Placing the Panels, Demobilization and General Cleaning of the Site			

Means	Impacts		Generating Actions	Phase		
				Planning	Implementation	Operation
Biotic	9	Fauna Accidents	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Demobilization and General Cleaning of the Site			
	10	Loss of Vegetation Cover	Installation of Construction Sites, Earthmoving and Construction of Access Roads			
	11	Alteration and/or Loss of Habitats	Installation of Construction Sites, Earthmoving and Construction of Access Roads			
	12	Polarized Light Pollution - "Lake Effect"	Operation and Maintenance of the Photovoltaic Plant			
	13	Increased Hunting and Capture of Wildlife	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Assembling the Base Structures and Placing the Panels, Demobilization and General Cleaning of the Site			
	14	Disturbance to Fauna by Alteration of Sound Pressure Levels	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Electrical Cabling, Demobilization and General Cleaning of the Site			

Means	Impacts		Generating Actions	Phase		
				Planning	Implementation	Operation
Socioeconomic	15	Generating Expectations	Studies and Projects, Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Assembling the Base Structures and Placing the Panels, Electrical Cabling, Demobilization and General Cleaning of the Site			
	16	Tax Collection	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Electrical Cabling, Operation and Maintenance of the Photovoltaic Power Plant			
	17	Job Generation	Installation of Construction Sites, Earthmoving and Construction of Access Roads, Civil Construction, Construction of Substation, Mounting of Base Structures and Placing of Panels, Electrical Cabling			
	18	Dynamism in the Economy	Installation of Construction Sites, Earthmoving and Construction of Access Roads, Civil Construction, Construction of Substation, Mounting of Base Structures and Placing of Panels, Electrical Cabling			
	19	Pressure on Traffic and Road Infrastructure	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Electrical Cabling, Demobilization and General Cleaning of the Site			
	20	Alteration of the Daily Life of the Population	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Electrical Cabling, Demobilization and General Cleaning of the Site			
	21	Direct Interference in the Settlement Prof. Maurício Oliveira	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the Substation, Mounting of the Base Structures and Placing of the Panels, Electrical Cabling, Demobilization and General Cleaning of the Site			
	22	Work Accidents	Installation of the Construction Sites, Earthmoving and Construction of the Access Roads, Civil Construction, Construction of the			

Means	Impacts	Generating Actions	Phase			
			Planning	Implementation	Operation	
Socioeconomic		Substation, Mounting of the Base Structures and Placing of the Panels, Electrical Cabling, Operation and Maintenance of the Photovoltaic Power Plant				
	23	Pressure on the Public Services Infrastructure				
	24	Change of Land Use and Occupancy				
	25	Increase in Energy Supply	Operation and Maintenance of the Photovoltaic Complex			
	26	Utilization of Renewable Energy Source	Operation and Maintenance of the Photovoltaic Complex			

7 - ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The potential negative environmental impacts identified must be avoided, minimized, or compensated for; in the case of positive impacts, their beneficial effects can be enhanced. Thus, a set of measures is recommended, grouped and detailed in Environmental Plans and Programs.

The RDPA then suggested 16 Programs, from the analysis of the RAS and the LP application. Table 13 presents the Programs foreseen in the RDPA and a preliminary analysis of them.

Table 13 - Environmental Plans and Programs - RDPA

#	Program	Ecology Comment/Recommendation
1	Environmental Management Program	OK
2	Environmental Control Program of the Works	OK
3	Program for Training, Hiring and Demobilization of Local Labor	Complies with the prioritization of local labor
4	Worker Protection and Work Environment Safety Program	Meets evidence of work accident risk
5	Environmental Management Program	OK
6	Signalization program for the works	There are no specific actions in the program directed to the community
7	Solid waste and effluent management program	OK
8	Environmental safety and emergency program	OK
9	Urban equipment monitoring program	Addresses the pressure on public facilities and services
10	Environmental education and social communication program	The scope does not cover fundamental aspects for the mitigation of negative impacts, does not define specific social communication actions, and does not present the directly affected population as its target audience
11	Program for the control and monitoring of erosive processes	OK
12	Deforestation control program	Presents only generic guidelines without detailing the activities and action plan
13	Fauna Management Program	OK
14	Wildlife monitoring program	OK
15	Degraded area recovery program	It only presents a description of the stages and activities to be carried out, and there is a lack of indication of areas that can be recovered, as well as executive projects for each one of them, list of species that can be used in the projects and action plans
16	Project decommissioning plan	OK

To facilitate the analysis and understanding of the proposed measures and programs **Table 14** presents the identified impacts and the corresponding measures/programs.

Table 14 - Impacts and related measures

Means	Impacts		Associated Programs
Physical	1	Landscape Alteration	Environmental Education and Social Communication Program; Environmental Control Program; Degraded Areas Recovery Program
	2	Air Quality Alteration	Environmental Control Program
	3	Alteration of the Sonority	Environmental Control Program
	4	Emergence/Erosive Processes Aggravation	Erosive Processes Control and Monitoring Program
	5	Alteration in Surface Water Runoff	Environmental Control Program
	6	Vibrations	Environmental Control Program
	7	Soil Contamination	Solid Waste and Effluent Management Program
	8	Water Contamination	Solid Waste and Effluent Management Program
Biotic	9	Fauna Accidents	Fauna Management Program
	10	Loss of Vegetation Cover	Plant Suppression Program; Germplasm Rescue Program; Forest Replacement Program; Degraded Areas Recovery Program
	11	Alteration and/or Loss of Habitats	Fauna Management Program; Fauna Monitoring Program
	12	Polarized Light Pollution - "Lake Effect"	Avifauna Monitoring Program
	13	Increased Hunting and Capture of Wildlife	Fauna Management Program; Fauna Monitoring Program
	14	Disturbance to Fauna by Alteration of Sound Pressure Levels	Fauna Management Program; Fauna Monitoring Program
Socioeconomic	15	Generating Expectations	Environmental Education and Social Communication Program
	16	Tax Collection	Environmental Education and Social Communication Program
	17	Job Generation	Program for Training, Hiring and Demobilization of Local Labor
	18	Dynamism in the Economy	Environmental Education and Social Communication Program
	19	Pressure on Traffic and Road Infrastructure	Environmental Education and Social Communication Program; Works Signaling Program
	20	Alteration of the Daily Life of the Population	Environmental Education and Social Communication Program; Environmental Control Program for the Works
	21	Direct Interference in the Settlement Prof. Maurício Oliveira	Environmental Education and Social Communication Program; Environmental Control of the Works Program
	22	Work Accidents	Environmental Education and Social Communication Program; Worker Protection and Work Environment Safety Program
	23	Pressure on the Public Services Infrastructure	Urban Equipment Monitoring Program

Means	Impacts		Associated Programs
Socioeconomic	24	Change of Land Use and Occupancy	Environmental Education and Social Communication Program
	25	Increase in Energy Supply	Environmental Education and Social Communication Program
	26	Utilization of Renewable Energy Source	Environmental Education and Social Communication Program

In addition to the programs presented in the RDPA and those requested by the LP, the following Programs are suggested:

- **Germplasm Rescue and Plant Conservation Plan**

This program aims to rescue genetic material from plants existing in the area directly affected by the project that, due to their local characteristics, need conservation, whether for economic or scientific interest.

The program foresees: (i) the planning and execution of germplasm collection activities in the suppression areas; (ii) the follow-up of the vegetation suppression fronts during the implementation of the undertaking; (iii) the formation of a vegetal germplasm bank to be used preferably in activities associated with the Forest Replacement Program, the PRAD and/or for donation to research entities and forest gardens interested in the reproduction of the material.

- **Forest Replacement Plan**

This program establishes measures to compensate for the removal of vegetation by the implementation of the project, through the planting of seedlings, providing the rehabilitation of areas around the project, reintegrating them into the landscape, so that normal relations in the environment are recreated. These activities foresee a partnership with the UCs inserted in the project's area of influence and with the owners of the potential areas.

- **Noise and Vibration Level Monitoring Program**

During the implementation and operation phases of the project, the various activities related to the construction aspects have the potential to generate noise and vibration pollution. In order to ensure that the implementation of the project meets the requirements of the pertinent legislation, this Program will have the objective of monitoring and controlling the emission of sound pressure and vibrations, in accordance with the frequency and locations established in the environmental licensing process.

And, still, it is observed that certain relevant impacts on the socio-economic environment were not considered in the measures prepared in the RDPA, for example, for the execution of earthmoving services for opening accesses, construction site and installation of photovoltaic panels, no measures are considered regarding the impact related to the Prof. Mauricio de Oliveira Settlement project, which will be affected by the main access of the project.

In addition, it does not consider as impact the increase of heavy vehicles on the roads of the AID in the implementation phase and, therefore, there are no established measures, since the access roads to the communities do not present any type of paving or coverage, besides the lack of public transportation, which suggests the significant presence of pedestrians in the directly affected area.

8 - ENVIRONMENTAL AND SOCIAL ACTION PLAN - ESAP

According to the data and analyses presented in this report, the studies carried out to obtain the environmental licenses from IDEMA have technical deficiencies that can and should be complemented in the next stages of the project's implementation. Therefore, this item of the report will present on **Table 15** the risk identification, the associated solutions in the context of the studies and impacts with a view to obtaining the Operation License, adapting the environmental programs presented in the RDPA to the IFC and Equator performance standard principles and priorities of each action to be implemented.

The Appendix 12 presents de description of the main problems found and suggested solutions.

Table 15 - Environmental and Social Risks and Action Plan

RISK IDENTIFICATION AND UNCERTAINTIES	PROBABILITY OF OCCURRENCE	RESPONSE PLAN	PRIORITY	ACTION TO BE IMPLEMENTED
<p>Impact: Water consumption by the project</p> <p>Cause: shortages in the water supply</p> <p>Consequence: Project costs increased</p>	Possible	<p>Identify the suppliers that can provide the necessary water volume for the project by water truck</p> <p>Assess the environmental regularity of water suppliers, as well as assess the source used, considering the multiple uses of water</p> <p>Assess the possibility of alternative/backup sources of water supply, such as existing wells in the region</p>	High	BEFORE CONSTRUCTION
<p>Impact: Change in air quality</p> <p>Cause: Circulation of machines and vehicles at the project site and accesses</p> <p>Consequence: Project costs increased</p>	Likely	<p>Formulate a specific program that contains the details of measures associated with the control of emission of particulate matter, taking into account the best international practices (example: regular wetting of access roads by water truck)</p> <p>Report and maintain constant communication with the environmental agency, indicating the measures taken</p>	Low	THROUGHOUT THE CONSTRUCTIVE PHASE
<p>Impact: Soil erosion</p> <p>Cause: project implementation</p> <p>Consequence: Project costs increased</p>	Almost certain	<p>Reformulate a specific Soil Erosion Control Program with actions and devices to minimize soil erosion, according to the best international practices</p> <p>Report and maintain constant communication with the environmental agency, indicating the measures taken</p>	Low	THROUGHOUT THE CONSTRUCTIVE PHASE
<p>Impact: Noise and Vibration Emission</p> <p>Cause: project implementation</p> <p>Consequence: Project costs increased</p>	Almost certain	<p>Reformulate a specific Noise Monitoring and Control Program that contains the details of measures associated with the control of noise and vibration, taking into account the best international practices</p> <p>Report and maintain constant communication with the environmental agency, indicating the measures taken</p>	Low	THROUGHOUT THE CONSTRUCTIVE PHASE
<p>Impact: Suppression of native vegetation without proper sampling of plant communities</p> <p>Cause: Installation of the project's infrastructure</p> <p>Consequence: Elimination of possible threatened, rare or endemic species.</p>	Almost certain	Carry out comprehensive sampling and application of environmental programs, such as: Rational Deforestation Program (review) and include Germplasm Rescue and Plant Conservation Plan, Degraded Areas Recovery Plan and Forest Replacement Plan.	High	BEFORE CONSTRUCTION
<p>Impact: Suppression of individuals belonging to the species <i>Spondia tuberosa</i> (umbu)</p> <p>Cause: Installation of the project's infrastructure</p>	Almost certain	Assess the resulting social and environmental impacts, minimize or offset negative impacts on producers, and keep them informed about potential risks to their livelihoods.	High	BEFORE CONSTRUCTION

RISK IDENTIFICATION AND UNCERTAINTIES	PROBABILITY OF OCCURRENCE	RESPONSE PLAN	PRIORITY	ACTION TO BE IMPLEMENTED
<p>Consequence: Decreases of the source of income of current owners/local producers</p>				
<p>Impact: Proper disposal of deleted material</p> <p>Cause: vegetation clearing</p> <p>Consequence: administrative penalties by the environmental agency, judicial and financial onus</p>	Possible	Review the Rational Deforestation Program, following the rules of federal and state legislation for the proper disposal of suppressed material.	Medium	BEFORE CONSTRUCTION
<p>Impact: Misclassification of Permanent Preservation Areas and Legal Reserves</p> <p>Cause: Misconception of the methodology for classification of APP/RL</p> <p>Consequence: Mistaken measurement of the project's useful area with costs of redoing the registrations</p>	Almost certain	Consider the rectification of this area in the rural environmental registry (CAR) with such rectification being carried out by the registering owner and technician.	Medium	BEFORE CONSTRUCTION
<p>Impact: Polarized Light Pollution (Lake Effect)</p> <p>Cause: intense presence of solar plates</p> <p>Consequence: morte de indivíduos da avifauna</p>	Possible	<p>Develop and execute a bird collision monitoring program in the operational phase</p> <p>Installation of anti-landing devices or fauna repelling equipment during construction</p>	Medium	BEFORE CONSTRUCTION THROUGHOUT THE OPERATION PHASE
<p>Impact: Increased hunting and capturing of fauna</p> <p>Cause: vegetation clearing</p> <p>Consequence: Elimination/trafficking of fauna individuals</p>	Likely	Carry out Environmental Education actions with the population and workers	Low	THROUGHOUT THE CONSTRUCTIVE PHASE
<p>Impact: Change and/or loss of habitat</p> <p>Cause: vegetation clearing</p> <p>Consequence: Driving away fauna, increasing competition and reducing species richness and abundance</p>	Almost certain	<p>Run the Wildlife Fauna Monitoring Program</p> <p>Execute the Wildlife Fauna Management Program</p>	Low	THROUGHOUT THE CONSTRUCTIVE PHASE
<p>Impact: Disturbance of fauna by noise</p> <p>Cause: Carrying out the construction (movement of vehicles, operation of machinery, clearing of vegetation, movement of people)</p> <p>Consequence: Driving away fauna, interfering with the reproductive success of amphibians and birds</p>	Almost certain	<p>Run the Wildlife Fauna Monitoring Program</p> <p>Execute the Wildlife Fauna Management Program</p>	Low	THROUGHOUT THE CONSTRUCTIVE PHASE

RISK IDENTIFICATION AND UNCERTAINTIES	PROBABILITY OF OCCURRENCE	RESPONSE PLAN	PRIORITY	ACTION TO BE IMPLEMENTED
<p>Impact: Wild Fauna accidents</p> <p>Cause: Vehicle movement, machinery operation, vegetation clearing</p> <p>Consequence: Death of avifauna individuals</p>	Almost certain	Execute the Wildlife Fauna Management Program	Low	THROUGHOUT THE CONSTRUCTIVE PHASE
<p>Impact: Lack of Fauna Management Authorization for the Wild Fauna Monitoring Program and Fauna Management Program</p> <p>Cause: Need to manage animals in the suppression phase during program execution</p> <p>Consequence: Delay in the start of construction</p>	Almost certain	Obtain Wildlife Fauna Management and Wildlife Monitoring Authorization	High	BEFORE CONSTRUCTION
<p>Impact: Deficiency/lack of regular and updated information about the project for the occupants of the properties (caretakers)</p> <p>Cause/Reason: The lack of communication between housekeepers and company representatives results in an increase of expectations and also in uncertainty regarding the future, causing discomfort.</p> <p>Consequence: Sensation of uncertainty and increased tension due to lack of knowledge about the process and policy of resettlement.</p>	Likely	<p>Provide a relationship and engagement plan with occupants/caretakers by carrying out actions with the following objectives:</p> <ul style="list-style-type: none"> - Consultation with property occupants to understand the current situation and listen to their desires and demands. Formulate questions to be asked to the caretakers. - Establish a direct and regular communication routine and an effective channel with property occupants from the properties that shall be relocated. <p>Proposed Questions to Property occupants/farm employees:</p> <ul style="list-style-type: none"> . What do you expect from the entrepreneur in terms of the consequences of the implementation of this project? How it will affect your livelihood? . Would you like to maintain/improve your current living conditions? . Do you have any other land/place to live? If yes, where? . What are the current conditions in this place? Is there a property where you can live in? Will you be able to replicate or improve your current livelihood pattern? If the answer is negative, do you have in mind where you would like to acquire a new property? <ul style="list-style-type: none"> - Establish a direct and regular communication routine and an effective channel with property occupants from the properties that shall be relocated; - Evaluation of alternatives other than involuntary resettlement; - Provide continuous feedback on the progress of actions to be taken; - Involve the parties in the decision-making process. 	High	BEFORE CONSTRUCTION
<p>Impact: The occupants of the properties/Caretakers shall be relocated</p> <p>Cause/Reason: The properties where these occupants live will be used in the implementation of the project and the caretakers will be affected.</p>	Possible	<p>Preparation of a specific Action Plan for Relocation/Resettlement</p> <ul style="list-style-type: none"> - Identify the impacts of the project and how the properties' occupants will be affected; - Define a legal framework for land acquisition; - Establish and define models/strategies of compensation for physical and/or economic displacement; - Define the resettlement/relocation implementation plan - Establishment of a detailed budget for all action plans; 	High	BEFORE CONSTRUCTION

RISK IDENTIFICATION AND UNCERTAINTIES	PROBABILITY OF OCCURRENCE	RESPONSE PLAN	PRIORITY	ACTION TO BE IMPLEMENTED
<p>Consequence: Evaluation of alternatives other than involuntary resettlement</p>		<ul style="list-style-type: none"> - Preparation of the chronogram and the detailed schedule involving all phases of the process; - Establishment of relocation procedures responsibilities; - Establishment of the level of engagement and participation of affected parties in planning, development and decision making in the whole context of the situation; - Create and keep a communication channel for complaints, suggestions and information; - Development of monitoring, evaluation and reporting of actions taken, in progress or when corrective actions are needed. According to the best practices, this activity should continue for at least three years after the resettlement ends. - After this period, as a best practice, the entrepreneur must carry out an independent assessment in order to evaluate the results of the process in terms of improving the quality of life of the affected parties and the actions that shall be implemented to restore the living standards and if the procedures were executed in an appropriate manner . 		
<p>Impact: No relocation of property occupants.</p> <p>Cause/reason: The areas planned for the implementation of the project will not consider the occupants' properties</p> <p>Consequence: Permanence of residents on the properties. No impacts</p>	Possible	<p>Develop an engagement and relationship plan with the following actions:</p> <ul style="list-style-type: none"> - Hold separate meetings with the occupants of the properties to inform about the permanence on the property, present the project, work schedule and definition of agreements to remain on the property; - Establish a direct focal point of the entrepreneur for regular relationship and communication with occupants; - Evaluate job opportunities and the possibility to hire occupants in the project phases, implementation and operation, for example; - Consider the best practices to implement improvements in the conditions and livelihoods of these occupants, regarding housing and productive activities to increase income generation; - Establish technical assistance procedures regarding productive activities carried out by the occupants; - Offer support to the feasibility of processes of the production chain on the property, considering production, sale and transport. - Monitoring and evaluation of the activities implemented by an action plan developed for the project regarding the non-relocation process, considering a period of at least two years. - After this period, as a best practice, the entrepreneur must carry out an independent assessment in order to evaluate the results of the process in terms of improving the quality of life of the affected parties and the actions that shall be implemented to restore the living standards and if the procedures were executed in an appropriate manner . 	High	BEFORE CONSTRUCTION

RISK IDENTIFICATION AND UNCERTAINTIES	PROBABILITY OF OCCURRENCE	RESPONSE PLAN	PRIORITY	ACTION TO BE IMPLEMENTED
<p>Impact: Deficiency/lack of constant and updated information on the project's progress for the properties' owners</p> <p>Cause: The lack of information has generated expectations and demands by the owners.</p> <p>Consequence: Unsatisfaction and insecurity due to the lack of time concerning the project's implementation</p>	Likely	<p>Development of a relationship and engagement plan with properties' owners by holding/scheduling meetings with the following objectives:</p> <ul style="list-style-type: none"> - Disclosure of the project and the presentation of the new entrepreneur, also showing the layout of the project, chronogram, the start-up period and other relevant issues for this group. These owners reported during the field work that they did not know the whole context of the project, as well as they mentioned a lack of information about the exact areas that will be used and the way how the entrepreneur will implement in the region. This situation is an example of the impacts regarding the lack of communication with the inhabitants of the farms in a way to define how they will release their properties. - Establish a direct and effective communication routine with the owners using the appropriate tools with the purpose of clarification, disclosure of information and to answer any questions and doubts; - Establish and maintain a constant and regular contact with land owners, holding monthly meetings to provide them any information and to update the project's implementation status; - It is important to mention that Scatec, if acquiring and being part of the project, shall clarify the issue related to the payment of a monthly indemnity to property owners, from the moment their properties are purchased by the entrepreneur. <p>This situation was verbalized between the parties, but it is necessary to formalize this agreement in legal terms, in which the owners will receive a monthly amount to be defined, from the moment of delivery of the property to its relocation and the beginning of the operation, as a means of compensate farmers for the interruption of their productive activities.</p> <ul style="list-style-type: none"> - It should be noted that even though there is legal support for all parties involved in this property acquisition process, it is important to engage with the properties' owners to clarify the entire process, in order to guarantee the necessary transparency in this entire context. - This aspect considers the consonance of the legal process with the best social responsibility practices. This action will help Scatec to strengthen the relationship with the parties based on dialogue, transparency and trust. 	High	BEFORE CONSTRUCTION
<p>Impact: Deficiency/lack of information about the project for the residents of the settlement</p> <p>Cause: Lack of information generates negative expectations and demands</p> <p>Consequence: Unsatisfaction due to the total lack of contact and relationship with the company.</p>	Almost certain	<p>Elaborate and implement an engagement plan, starting with consultation with the settlers and meetings to present the Project informed about the work schedule, impacts, mitigation measures, number of vacancies and workforce profile, hiring process and other doubts and questions.</p> <p>Create a phone line 0800 service to clarify doubts and complaints.</p> <p>Establish a continuous feedback process regarding the progress of actions to be taken.</p>	High	BEFORE CONSTRUCTION
<p>Impact: Vibration Emission</p> <p>Cause: Project implementation.</p>	Almost certain	<p>Meetings with representatives of the associations and residents to discuss possible solutions to minimize the inconvenience and impact to settlers the such as establishing timetables for the circulation of trucks.</p>	Medium	THROUGHOUT THE CONSTRUCTIVE

RISK IDENTIFICATION AND UNCERTAINTIES	PROBABILITY OF OCCURRENCE	RESPONSE PLAN	PRIORITY	ACTION TO BE IMPLEMENTED
<p>Consequence: The emission of vibrations is a relevant social and environmental aspect, considering that the routine activities in the implementation phase, such as the circulation of trucks and heavy machinery, have the potential to cause inconvenience to the population in the vicinity of the project and its accesses, notably in the Prof. Mauricio Oliveira, including damage to improvements and homes.</p>		<p>Establish a continuous feedback process regarding the progress of actions to be taken.</p> <p>Propose the creation of a Project Monitoring Commission with the participation of representatives of the settlers, municipal authorities, public prosecutors, NGOs.</p>		PHASE
<p>Impact: Lack of consent from INCRA due to the presence of the Settlement Project.</p> <p>Cause: Need for INCRA's consent before issuing the installation license</p> <p>Consequence: Project costs increased due to INCRA's request for compensatory actions</p>	Almost certain	<p>It is recommended to obtain further information regarding this matter in order to assess if INCRA was consulted.</p> <p>It becomes more relevant once that the main access/road to the site goes through the limits of PA Maurício de Oliveira.</p>	Low	BEFORE CONSTRUCTION
<p>Impact: Failure to survey the Stakeholder Mapping</p> <p>Cause: Failure to carry out the Preliminary Stakeholder Mapping does not identify the existence of prior issues, tensions, conflict situations between the interested parties, situations of support or rejection regarding the arrival of the project, as well as the motivations involved, based on information available from official and unofficial sources and consultation with interested parties.</p> <p>Consequence: Failure to carry out stakeholder consultations can bring risk to the project, such as a process of opposing mobilization and resistance to the project, or even seeking the Public Ministry</p>	Almost certain	<p>Carry out consultations and meetings with stakeholders to present the project, with a schedule, the impacts in the different phases and their mitigation measures, the opportunities arising from the project, and also clarify how they may or may not be impacted on a daily basis. Inform the mechanisms of communication channels and complaints.</p> <p>Based on the result of stakeholder consultations, elaborate an Engagement and Relationship Plan with all interested parties, including public agencies, non-governmental organizations operating in the area of the enterprise, religious institutions, teaching, research and social movements, trade union.</p>	Low	ALL PHASES (BEFORE CONSTRUCTION; CONSTRUCTION PHASE; OPERATION PHASE)

9 - CONCLUSIONS

The Environmental and Social Impact Assessment of the Mendubim Project, to be implemented in the municipality of Açú/RN, was carried out based on the current environmental legislation, the environmental studies carried out as part of the environmental licensing process, World Bank Policies, and the World Bank's Environmental Health and Safety Performance Standards. And also, based on a technical visit to the site to survey the environmental and social conditions, stakeholder consultation, analysis of the possible project intervention, and finally, analysis of the potential socio-environmental impacts associated with all aspects of the proposed project.

The project will be developed in the northeast region of the country, in a caatinga biom vegetation area, with approximately 800 hectares of native vegetation to be suppressed. The project area will consist of 10 properties, two of them with vulnerable residents and one property still being used by the owner for housing. The project also presents a direct impact in the area of two settlements, especially the Prof. Mauricio de Oliveira settlement, which houses the project's main access during construction.

As presented, the licensing process, already established to Installation License, met the minimum legal requirements existing at the time of its development. However, in order to start the installation phase, the fauna and vegetation suppression authorizations are still necessary, as well as the starting the licensing process for the transmission line, substation, and construction site (including authorizations from intervening agencies, especially IPHAN).

Regarding the socio-environmental diagnosis carried out in the RAS (Simplified Environmental Report), confirmed in large part by this ESIA, the issue that most needs the Buyer's attention is socioeconomic, due to communication deficiencies and failures in previous processes and to date, evidenced with the community, owners and residents. Therefore, an environmental and social analysis was carried out considering multidisciplinary criteria such as soils, air quality, noise and vibration, water resources and water quality, species of importance for the conservation of fauna and flora, as well as several socioeconomic aspects, including interviews with the local population. The impact analysis of the RAS was found to be superficial, and therefore was recommended a new impact matrix, with justification for the removal and inclusion of some suggested impacts. The analysis considered all the interventions that will be made in the physical, biotic and, mainly, socio-economic environments, such as, alteration in the landscape and in land use, loss of vegetation cover, pressure on traffic and existing public service infrastructure, besides direct interference in one of the settlements. From this analysis it was concluded that most impacts are expected to occur during the construction phase and are considered temporary in nature. However, it is worth pointing out that the impact of changing the use of the soil, as a result of the need to suppress approximately 800 hectares of native vegetation, is an irreversible impact and deserves special treatment in the scope of the measures and action plan.

Based on the impacts and socio-environmental programs of the RDPA identified in the studies and experience in other projects of the same nature, an analysis was carried out based on risks and uncertainties, correlating the probability of their occurrence. Based on this result, an action plan was prepared, prioritizing the actions to be implemented with the objective of assisting the Buyer in decision making. Also, a critical analysis of the Environmental Programs indicated by the RDPA was carried out, where some points for improvement were pointed out, as well as new programs suggested.

From the standpoint of community relations and biodiversity loss, although not addressed in the context of environmental permitting, the project can be considered sensitive, although not complex. In other words, these two aspects must be given the proper treatment so that the impacts are effectively mitigated. Regarding the other impacts, there is nothing to highlight, so that the proposed mitigation measures will be easy to implement, especially those related to construction, which are under the responsibility of the contractors.

Implementation of the Action Plan will help the developer comply with the national regulatory framework as well as meet the requirements of the IFC Performance Standards. In addition, according to the assessment of the lack of information about the project and the vulnerable situation of some families, this study also suggests the preparation of the Stakeholder Engagement Plan and the Stakeholder Outreach and Consultation Plan in accordance with the appropriate policy for the funding agency.

Therefore, it can be said that the impacts of the project are mitigable or compensable, if the guidelines set forth in this document are followed.

10 - TECHNICAL TEAM

The following table lists the professionals involved in this study and their responsibilities.

Table 16 - List of the Technical Team responsible for the ESIA.

Professional	Function	Training	RG or Registration in Class Council	CTF IBAMA
Management and Coordination				
Raphaela Ferreira (*)	Project Manager and Technical Coordinator	Biologist, MSc. Applied Ecology	CRBio 49549/04	2224834
Marco Brancato	Technical Specialist - IFC Standards and Equator Principles	Forest Engineer	CREA RJ 123905-D	188330
Fernanda Leite Barbosa	Technical Reviewer	Attorney, Msc. Energy and Environmental Planning	ID 12122619-5	-
Legal Aspects				
William Duarte Almeida	Legislation	Attorney	OAB/RJ 202.251 and OAB/SP 411.420	-
Physical Environment and Integrated Analysis				
Ingo Salvador Kuerten	Coordinator of the Physical Environment and Integrated Analysis Nucleus	Geographer, MSc. Geography - Environmental Analysis	CREA-RS 161394-D	5011289
Felipe Fraifield	Physical Environmental Technician	Geographer and Environmental Engineer	CREA-RJ 2011116095	3747273
Carolina Malta Nunes	Integrated Analysis Technician	Agricultural and Environmental Engineer	CREA-RJ 2019100587	6131142
Renata da Silva Corrêa	Integrated Analysis Technician	Geographer, MSc.	CREA-RJ 2019100244	4119105
Biotic Environment - Fauna and UCs				
Rafaela Dias Antonini	Coordinator of the Fauna Center	Biologist, MSc. Animal Biology	CRBio 32785/02	251189
Luiz Henrique Lyra	Fauna Technician	Biologist, MSc.	CRBio 65548/02	4971510

Professional	Function	Training	RG or Registration in Class Council	CTF IBAMA
Biotic Environment - Flora				
Hiram Feijó Baylão Júnior	Flora Nucleus Coordinator	Forest Engineer, DSc.	CREA-RJ 2008119693	3682974
Alexandre Medeiros dos Santos	Flora Technician	Forest Engineer, DSc.	CREA-RJ 2010136277	3296987
Thiago Ferreira de Souza	Flora Technician	Forest Engineer	CREA-RJ 2011129181	5507769
Socioeconomic Environment				
Marcus Vinicius Ferreira do Nascimento	Coordinator of the Socioeconomics Center	Production Engineer	CREA 1999119319	4200245
Simone de Oliveira Siviero	Stakeholders and IFC Standards Specialist	DSc. Social Sciences	RG 06240753-1 IFP/RJ	292228
Aline Viana de Sousa	Socioeconomics Technician	Social Scientist, MSc.	MTE 0000745/RJ	5910991
Jessica Siviero Vicente	Socioeconomics Technician	Social Scientist	RG 12312069 SSP MG	7857968
Geoprocessing				
Marília Salgado Martins	Geoprocessing Center Coordinator	Forestry Engineer	CREDA 2010146561	3889738
Pedro Cartaxo Faustini	GIS Technician	Geographer	RG 21439713-5 DETRAN/RJ	4261225
Editing				
Francine Azeredo	Editing Coordinator	Systems Analyst	RG 11091672-3 DETRAN/RJ	-
Vanessa Romão	Publishing	Systems Analyst	RG 10416994-1 IFP/RJ	-

(*) Replaced by the new project manager (Daniela Sittop) who managed and reviewed the report together with the teams.

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Appendix 1 - Site Visit Plan

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SITE VISIT PLAN

1 - INTRODUCTION

The following site visit plan describe the main activities that will be conducted during the field work. As discussed with Scatec during the meeting on April 22nd, when it is necessary, the team will be presenting themselves as in *“a data gathering mission on behalf of potential investors, which will be updating the studies that has been made 3 years ago”*. We will also make sure we have the same message for everybody.

2 - TEAM

The site visit will be carried out by 03 people, being:

- Forest Engineer Thiago Silva
- Biologist Luiz Henrique Santos
- Social Scientist Jéssica Siviero

3 - LOGISTICS

The forest engineer and biologist will travel by plane from Rio de Janeiro (RJ) to Natal (RN) and then will go to Açu (RN) by car on April 27th and return to Rio de Janeiro on April 30. The Social Scientist will travel by plane from Rio de Janeiro (RJ) to Natal (RN) on April 27th and return to Rio de Janeiro on May 1st. These dates may change if during the fieldwork the team identify it will be necessary more days of work. They all will stay at Hotel União, in Açu.

4 - MAIN ACTIVITIES

4.1 - SOCIOECONOMIC

During the fieldwork the social scientist will focus her work on interviewing the people of the Settlement projects, the people living in the farm and also the landowners. The social scientist will conduct semi-structured interviews, aiming to understand and describe the landuse and way of living of the people that might be affected by Mendubim Project.

4.1.1 - Settlement Project

Regarding the settlement projects, the work will focus mainly on the one affected by the improvement of the access road, named PA Professor Mauricio de Oliveira. The objective is to identify and describe the way of life of the residents and also identify its infrastructure and access to public services. Below we list some questions that the team will have in mind in order to make the interviews and get the necessary answers. It is important to note that the questions will not be necessarily made in such terms to the interviewees.

- Report on the settlement process, how many families, infrastructure (update and complete the RAS)
- How do they live?
- What do they do for living?
- Talk about the difficulties and challenges in the settlement. Remember to address the water issue.
- Does the settlement have any project with public or private agencies? If so, which ones?
- Identify the Legal Reserve area of the settlement.

Following we specify the issues and questions to be made in order to raise the kNowledge or not of the settlers about Mendubim project:

- What kind of information has been passed on (what do they really kNow)?
- Who and when did they have this information (considering the studies were carried out 3 years ago)
- What are the expectations, desires, and doubts about the project/this kind of project?
- Are you aware of other projects of this nature or similar in the region? If so, which one (s)?
- Do you believe that a project like this/this project will interfere with your daily life? If so, explain how?
- What are the positive and negative points of the implementation of this project?
- Ask the interviewee to explain the positive and negative points.
- What is your position in relation to the project? Whatever the respondent's response, ask why.

4.1.2 - Landowners

Following we specify the issues and questions to be made to landowners:

- Interview the owner to understand the negotiation process and current situation. Does he receive any money yet?
- Has the new entrepreneur already established contact? If so, who? When? How was that contact? What information is passed on?
- Would you like to say anything else? Asking questions, clarifying questions, answering questions?
- For Mr Vandick: where are you moving from? Do you have any income from the land nowadays?
- For Mr Antonio Almeida: what is the partnership do you have with the tenants?

4.1.3 - Employees/Tenants

Following we specify the issues and questions to be made to employees:

- To find out if he was actually informed that should you leave the farm? If so, what was said.
- What was proposed? A new place to live and work? Or just pay for those years of work.
- Did you feel or do you feel pressured?
- Are you satisfied with the agreement proposed by the owner? If not, what?
- How is your current life? Check the living conditions (income, who lives, vulnerable).
- And ask the interviewee on the move he will be able to maintain his current living conditions
- He can answer that he heard about the project from other people. If so, ask who and what has been told for him?
- What will he do once the project starts? Do you know where to go? When? Like?
- What do you think about this change in life? How is this impacting the you and your family?

4.2 - BIOTIC ENVIRONMENT

4.2.1 - Fauna

During the survey, the fauna specialist will carry out a characterization of the environment present in the area of the photovoltaic complex and associated LT, as well as identify the presence of fauna species, their habitats and available resources that may be affected during the implementation and operation of the enterprise.

Prior to the survey, sites of potential occurrence of fauna and its resources will be selected, based on satellite images and pictures taken in the project area. In the field, these places should be visited for photographic registration and confirmation of pre-identified information.

4.2.2 - Vegetation

The flora specialist will carry out a characterization of the plant formations present in the area of the Photovoltaic Complex and associated LT, as well as identify the presence of species of flora and observe whether natural resources are used. Legal Reserve areas in interface with the enterprise will be visited to characterize the current use and land cover.

Prior to the survey, areas with different plant types and areas of permanent preservation will be selected, based on satellite images. In the field, these places should be visited to characterize the local flora, photographic records and confirmation of pre-identified information.

4.3 - PHYSICAL ENVIRONMENT

During the survey, the aspects of the physical environment that will be evaluated focus on the water resources existing in the project areas, aiming to identify the vulnerability of surface and underground water impacts that could happen during the work phase and operation of the enterprise

The specialists will also evaluate the existence of environmental liabilities resulting from irregular mineral exploration, as well as aspects related to soil erosion. The impact of vibrations and particle pollution caused by the circulation of machinery and trucks during the work phase of the enterprise will also be evaluated through the inspection of community constructions build near the access road to the project.

The field points were selected based on satellite image interpretation and analysis of data wells, topographic charts and mining processes. These points should be registered by photographic records and data collected by notes.

Appendix 2 - Preliminary Stakeholder Mapping and Analysis (Digital)

Appendix 03 - Environmental Legislation

1.1.1 - Main Environmental Legislation Applicable to the Project

Federal

- Federal Law No. 6,938/1981 - National Environment Policy;
- Federal Law No. 12,651/2012 - Forestry Code;
- Joint Ministerial Ordinance n. 60/2015 - Regulates the intervention of other government agencies in the environmental licensing procedure.

State of Rio Grande do Norte

- Complementary State Law n. 272/2004 - State Environment Policy;
- Normative Instruction IDEMA/RN No. 01/2018 - Regulates the environmental licensing of solar power structures.
- CONEMA/RN Resolution No. 03/2011 - Regulates the forestry compensation.

Municipality Rio Grande do Norte

- Complementary Municipal Law n. 015/2 - Municipal Development Plan.

1.1.2 - Other Environmental Legislation

The following are other legal provisions applicable to the project.

- Complementary Law No. 380 of December 26, 2008. Amends State Complementary Law no. 272, of March 3, 2004, modifies the name of the Environmental Defense Institute of RN and makes other provisions
- State Law No. 6.621/1994, which provides for the control of noise pollution and conditioning of the environment in the state of Rio Grande do Norte and makes other provisions.
- Federal Law No. 8.723, October 1993. Provides for the reduction of pollutant emissions by automotive vehicles and makes other provisions.
- Federal Law no. 6.938, of August 31, 1981. Provides on the National Environmental Policy, its purposes and formulation and application mechanisms, and makes other provisions.
- Federal Law no. 9.605, of February 12, 1998. Provides on the penal and administrative sanctions derived from conducts and activities that are harmful to the environment, and makes other provisions.
- Law N° 12.651, of 05/25/2012 that provides for the protection of native vegetation.
- Law N° 10.650/2003
- Law N° 11.284/2006
- Law No. 12,727, of 17/10/2012
- Law N° 13.295, of 06/14/2016
- Decree No. 8,235 of 05/05/2014. Establishes general rules complementary to the Environmental Regularization Programs of the States and the Federal District, referred to in Decree No. 7,830, of October 17, 2012, establishes the Mais Ambiente Brasil Program, and makes other provisions.
- Decree No. 7,830, of 10/17/2012

- Minter Ordinance N° 100, de 14/07/1980 - Provides on the emission of smoke by vehicles powered by diesel oil.
- MMA Ordinance No. 103, of 04/05/2006
- MMA Ordinance N° 253, of 08/18/2006 that institutes, as of September 1, 2006, within the scope of the Brazilian Institute of Environment and Renewable Natural Resources - IBAMA, the Forest Origin Document - DOF to replace the Authorization for Transport of Forest Products - ATPF.
- MMA Ordinance No. 443, of 12/17/2014
- IBAMA NORMATIVE INSTRUCTION No. 112, of August 21, 2006, which deals with the definitions and concepts used in issuing the Forest Origin Document - DOF;
- IBAMA Normative Instruction No. 06, of 04/07/2009
- IBAMA Normative Instruction No. 21, of 12/23/2014 that establishes the National System for the Control of the Origin of Forest Products - SINAFLOR, with the purpose of controlling the origin of wood, charcoal and other forest products and by-products and integrating the respective data from the different federative entities.
- MMA Normative Instruction No. 01/2008
- MMA Normative Instruction No. 02, of 05/06/2014, which provides on the procedures for the integration, implementation and compatibility of the Rural Environmental Register System-SICAR and defines the general procedures of the Rural Environmental Register-CAR
- MMA Normative Instruction No. 06, of 12/15/2006
- CONAMA Resolution 001/1990 - Provides on criteria for noise emission standards, as a result of any industrial activities.
- CONAMA Resolution 02/1990 - Establishes the National Program for Education and Control of Noise Pollution - SILENCE.
- CONAMA Resolution 05/1989 - Establishes the National Air Quality Control Program.
- CONAMA Resolution 491/2018 - Provides for air quality standards.

- CONAMA Resolution No. 300/2002
- CONAMA Resolution No. 369/2006, states about the exceptional cases, of public utility, social interest or low environmental impact, which allow the intervention or suppression of vegetation in Permanent Preservation Areas.
- CONAMA Resolution No. 378, of 10/19/2006
- CONAMA Resolution No. 379, of 10/19/2006
- Law No. 3.924 (07/26/1961);
- CONAMA Resolution 01/86 Article 6, Paragraph I, Subparagraph C;
- Federal Constitution of 1988 (Article 225, Paragraph IV) and Article 216;
- CONAMA Resolution 237/97;
- IPHAN Ordinance No. 07 (12/01/1988);
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- International Finance Corporation (IFC) / World Bank Group (WBG). Environment, Health and Safety Recommendations. Environmental, Health & Safety - EHS Guidelines, section 1.7 - Noise. 2007.
- OIML International Recommendation R 58:1998, Sound level meters.
- OIML International Recommendation R 88:1998, Integrating-averaging sound level meters.
- ISO 10052:2020, Acoustics - Field measurements of airborne and impact sound insulation and of service equipment sound - Survey method.
- ISO 13.080.01, SOIL QUALITY AND PEDOLOGY IN GENERAL INCLUDING POLLUTION, EROSION, DEGRADATION, ETC.

- ISO 1996-1/2016 - Establishes the basic quantities to be used for the description of noise in community environments and provides basic assessment procedures.
- ISO 1996-2/2017, Acoustics - Description, measurement and assessment of environmental noise - Part 1: Basic quantities and procedures and Part 2: Determination of sound pressure levels.
- ABNT NBR 10.151/2019 Er1:2020 - Acoustics - Measurement and evaluation of sound pressure levels in inhabited areas - General purpose application.
- ABNT NBR 11.682/2009, which deals with slope stability.
- ABNT NBR 13.412/95 - Particulate matter in suspension in the atmosphere - Determination of the concentration of inhalable particles by the large volume sampler method coupled to an inertial particle separator.
- ABNT NBR 16313 - Acoustics - Terminology.
- ABNT NBR 6016/2015 - Assessment of soot content with the Ringelmann scale.
- ABNT NBR 7027/2001 - Automotive road vehicles - Smoke emitted by diesel engine - Determination of opacity or degree of blackening at constant regime.
- ABNT NBR 8044/2018, Geotechnical Project.
- ABNT NBR 9.547/97 - Particulate matter in suspension in ambient air - Determination of total concentration by the large volume sampler method.
- IEC 60942, Electroacoustics - Sound calibrators.
- IEC 61094-4, Measurement microphones - Part 4: Specification for working standard microphones.
- IEC 61094-5, Electroacoustics - Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison.
- IEC 61094-6, Measurement microphones - Part 6: Electrostatic actuators for determination of frequency response.

- IEC 61260-1, Electroacoustics - Octave-band and fractional-octave-band filters - Part 1: Specifications; IEC 61260-2, Electroacoustics - Octave-band and fractional-octave-band filters - Part 2: Pattern evaluation tests.
- IEC 61260-3, Electroacoustics - Octave-band and fractional-octave-band filters - Part 3: Periodic tests.
- IEC 61672-1, Electroacoustics - Sound level meters - Part 1: Specifications IEC 61672-2, Electroacoustics - Sound level meters - Part 2: Pattern evaluation tests.
- IEC 61672-3, Electroacoustics - Sound level meters - Part 3: Periodic tests.

Appendix 4 - Declaration of Açu Municipality



ESTADO DO RIO GRANDE DO NORTE
PREFEITURA MUNICIPAL DO ASSÚ
SECRETARIA MUNICIPAL DE MEIO AMBIENTE E URBANISMO - SEMURB

CERTIDÃO DE USO E OCUPAÇÃO DO SOLO

Nº 020/2021

VALIDADE: 28/04/2024

NÚMERO DO PROTOCOLO: 5292/2021

Certificamos para os fins de licenciamento ambiental, que o empreendimento do **COMPLEXO FOTOVOLTAICO MENDUBIM**, com potência total de **453MW**, distribuídas em **13 Usinas Solares Fotovoltaicas (UFV)**, a ser implantado no município de Assú, com instalações descritas a seguir:

UFV	Potência (MW)	UFV	Potência (MW)	UFV	Potência (MW)
Mendubim 1	36,0	Mendubim 6	33,5	Mendubim 11	57,0
Mendubim 2	33,0	Mendubim 7	29,0	Mendubim 12	27,5
Mendubim 3	36,0	Mendubim 8	34,0	Mendubim 13	25,0
Mendubim 4	36,5	Mendubim 9	36,0	-	-
Mendubim 5	33,5	Mendubim 10	33,0	-	-

A área do projeto é de aproximadamente 1.213,00 ha, localizado nas coordenadas de referência em UTM (Zona 24M): **718.864,00mE; 9.379.331,00mN**, Datum SIRGAS 2000.

A instalação, a operação e a manutenção são de interesse e responsabilidade da **MENDUBIM GERAÇÃO DE ENERGIA LTDA**, inscrito no CNPJ de nº 37.640.312/0001-70, com endereço no Sítio Dois Irmãos, Município de Assú/RN, CEP: 59.650-000, e está em conformidade com a Lei Municipal Complementar Nº 015/2006 de uso e ocupação do solo, estando localizado na **Zona Rural** do Município definida no Plano Diretor, **devendo ser atendidas as seguintes condicionantes:**

1. Quando do início da execução da obra, apresentar a SEMURB os seguintes documentos:
 - 1.1. Licença(s) Ambiental(is);
 - 1.2. Alvará Municipal

Luzia Luana Berto da Silva Fernandes
Secretária M. de Meio Ambiente
e Urbanismo - SEMURB - P.M. Assú
Município de Assú - RN

A instalação, a operação e a manutenção são de interesse e responsabilidade da MENDUBIM GERAÇÃO DE ENERGIA LTDA

01 de 02

Os documentos deverão ser entregues em meio físico na SEMURB ou em meio digital em CD, DVD ou PenDrive ou enviados para o e-mail semurb@assu.rn.gov.br com o assunto "CONDICIONANTES Nº 020" em um prazo de 7 (sete) dias após a expedição da autorização.

O que para tanto, firmamos a presente CERTIDÃO.

Assú, 28 de Abril de 2021.


Luzia Luana Berto da Silva Fernandes
Secretária M. de Meio Ambiente
e Urbanismo - SEMURB - P.M. Assú

LUZIA LUANA BERTO DA SILVA FERNANDES
Secretária Municipal de Meio Ambiente e Urbanismo
Matrícula: 1010-6

**Appendix 05 - Existing Environmental and Social Conditions -
Methodological Aspects**

1.1 - PHYSICAL ENVIRONMENT

1.1.1 - Methodological Aspects

The characterization of the aspects of the Physical Environment in the area planned for the Mendubim Photovoltaic Complex was performed based on a survey of secondary and primary data. The secondary data survey was based on the consultation of the Simplified Environmental Report - RAS (CASE, 2017) already conducted by the developer. Additionally, to evaluate the information presented in the studies carried out, as well as the need to update information, the data from reference bases, such as IBGE, CPRM, ANM and ANA, were consulted in a SIG (Geographic Information System) environment.

For the primary data survey, a field campaign was conducted on April 28 and 29, 2021 in which aspects of the physical environment were assessed through field walks and interviews with landowners.

1.2 - FAUNA

1.2.1 - Methodological Aspects

The Fauna Report was prepared based on data collected from scientific literature (secondary data) and a field study (primary data), on amphibians, reptiles, birds, and mammals of the region, emphasizing the endemic, threatened, and ecologically interesting species. During this field study, which was carried out between April 28 and 29, 2021, the methods of active search (walking along the development noting the recorded species) and interviews with the owners were carried out, where direct capture of animals was not used, therefore not requiring specific environmental permits.

1.2.1.1 - Secondary Data

The fauna diagnostics of the Simplified Environmental Report (RAS) (CASE, 2017), for the Mendubim Photovoltaic Complex were consulted, as well as the Environmental Impact Study (EIA)/Environmental Impact Report (RIMA) of the 500 kV Quixadá - Açú III Transmission Line and Associated Substations ESPERANZA/ECOLOGY BRASIL (2015).

1.2.1.2 - Primary Data

Primary data collection was carried out using the methods described below:

- a) Active search: walks along the area planned for the project, noting the species recorded.
- b) Interview: residents in the region of the project were interviewed regarding the presence of animal species.

1.2.1.3 - Data Analysis

The scientific nomenclature adopted for herpetofauna followed FROST (2021) for amphibians and COSTA & BÉRNILS (2018) for reptiles. Vernacular and common names were mostly taken from empirical observations or field guides (e.g. FREITAS, 2015; HADDAD *et al.*, 2013).

For avifauna, the nomenclature followed the classification of the Brazilian Committee of Ornithological Records (CBRO - PIACENTINI *et al.*, 2015), while for mastofauna, the nomenclature followed PAGLIA (2012). Other more recent reviews were also consulted, when available.

The degrees of threat of the species were consulted in official databases at different levels. For the global level, the listing of threatened species in the International Union for Conservation of Nature and Natural Resources (IUCN, 2021) red book was consulted. At the national level, the listing prepared by the Chico Mendes Institute for Biodiversity Conservation instrumentalized in the Ministry of Environment's Ordinance No. 444, dated December 17, 2014 (MMA, 2014) was consulted. Endangered species and species subject to commercial interest were consulted in the appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2021).

Species were classified as rare when there was an indication in a specific bibliography. Endemics were considered when taxa had geographic records restricted to the Atlantic Forest. To this end, extensive consultation was made of specific bibliographies contained in scientific literature and/or books and field guides whose biogeographic information of the species was available (e.g. ROSSA-FERES *et al.*, 2017; TOZETTI *et al.*, 2017; BENCKE *et al.*, 2006; GRAIPEL *et al.*, 2017). Finally, exclusively for avifauna, species were also classified as to migration pattern (CEMAVE, 2016; PIACENTINI *et al.*, 2015), invasion (HÓRUS INSTITUTE, 2017), sensitivity (STOTZ *et al.*, 1996) and habits (TILMANN *et al.*, 2014).

1.3 - FLORA

1.3.1 - Methodological Aspects

The Flora Report was prepared based on data collected from scientific literature (secondary data) and a field study (primary data). During this field study, which was conducted on April 28 and 29, 2021, the methods of active search (walking along the development noting the phytophysiognomies and plant species used as income) and interviews with local landowners (Legal Reserve (RL), Permanent Preservation Area (APP), cultivation, and income generation) were conducted.

1.3.1.1 - Secondary Data

Flora diagnostics from the Simplified Environmental Report (RAS) (CASE, 2017) and the Forest Activity Report (RAF) (CASE, 2019) were consulted for the Mendubim Photovoltaic Complex. In addition to the Environmental Impact Study (EIA)/Environmental Impact Report (RIMA) and the Forest Survey for ASV purposes of the Transmission Line (TL) 500 kV Quixadá - Açú III and Associated Substations ESPERANZA/ECOLOGY BRASIL (2015 and 2016).

1.3.1.2 - Primary Data

Primary data collection was carried out using the methods described below:

- a) **Active search:** Walk along the development noting the phytophysiognomies and the plant species used as income, in 10 properties, according to **Table 1**.

Table 1 - Mendubim Photovoltaic Complex area spreadsheet

Name of the Property	Registration	Total Area (Ha)	Anthropized Area (Ha)	Vegetated Area (Ha)	APP (Ha)	Legal Reserve Area (Ha)
Modelo Farm	14,565	141.15	108.47	32.68	0	100.1994
São Pedro Farm	14,566	114.19	1.58	112.61	0	
Nobreza Farm	14,567	243.33	69.15	174.18	0	
Boa Esperança Farm	14,568	126.66	124.99	1.67	6.58	65.4064
Baixa dos Taques I Farm	14,569	100.72	4.06	96.66	0	
Baixa dos Taques II Farm	14,570	100.92	1.24	99.68	3.36	
Linda-Flor Farm	14,571	99.17	0	99.17	0	62.7152
Planalto Farm	14,572	66.63	0	66.63	0	
Novo Horizonte Farm	14,573	144.52	5.96	138.56	0	
Esperança Farm	14,573	92.4	27.29	64.54	0	18.86
Total		1229.69	342.74	886.38	9.94	247.181

b) **Interview:** Five (5) individuals, owners of the aforementioned areas, were interviewed.

1.4 - SOCIOECONOMICS

1.4.1 - Methodological Aspects

The characterization of the socioeconomic aspects in the area planned for the Mendubim Photovoltaic Complex was performed based on a survey of secondary and primary data.

Secondary data were extracted from the websites of federal, state, and municipal agencies, such as: Brazilian Institute of Geography and Statistics (IBGE), Database of the Unified Health System (DATASUS), National Institute of Educational Studies and Research Anísio Teixeira (INEP) and Institute of Sustainable Development and Environment of Rio Grande do Norte (IDEMA), as well as the Simplified Environmental Report - RAS (CASE, 2017).

For the fieldwork, the RAS (2017) indicates that information was gathered by the researchers with settlement inhabitants in field activities in three (3) settlements, they are: Settlement Prof. Mauricio Oliveira, Settlement Bom Lugar II and Settlement Novos Pingos, approximately 1 km, 1 km and 1.8 km, respectively, from the project's ADA (Directly Affected Area).

1.4.1.1 - Secondary Data - Analysis of the RAS's Socioeconomic Diagnosis

According to the RAS (2017), the delimitation of the Socioeconomic Environment area of indirect influence considered the municipality of Açú/RN, where the project is located, taking into consideration the generation of taxes and tributes, which contribute to the economic development of the municipality.

For the Area of Direct influence (AID) definition, aspects of land use and occupation were considered, as well as social and economic aspects, corresponding to the area delimited by 500 meters from the ADA. For the directly affected population the three settlements already mentioned were considered.

1.4.1.1.1 - Area of Indirect Influence (All)

a) Land use and occupation

The mapping areas are the result of the overlap between the limits of the area leased for the implementation of the project, in which a 1500-meter buffer was generated from the ADA to the All. In this section, the RAS points out that approximately 16 buildings and 2 communities were verified in the settlements (p.153 and 155), with a predominance of low and scattered

vegetation and soil use characterized by agro-forestry and cattle raising, extensive goat and cattle raising, and planting in irrigated areas.

However, it is observed that for the 1500 meter buffer defined for All, the methodological resource established for its definition is not exposed in the RAS, which does not coincide with the All defined in the study - municipality of Açú/RN (p.34).

b) Demographic Aspects

For the All, statistical data from official agencies are presented for the municipality of Açú/RN, mainly in relation to the 2000 and 2010 Demographic Censuses. The total population in 2010 was 53,227, with 74% living in urban areas and a population density of 40.8 inhabitants/km².

There are more women than men, and the population is young/adult, concentrated in the age range of 10 to 30 years in 2010, approximately. Also, adult population tends to decrease as age increases and does not go beyond the age of 80.

A population growth of 11.1% was observed in the period from 2000 to 2010, suggesting a trend of population attraction.

c) Housing

In 2010, in the All, approximately 86.1% of the households had water supply by mains, while 79.5% had sanitary sewerage by rudimentary cesspool. Garbage collection served 86.4% of the households in that year. The solid residues of the city are destined to a dump, located in the Lagoa do Ferreiro district, in the northern part of the municipality of Açú.

Most households in the All had power supply in 2010, with the Companhia Energética do Rio Grande do Norte - COSERN as the distribution concessionaire.

d) Public Equipment

In the municipality there were 56 health facilities in 2016, of which 06 (six) are located in rural areas.

In addition, the educational units in the All have all levels of schooling, and of the 51 schools in operation, 25 serve students who live in rural areas. In 2010, 21.2% of the All population

over the age of 15 was not literate, with the 40 to 59 age group having the highest illiteracy rate (40.9% of illiterates).

There are leisure facilities, including a library, social clubs, soccer fields, a cultural center, and sports courts. Besides this, there are 11 points with vocation for Tourism in Açu.

e) Social Organizations

Among the social organizations in the city, the unions of workers' classes stand out, of which we can mention the Union of Municipal Public Servants, the Union of Retail Commerce of Açu, and the Union of Rural Workers of Açu.

In addition, in the All there are organizations with activities focused on education, training, economic development, and social assistance, among others. They are: Associação dos Moradores dos Bairros Frutiflânida I II e Fulo do Mato, Educandário Nossa Senhora das Vitórias, Organização Potiguar de Arte, Cultura, Desporto e Meio Ambiente, Valer Capacitação e Pesquisa para Desenvolvimento Local Sustentável.

f) Historical, Cultural, Archeological and Speleological Heritage

The material that lists the movable and integrated assets of the state of Rio Grande do Norte mentions 4 (four) monuments located in the city of Açu, present in public areas, such as busts of public figures, and a religious statue, in addition to Sobrado da Baronesa, indicated as architectural heritage. However, it is difficult to understand if the monuments are listed.

In addition, five intangible heritage sites are indicated in Açu/RN: (i) the traditional festival of São João Batista; (ii) the Vaquejada of Açu; (iii) the art of praying of Dona Francisca; (iv) the art of Carneiro in the production of ludic ceramics; and (v) the Saturno Circus.

In the municipality in question there are no assets listed by the National Institute of Historical and Artistic Heritage - IPHAN, and there is no indication of the existence of equipment listed by the municipal government.

In All there are 05 (five) archaeological sites identified by IPHAN. It is noteworthy that none of these are in the ADI (Area of Direct Influence) of the proposed development.

g) Road Structure and Transportation

The All is located 207 km from the state capital and its main access roads are BR-304 and RN-233.

h) Productive and Services Structure

From 2010 to 2013, the industrial activity was the most significant economic activity in the municipality's GDP, followed by the service sector and agriculture and cattle raising.

For the farming sector, in 2014 the cattle and sheep herds were the ones that stood out in the All, in addition to milk production. Among the permanent crop products, banana and corn (grain) production stands out for the temporary crop products for the year 2014.

About the industry sector, there are 62 industries located in the municipality of Açu that have Industrial Registration with the Federation of Industries of the State of Rio Grande do Norte - FIERN (2016). The industrial activities in Açu are quite diversified, with construction companies, bakeries, ice cream manufacturers, clothing manufacturers, bottled water manufacturing, stone, sand, and clay extraction, among others. Although they are predominantly located in the urban area, there are also industries in the rural area of the municipality.

As far as the service sector is concerned, there is no indication of the main activities developed in the municipality. It is pointed out about the number of companies present in the municipality (1,177 companies in 2013), however it does not specify whether these are related exclusively to the service sector.

i) Traditional communities

As for the presence of quilombola communities in the All, the Fundação Quilombo do Palmares, registers the presence of one quilombo in the municipality under study. This is the Bela Vista Piató community, which is located in the western region of the Piató Lagoon, more than 5 km east of the AID of the project and was certified as a remaining quilombo community by the Official Gazette of the Union of 11/05/2011. According to information made available by FUNAI, there is no demarcated indigenous land in the municipality in question.

1.4.1.1.2 - Area of Direct Influence (AID)

a) Land use and occupation

The mapping areas are the result of the overlapping between the limits of the area leased for the implementation of the project, where a 500-meter buffer was generated from the ADA (Directly Affected Area) to the AID, which resulted in the identification of approximately 11 buildings, with the development of agro-sylvo-pastoral activities (extensive cattle and goat raising and planting in irrigated areas), being the composition characterized by dense and open vegetation.

b) Demographic Aspects

The numbers of settled families in the three communities were considered. The information gathered from INCRA indicates that there are 70 families in the Professor Maurício Oliveira Settlement and 56 families in the Novos Pingos Settlement. In the Bom Lugar II settlement, no records were found in INCRA's report, but an image analysis verified the existence of approximately 59 lots that, for the most part, have only one housing unit.

c) Housing

The AID is composed of farms with development of agrosilvopastoral activities (extensive cattle and goat raising and planting in irrigated areas) and its composition is characterized by dense and open vegetation.

The dwellings are predominantly served by the state's pipeline system for water supply. In addition, some families use the water supply from well drilling. In relation to sanitary sewage, it is verified in the AID that this occurs from the adoption of septic tanks or cesspits, and the practice of waste burning by the residents is common; however, there is weekly collection by the cleaning service. Finally, in the AID all settlements have electricity supplied by COSERN.

d) Public Equipment

There are no health facilities in the AID. Approximately once a month medical care is provided through visits from health professionals. In urgent situations the residents travel to nearby units, such as the unit located in the Caboclo community.

There is no school unit nearby, where the school-age population travels to the headquarters of the municipality of Açu. Furthermore, there are no police stations or intensive patrols, only sporadic police patrols. No quantitative figures were indicated for AID in relation to illiteracy.

There is no indication of the presence of leisure and cultural facilities in the AID, and points out that none of the municipality's tourist attractions are located in the area. There is also an indication about the presence of festivals, cultural manifestations and traditions in the AID.

e) Social Organizations

For the social organizations in the AID, the residents' associations of the settlements were indicated. In the Novos Pingos Settlement, the Novo Pingos Association stands out, while in the Bom Lugar II Settlement there is the Associação dos Posseiros do Assentamento Bom Lugar II e III and the Associação dos Produtores e Produtoras do Projeto de Assentamento Prof. Mauricio de Oliveira. These associations are characterized as spaces for social participation and infer an important aspect for the development of social capital.

f) Historical, Cultural, Archeological and Speleological Heritage

No archaeological, historical, cultural, or speleological sites have been identified in the AID. However, it is important and primordial to know that in the next stages of licensing, an archaeological diagnosis will be carried out, as per IPHAN's ordinances and norms.

g) Road Structure and Transportation

The accesses to the communities located in the AID are possible from side roads, without any kind of paving or covering of the roads in the communities, besides the fact that there is no regular urban transportation service in any of the settlements.

h) Productive and Services Structure

In the AID there are no commercial or industrial activities, and the development of agrosilvopastoral activities is predominant. About work and income, the research carried out in the RAS verified that, in the three settlements, there are people who receive the Bolsa Familia benefit, who work formally in the municipal seat, without specifying the type of occupation, and those who declared they work informally, doing odd jobs (also without specifying which ones), besides the agrosilvopastoral activities present in the settlements.

As for the expectations of the inhabitants with the implementation of the project, for part of the interviewees the project will benefit the city of Açu and will also generate jobs for the local population.

i) Traditional communities

The existence of quilombola and/or indigenous communities was not observed in the AID.

1.4.1.2 - Preliminary Stakeholder Mapping

The methodology applied for the preparation of the Preliminary Mapping of Stakeholders was carried out based on documents made available by Scatec, survey of secondary data on news sites, social networks, blogs, official websites of government institutions and non-governmental organizations, institutional educational sites , research and social movements, including field data obtained by the consulting company in studies previously carried out in the region, and in methodological references adopted in the implementation of similar projects, which provided complementary subsidies, used here and adapted to the context of stakeholder mapping .

The stage of preliminary Stakeholders mapping served to define and update which stakeholders are present in the Area of Influence, the identification of interlocutors and contact details and the prior mapping of existing issues, existing tensions, conflict situations between the stakeholders, political and social engagement and possible situations of support or rejection regarding the arrival of the project, as well as the motivations involved, based on information available from official and unofficial sources.

The criteria adopted for the preliminary search of Stakeholders in the region followed the guidance of the following scheme (Figure 1).



Figure 1 - Criteria for defining stakeholders

The second stage of the mapping, carried out in April 2021, consisted of conducting individual interviews with the developer, in order to understand and update the information on the environmental licensing process, specifically negotiations with the owners and the situation of the inhabitants of the farms. In this contact with the developer and the consultancy responsible for the licensing process, relevant information was obtained regarding the interlocutors that the company already had contact with, the main issues and problems faced by the environmental licensing process.

Based on the documents made available and with the crossing of the survey of secondary data, the consultancy consolidated a preliminary list of interested parties to be consulted, as presented in Appendix 3. For the interviews to be carried out in this first moment and, due to the conditions of the Covid 19 Pandemic, priority was given to the owners, tenants/residents of the properties that will make up the Solar Complex and agrarian reform settlements in the vicinity of the project as the target audience. The prioritization of this audience was based on the importance of ascertaining and updating information and the current situation regarding these stakeholders.

1.4.1.3 - Primary Data - Field Visit Report

The primary data survey was conducted between April 27 and May 2, 2021, from field visits focused on conducting face-to-face semi-structured interviews with the owners, tenants/landlords of the properties that will make up the Photovoltaic Complex and agrarian reform settlements around the project.

For better understanding, Erro! Fonte de referência não encontrada. presents the summary of the land situation and Table 7 summarize the interviews with owners, followed by a description of the interviews conducted with owners and residents.

Table 2 - Summary of the land situation

Mendubim Photovoltaic Complex	Property Name	Owner	Registration	Total Area (ha)
X	Modelo Farm	[REDACTED]	14565	140.3
IX, X and XI	São Pedro Farm	[REDACTED]	14566	113.5
I, II, III and XI	Nobreza Farm	[REDACTED]	14567	232.9
VII and VIII	Boa Esperança Farm	[REDACTED]	14568	125.9
V, VI and VII	Baixa dos Tanques I Farm	[REDACTED]	14569	100.3
V, VI and VII	Baixa dos Tanques II Farm	[REDACTED]	14570	100.1
XIII	Linda-Flor Farm	[REDACTED]	14571	98.6
XII	Planalto Farm	[REDACTED]	14572	66.2
III, IX and XI	Novo Horizonte Farm	[REDACTED]	14573	143.6
IV	Esperança Farm	[REDACTED]	14574	91.8
TOTAL AREA				1213.2

Table 3 - Interviews with Owners

Organization/Ins titution	Stakeholder Name	Position	Stakeholder Contacts	Email	Address	Information Sources	Interview Date
Owner of the leased farms	[REDACTED]	Owner	[REDACTED]	[REDACTED]	[REDACTED]	Interview with owner representatives (Maciel and Raimundo) and field work	28/04/2021
Owner of the leased farms	[REDACTED]	Owner	[REDACTED]	[REDACTED]	[REDACTED]	Remote Interview	29/04/2021
Owner of the leased farms	[REDACTED]	Owner	[REDACTED]	[REDACTED]	[REDACTED] Centro, Assu.	Interview with the owner and field work	28/04/2021
Owner of the leased farms	[REDACTED]	Owners	[REDACTED]	[REDACTED]	[REDACTED]	Interview with owners and field work	28/04/2021

In addition, inspections were made in the area of the farms, improvements, settlements, the main accesses to the project.

1.4.1.4 - Interviews with Owners

1.4.1.4.1 - [REDACTED]

Mr. [REDACTED] is the owner of the properties with registration numbers 14565, 14566, 14567 (UFV Mendubim I, II, III, IX and X).. Married to [REDACTED], both are retired. [REDACTED] has owned a ceramics industry in Itajá since 1975. The leased farms are Modelo Farm, São Pedro Farm and Nobreza Farm.

Among the improvements on [REDACTED] properties were presented: 1 main house - consisting of 1 living room, 1 dining room, 4 bedrooms, 1 suite, 1 bathroom, 1 kitchen, service area with pantry and balcony- 1 warehouse and 1 corral. In addition, a deforested area where they raised the farm animals was reported as an improvement; as it has been a few years without animals, vegetation has grown back.

According to information provided by Mr. [REDACTED] employee, [REDACTED], and resident of the property, since the lease contract was signed with Enerlife, [REDACTED] was warned that no animals could be kept in the area. Cassimiro had approximately 400 sheep and cattle and they were all sold; since then there is no more animal husbandry on the farm. They have not planted for 10 years. For 10 years, [REDACTED] has been the only employee on the farm; as they raised cattle extensively, there was little work.

On the farm there are cashew, papaya, coconut, imbu, mango, guava, pineapple, lemon, acerola, and tamarind trees, whose fruit is mainly consumed by [REDACTED] family. The imbu trees produce a lot of fruit and are rented. [REDACTED] did not know the exact number of trees (he confirmed that there are more than 10), nor the rental value.

The farm has 40 hens, they manage to collect, on average, 10 eggs a day. They are consumed, mainly, by the family of the resident Antonio.

They also own 15 peacocks; on a few occasions, buyers appear and take the animals alive. A couple is worth an average of R\$300.00.

According to [REDACTED], no animals are raised loose in the region of the complex, the cattle raised extensively are in already fenced areas.

The water on the farm arrives by water truck with a load of 8,000 liters twice a month.

1.4.1.4.2 - [REDACTED]

Mr. [REDACTED] is the owner of the properties with registration numbers 14568, 14569, 14570 (UFV Mendubim V, VI, VII and VIII). Mr. [REDACTED] properties have no residents. Married to [REDACTED] da, both are 75 years old and retired. The couple has 2 daughters, aged between 40 and 50, who have already started a family and are not financially dependent on their parents.

[REDACTED] main economic activity was commerce. He owned, together with [REDACTED] and other brothers, a chain of textile stores with branches in Natal, Mossoró, Açú. In addition to this activity as a merchant, he managed his farms. He and his wife live in the city of Açú, the family's main source of income is still not tied to the farms that are the objects of the contract. He bought his land in 1974. He has 3 properties under contract: Boa Esperança Farm (126 hectares), Baixa dos Tanques I Farm (100 hectares), and Baixa dos Tanques II Farm (101 hectares). All these properties have Cadastro Ambiental Rural (CAR), sizes were changed after georeferencing.

Since the contract with Martifer¹, made in 2015, it has been reducing its production. He has other rural properties that are not the object of the contract, but are smaller and do not hold everything he produced, which forced him to reduce his production to approximately 10%.

Among the improvements he declared to have on the properties under concession are: 1 house (deteriorated), 1 warehouse, 1 cistern of 30 thousand liters, 1 cistern of 15 thousand liters, 1 corral for bovines, 1 corral for sheep (sheepfold) of 30 m². In addition, there is an extensive deforested area in Boa Esperança Farm for which he expects compensation - according to his report, half of the farm is deforested, however, it has not been used for years and the vegetation has grown again. He did not know which activities were developed on each property, but reported that most of these activities were carried out at the Boa Esperança Farm.

Among the productive activities he still performs on the property, he reported harvesting imbus. He has approximately 200 trees of imbu at the Boa Esperança Farm. When asked about the average yield of a plant, he informed that it can yield up to 60 boxes, depending on the time of the year. When asked about the average yield of his property, he reported that he harvests 1,500

¹ Martifer was the first company to approach the owners for the development of the photovoltaic complex project and responsible for signing the first lease contract, later transferred to ENERLIFE.

to 2,000 boxes of imbu per year, depending on the rainfall and natural productivity of the trees. In relation to the income earned from the activity, he did not know how to specify values, but informed that in the first harvest (which occurs spontaneously in April), the box of imbu is sold for R\$ 40.00, and in the second harvest (which occurs in an induced way in September, when there is not much availability of the fruit in the market), the box is sold for R\$ 100.00.

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He planted beans, corn and sorghum on the farms. In good winters, he could harvest 700 to 1,200 sacks of beans. In 2016 or 2017, the last time he sold his production, he recalls a bag of beans (60 kg) costing R\$400.00. He planted 30 hectares with sorghum, which yielded approximately 700 sacks of silage at an average price of R\$30.00. In 2014 and 2015, he planted watermelon, which produced very well, he did not continue with the crop in anticipation that the photovoltaic complex would be built.

For 20 years he worked with cattle, he started to reduce his herd and production from the moment he signed the contract with Martifer and Enerlife. Until 2016 or 2017, he owned more or less 150 head of cattle. Currently, he has 50 head of beef cattle. He sold the rest of the herd to free up the land, which is now idle. He used to raise sheep, owned more or less 400 head, sold the entire flock 2 years ago (2018/19) - each head was sold for an average of R\$250.00. As of 2017, he only maintained pasture leases for beef cattle. He rented until 2019 or early 2020, but no longer rents.

He reported disbanding and demobilizing the productive activities he carried out on the properties. Until 2018, he had 3 caretakers/landlords, who did not live on the farm permanently, spending only the winter (rainy season) on site. Their cottages have already been torn down. Since 2017, he no longer plants on the farms in anticipation of the complex being built

As for access to water, he informed that they receive piped mineral water from the Novos Pingos Settlement Project (PA), which is sufficient for human consumption and cattle raising. Even when he had 400 head of sheep and goats, the flow was sufficient. There are no water wells on the farms, and he does not think it is interesting to drill them, because he claims there is no water even underground. He recounted the situation of other people who drilled wells in the region in vain.

Measurement of solar irradiation was done on his farms, as reported, for more than a year equipment was in place collecting data.

1.4.1.4.3 - [REDACTED]

Mr. [REDACTED] is the owner of the properties license registrations 14573, 14571, 14572 (UFV Mendubim XI, XII and XIII). Mr. [REDACTED] is the brother of [REDACTED]. Antônio has Alzheimer's, so he is represented by his son-in-law [REDACTED], who owns a textile industry in Açú (jeans and other fabric factory). [REDACTED] is 82 years old, already retired as a merchant. His wife [REDACTED] is 78 years old, not retired, as she did not contribute. The couple has two daughters, between 40 and 50 years old ([REDACTED] couldn't specify their ages), are already married and have started families, neither of them financially dependent on their parents. The property currently has three residents: [REDACTED], who has a partnership contract with [REDACTED], [REDACTED] wife, and their granddaughter. Mr. [REDACTED] is the brother of [REDACTED]

As previously described, the main economic activity developed by [REDACTED] was commerce, since he also owned a chain of textile stores with branches in Natal, Mossoró, Açú. The management of the farming activities developed on the farms was a complementary income activity for the family, and this is still the case today.

His land was bought in 1976. He has three properties under concession: Linda Flor Farm (99 hectares), Planalto Farm (66 hectares) and Novo Horizonte Farm (144 hectares). All the properties already have CAR, however, he informed that he has another property, in a nearby municipality, to which the CAR of the properties under contract could be relocated.

He declared that there are no improvements on the property other than the house where its inhabitant lives, the 26 imbu trees that are on this land. As reported by the resident José, in the last 2 years, the imbu trees have not produced, but when there is fruit, [REDACTED] (owner) wife rents the trees.

Since they started talking about the project, the cattle on the farm has been sold. They still have a few chickens, which are kept by the caretakers.

Over the past few years, the only sources of income he had from the properties were through grazing lease agreements. The contracts ended in February 2021 and were not renewed as a result of the project. The entire area of the farms was subject to leasing, each contract was signed for R\$4,500.00/year. He was able to obtain R\$10,000/year with leases.

1.4.1.4.4 - [REDACTED]

Mr. [REDACTED] is the owner of the property with registration number 14564 (UFV Mendubim IV). Married to [REDACTED], they are both companies. The couple lives on the property that is in the concession contract together with [REDACTED]'s brother.

They bought the Esperança Farm in 2009, the property measures approximately 93 hectares. They informed that it was larger, that it measured over 100 hectares, it was reduced after the georeferencing. The property has CAR and its Legal Reserve area was transferred to a property owned by [REDACTED] father in Caicó (another municipality in RN)². They refer to their farm as a 'sítio' (small farm).

The couple informed that the family's income reaches R\$1,500 or R\$1,800 per month, varying according to the sale of animals and defraying expenses with the farm.

They have worked in their restaurant all their lives, three years ago they started renting the farm. As a result of the Covid-19 pandemic, it is currently empty. They have a house in the city of Açu, to where they will move when they need to hand over the farm for the construction of the complex. In addition, they have a farm in Açu (6 hectares) where they will rebuild a vegetable garden and another property (size not informed) neighboring the current one, where they will keep their sheep farming.

On the farm, they have more or less 100 chickens, selling an average of 150 eggs a week at the fairs in the city of Açu. Sometimes they also sell *caipira* chicken for slaughter. They also have approximately 20 Guinea hens (as chickens from Angola are called in the region). Their herd also consists of 2 dairy cows that serve only for the family's consumption and 50 goats. The kilo of goat meat is sold, on average, for R\$ 20.00. Foreleg average R\$ 22.00 per kilo. These animals will be sold when they need to deliver the farm. The 150 sheep are already being raised on the other property they own.

They maintain an area of 26 or 30 hectares with sorghum. This field guarantees silage for their animals, and what is left over they sell. In the last harvests, it produced 170 to 250 thousand kilos of silage, selling at R\$ 0.25 a kilo.

² The information that the legal reserve was transferred to a property owned by [REDACTED] father could not be validated by analyzing the CAR receipts. When rectifying the registrations in the CAR, this information must be taken into account.

They sell manure twice a year, a truck goes to their property to pick it up for R\$300.00 each truck.

They have imbu trees on the farm, still small, since they were planted in 2009. They sell imbu in the markets of Açú.

Among their improvements is the house where they live, which is composed of 1 large living room, 3 bedrooms, 1 kitchen, and 2 indoor bathrooms, and is surrounded by a balcony. It is in very good condition. In addition, the farm has 1 chicken coop, 1 corral, and 1 pigsty - although they have stopped raising pigs. They also declared they owned 40 hectares already deforested, arguing that they would be eligible for compensation, since the cost of deforestation is around R\$4,000 to R\$5,000 per hectare.

They receive piped water that comes from Novos Pingos Settlement, which is of good quality, but comes in low quantity, serves for human consumption and sheep (who drink little water). Dryer periods require a water truck for the animals.

They had a son who died 10 years ago of leukemia but they prefer not to talk about it. It is important to say that communication should be done with both of them as a couple, Ana is the person who keeps the contract information stored and up to date.

Leaving the farm will change the couple's way of life substantially and will increase their cost of living, as they will no longer produce items that they need to buy, such as eggs and meat. They will no longer have income from sales at fairs. However, they say they are very interested in having the complex built, because it will be a stable source of monetary income for their family, whose income is not high.

They do not like the delay in the construction of the complex and the lack of constant, up-to-date information. It generates expectation, they stopped producing and stopped increasing the farm, because they know they will need to leave.

1.4.1.5 - Interviews with Residents

In the real estate properties object of interest for the implementation of the photovoltaic complex, we found two workers and their respective families living in the condition of residents.

One of these is Mr. [REDACTED] and his wife Mrs. [REDACTED] who live on Mr. [REDACTED]'s property. The other family is Mr. [REDACTED] and his wife Mrs. [REDACTED], who work and live on Mr. Cassimiro's property.

It is noteworthy that when we use the term "resident" we are referring to an informal labor arrangement, however, quite widespread in the Brazilian rural sector. The rural worker called "resident" (in some parts of the country, also called "caretaker") is the one who lives on the property (farm or ranch) of his employer along with his family, and is allowed to use part of the property's land for cultivation, planting and/or grazing for his own consumption (his and his family's). These fractions of the properties are usually fenced, and are called roçado, roçadinho, quintal or tarefa (the last term is the most common in the region in question). As part of his labor duties and obligations, the dweller may devote days of his week to work in the owner's fields, tending his cattle or just watching over the property, and there are many possible arrangements. This worker/dweller may or may not receive a salary, as well as may or may not be registered as a farm laborer or farm employee. In general, the family of the resident also works for the owner of the property, and it is most common for the wife and children not to receive a salary and not to be registered as workers, but to figure as helpers for the working father.

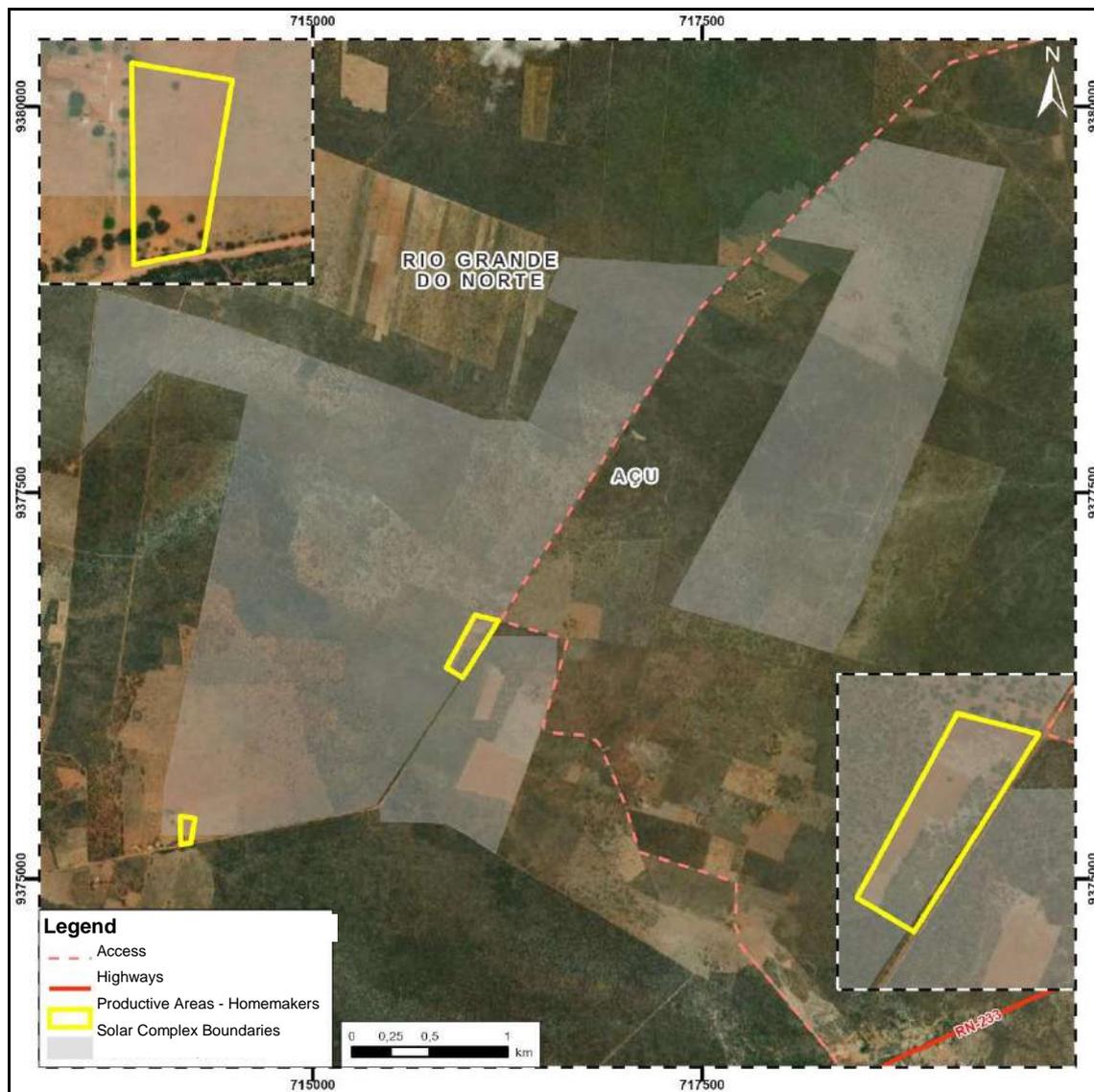


Figure 2 - Location of the productive areas of the workers/residents. In the bottom corner on the left, the residents of Senhor Casimiro's property and in the central region the residents of Mr. Antônio Almeida's property.

Next, we describe and present the information produced from the visits made to the two families of residents who are in the areas of the development. They were held on April 28, 2021 and April 29, 2021, respectively.

Table 07 presents the interviewees' data and the current situation of occupation on the farms.

Table 4 - Interviewees data and current situation of occupation on the farms

Category	Stakeholder Name	Rural employee situation	Stakeholder Contacts	Information Sources Date
Property occupants/partnership agreement	██████ (husband), ██████ (wife), and ██████ (granddaughter)	██████ has a Partnership Contract with the landowner ██████ since 2007 (Annex 5.1) , this contract is indefinitely and establishes that ██████ and his family can use 1 hectare for food crops with no costs to landowner. The contract doesn't mention the housing or rent relationship of the house where the family lives and belongs to landowner. ██████ is not registered as his employees, and have never received wages for working for ██████. ██████ is not a employee of the landowner despites works at his farms (Linda Flor Farm, Planalto Farm, and Novo Horizonte Farm) as a wrangler/stockman/cattle breeder/cowman. The couple's financial income comes from their pensions as farm workers.	████████████████████ ████████████████████ ████████████████████ ████████████████████ ████████████████████ ████████████████████	Visit and interview with the couple. 28/04/2021
Property occupants/formal worker	██████ (husband), ██████ (wife), daughter, and ██████ (son)	██████ is a employee of the landowner. He and his family live at Nobreza Farm without a rent contract. They have been residents of ██████ farm for 11 years. ██████ receives a minimum wage to work for ██████ taking care of the farm, is registered as a general service worker in ██████ ceramics factory and not as a farm laborer on the farm. He reported receiving all his labor rights, however, even in his vacation months (which are paid) he works on the farm. ██████, despite providing sporadic cleaning services at ██████'s house, was never paid for her services. The couple's son has also always helped with the few tasks on the farm, and never received a salary or any remuneration in kind. The landowner allows ██████ to grow food crops on the Nobreza Farm	████████████████████ Nobreza Farm	Visit and interview with the couple. 29/04/2021

1. ██████ and ██████ (residents of ██████'s properties):

This couple has worked and lived on ██████'s property for 14 years, are not registered as his employees, and have never received wages for working for ██████. According to information provided by ██████ (████████ brother), ██████ and ██████ have a Partnership Contract that has also been notarized. ██████ was born in Cirió, and has lived in Açú for 40 years. ██████ was born in Açú. ██████ can not read, he is 63 years old. ██████ reads a little, studied until the 4th grade, is 62 years old. This couple lives together with a teenage granddaughter, ██████ (14 years old). They have five children who, although they do not live with their parents, are unemployed and depend on financial help from them. The couple's financial income comes from their pensions as

farm workers. Before becoming [REDACTED] residents, they worked and lived on the farms of [REDACTED] ([REDACTED] brother) for 17 years.

They live in a house built and lent to the couple by [REDACTED] (owner of the farm), which has 2 bedrooms, 2 living rooms, 1 kitchen with pantry and 1 indoor bathroom. This house, although in good condition, presents deterioration and wear and tear due to use, needing small non-structural reforms, the quality of the construction consists of the thermal comfort it provides and its size.

In addition to this house, they were given an area of 3 to 4 hectares to grow crops and raise smaller animals. On this land they grow corn, beans and sesame for their own consumption. Given the scarcity of water and little rainfall in the rainy seasons of previous years, the types of crops and their varying extents have been reduced over the past few years. Last season they harvested approximately 12 sacks of beans, 12 sacks of corn, and 3 sacks of sesame. Each sack weighs 60 kg (not an exact weight, it varies from 50 to 60 kg).

In periods of abundance of beans in the market, the kilo costs, on average, R\$ 3.00, and in periods of scarcity it can reach R\$ 10.00. As for corn, these prices vary from R\$110.00 to R\$40.00 or R\$50.00, also considering supply in the market. The average cost of a kilo of sesame is R\$ 15.00.

The couple keeps between 30 and 40 sheep grazing on their farm, however, they are allowed to let their animals loose in the other areas of the farm. They consider this herd small, and do not increase it, because they do not have enough income to buy silage during the long dry periods. A large live sheep can be sold for up to R\$200.00, a small one for R\$150.00. They sell mainly when they need monetary income. They also have 1 mare and 1 foal and a herd of 10 cows and their calves, which provide milk for their own consumption - in more critical situations and periods they sell these animals. If they needed to fence an area to raise their animals in confinement, they estimate that they would need 20 or more hectares. [REDACTED] also keeps a small vegetable garden in her backyard where she plants potatoes, tomatoes, and red pepper.

Water is a major bottleneck for their agricultural production and even for human consumption. They receive piped water from the artesian well drilled in Novos Pingos Settlement, but the flow is small. When the farm owner raised animals, in particular cattle, it was necessary to purchase water trucks for animal watering. In longer periods of drought, they even lose animals due to lack of water and food (silage or pasture).

This family lives in a situation of social and economic vulnerability, even eating armadillo meat, as observed during the field visit.

Regarding the installation of the photovoltaic complex, the couple knew about the complex, however, [REDACTED] (wife of [REDACTED], owner of the land) had informed them that they could continue living there as residents, that this had been agreed upon with the company that will build the complex. [REDACTED] and [REDACTED] do not want to leave the place where they live as residents. They have no other land or house to live and farm on. [REDACTED] parents have a small farm, with no land available for cultivation or farming, which will be inherited by 10 children (including [REDACTED]).

As for the access to public policies, the granddaughter goes to school in Açú, although they are visited by health agents, in order to see doctors they need to go to the village Riacho or to the Novos Pingos Settlement, as they are not guaranteed or offered transportation by the municipality.

2. [REDACTED] and [REDACTED] (residents of [REDACTED]'s properties):

[REDACTED] and his wife [REDACTED] live with their 17-year-old daughter [REDACTED], who is in high school, and their 23-year-old son [REDACTED], who has completed high school but is unemployed. [REDACTED] studied very little, can read, but with difficulty. [REDACTED] has completed the 4th grade of elementary school, she can read. They have been residents of [REDACTED] farm for 11 years. [REDACTED] receives a minimum wage to work for [REDACTED] taking care of the farm, is registered as a general service worker in [REDACTED]'s ceramics factory and not as a farm laborer on the farm. He reported receiving all his labor rights, however, even in his vacation months (which are paid) he works on the farm. [REDACTED], despite providing sporadic cleaning services at [REDACTED]'s house, was never paid for her services. The couple's son has also always helped with the few tasks on the farm, and never received a salary or any remuneration in kind.

They live in a house given by [REDACTED] that consists of 3 bedrooms, 1 living room, 1 dining room, 2 kitchens (one internal and one external), 1 internal bathroom and 1 balcony.

[REDACTED] family has 1 cow and 3 calves to get milk for their own consumption. In addition, they use a 1.5 hectare area to grow beans and corn for family consumption. Last year they produced on average 1 sack of beans and 30 kg of green corn. Everything they plants is for their own consumption, they never agreed with Cassimiro to plant for sale in the market. He emphasized that he only grows 1.5 hectares because he wants to, and could open more and bigger fields if he wanted to.

The family has access to cashew, papaya, coconut, imbu, mango, guava, pineapple, lemon, acerola, and tamarin trees for their own consumption, and they make frozen pulp to consume during the year.

As it is this couple that takes care of the chickens on the farm, these are destined for their own consumption. When the owner goes to the farm, he takes part of the eggs. Chickens are also slaughtered to make up the diet of the two families.

Important sources for supplementing the family's diet cannot be accessed off the farm: eggs, milk, fruit, as well as beans and corn from their fields.

Access to services and public policies: the couple's daughter is still studying, a bus picks her up to take her to school in the city of Açú. The daughter wants to join the supermarkets in the region as a young apprentice. They are visited by a health agent, but the health center and medical attention are accessed in the village of Riacho or in PA Novos Pingos.

Before they became residents of [REDACTED], they lived in the village Riacho, where they keep a house of taipa (a mud hut), composed of 1 living room, 1 kitchen and 1 small bedroom, with 1 bathroom that is outside. In addition to being small, the house is unmaintained and not suitable for family living. In this house, there is no yard or planting area, they reinforced that it is not a farm. In that village, if they want to have access to a cultivation area, they have to negotiate with the landowner there: they ask for permission to cultivate in an area of a certain size; if the landowner gives permission, they can cultivate. They give half of the production to the landowner. A system known as half or half share.

The landowners have never talked to [REDACTED] and his family about alternatives should they need to leave the farm. [REDACTED] has a ceramics factory, but [REDACTED] does not know if there is a job available for him there. In addition, [REDACTED] is a farmer and would not want to stop being one, just as he would not want to move to an urban area - where the cost of living is much higher and one lives with less quality. They hope and believe that when the land owners know what will happen, they will talk to the family.

CONTRATO DE PARCERIA AGRÍCOLA

Pelo presente instrumento particular de parceria agrícola, os abaixo assinados, de um lado, como primeiro (a) contratante: ANTONIO ADEMEIDA DA SILVA, brasileiro(a), casado(a), agropecuarista, portador da cédula de identidade RG nº 359.789 SSP/RN e do CIC nº 004 317 964 - 91, residente e domiciliado à AV SEN JOÃO CÂMARA, 845 - ASSU/RN, e do outro lado, como segundo(a) contratante: JOSE DE ARAUJO DA SILVA, brasileiro(a), trabalhador(a) rural, detentor da cédula de identidade RG nº 002.101.949 SSP/RN e do CIC Nº 664 393 704-30, casado(a) com _____, filhos(as) maiores de 14 (quatorze) anos:

residentes e domiciliados à SITIO NOVO HORIZONTE têm entre si, justo e acordado a sua lavratura, o qual rege-se-à mediante as seguintes cláusulas e condições, que reciprocamente estipulam e aceitam, a saber:

1º) Que o 1º (º) (primeiro) (a) contratante é senhor e legítimo proprietário do imóvel rural denominado: SITIO NOVO HORIZONTE (138,4ha) situado no município de: ASSU/RN conforme registro Nº R - 1 - 3 2 5 5 referente a matrícula de Nº 3 2 5 5 às FLS. 180 do livro número 2-0 de Reg. Geral, datado de: 23-5-86 ITR Nº 3143364-2;

2º) Que, dessa área, o (a) 1º (º) (primeiro) (a) contratante dá em parceira agrícola, ao 2º (º) (segundo) (a) contratante uma faixa de Uma (1) hectares destinadas as culturas agrícolas de arroz, feijão, milho, batatas, melancias e demais frutas e plantações existentes nesta dita faixa, para nela serem plantadas, cultivadas e colhidas pelo segundo (a) contratante;

3º) Que o prazo desta parceira feito nesta data: 03 / Set / 2007 época em que o 2º (º) (segundo) (a) contratante começou a plantar, lavar e colher seus produtos nessa faixa de terra do sobredito sítio, cujo término é por tempo indeterminado, ur a vez, que o mesmo (a) poderá continuar, se quiser, plantando, cultivando e colhendo;

4º) Que, o 2º (º) (segundo) (a) contratante fica obrigado a zelar e conservar todas as benfeitorias ali existentes e as que vierem a existir. No entanto, as culturas encravadas na área ainda que em parceria, ficam para o segundo (a) contratante fazer delas uso que bem entende e as suas custas;

5º) Que toda e qualquer benfeitoria que o segundo (a) contratante vier introduzir nos há de terra dados em parceira, fica incorporada a totalidade do imóvel, não podendo entretanto, o segundo (a) contratante exigir do primeiro (a) contratante-proprietário (a), a qualquer tempo, nenhum tipo de indenização por quaisquer benfeitorias introduzidas, na hipótese de rescisão deste contrato, decorrendo de qualquer motivo alheio à vontade das partes;

6º) Que as partes contratantes ficam obrigadas por si, seus herdeiros e sucessores a respeitarem este contrato em todas as suas cláusulas e condições, a fim de que o mesmo seja devidamente respeitado pelo novo (a) adquirente ou comprador (a);

7º) Que fica estabelecido, ainda que em caso de morte de quaisquer dos ora contratantes, o presente contrato será cumprido e respeitado integralmente, por todos os seus herdeiros e sucessores, sem restrições/

8º) Que as partes contratantes elegem, desde já, o foro desta Comarca, para nele ser dirimida ou resolvida qualquer dúvida ou questão porventura decorrente do presente contrato, na forma da legislação vigente;

E ASSIM JUSTOS, COMBINADOS E CONTRATADOS mandaram digitar este contrato em três vias de igual teor e forma que, lido e achado conforme, vai devidamente assinado pelas partes contratantes, juntamente com duas testemunhas presenciais do ato, idôneas, conhecidas dos contratantes, residentes e domiciliados nesta mesma comarca de Assu/RN.

Assu-RN, 03/ Set/ 07

Reconheço, por ser assinado pelo(a) titular(is)
() retro () supra de
Assu, de de da verdade
Em testº
Dra. Núcia Maria de Medeiros Fontes
TAbellis

dou fé 03/09/07

Fone: (084) 331-2906

3º. OFIC. DE REG. CIVIL
Trav. Perito Amorim
Centro - Assu
Dra. Núcia M. de Medeiros Fontes
TAbellis

TRIBUNAL DE JUSTIÇA DO GRANDE DO NORTE
Selo de Autenticidade

ABU 09597
FIRMA 1
ANDREGRN

1º CONTRATANTE

2º CONTRATANTE

TESTEMUNHAS

Appendix 06 - List of priority species of fauna

Table 1 - List of fauna species recorded by primary and secondary data for the Mendubim Photovoltaic Power Plant area of influence with their respective degrees of threat, according to the IUCN (2021), MMA (2014) and CITES (2021) lists, characteristics and habits.

Caption: Secondary data: 1 - CASE (2017); 2 - ESPERANZA/ECOLOGIA BRASIL (2015). Threat Categories: LC = low concern; EN = endangered; VU = vulnerable. CITES (Appendix I, II and II). Feature: End-Caa - endemic to the Caatinga biome; End. NE - Endemic to the Northeast.

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
AMPHIBIA									
ANURA									
Bufonidae Family									
<i>Rhinella dipptycha</i>	cane toad		2		LC			Terrestrial	
<i>Rhinella jimi</i>	cane toad	x		-	LC	-		Terrestrial	
Hylidae Family									
<i>Boana raniceps</i>	tree frog		2		LC			Terrestrial	
Leptodactylidae Family									
<i>Leptodactylus chaquensis</i>	frog		2		LC			Terrestrial	
Microhylidae Family									
<i>Dermatonotus muelleri</i>	spotted frog		2		LC			Terrestrial	
SQUAMMAT ORDER									
Gekkonidae Family									
<i>Hemidactylus mabouia</i>	household lizard		1, 2		LC			Terrestrial	
Teiidae Family									
<i>Iguana</i>	iguana		1		LC			Terrestrial	
Phyllodactylidae Family									
<i>Gymnodactylus geckoides</i>	lizard		1, 2		LC			Terrestrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
Teiidae Family									
<i>Ameiva</i>	Green calango; tejubina	x	1, 2		LC			Terrestrial	
<i>Ameivula ocellifera</i>	crab	x	1, 2		LC			Terrestrial	
<i>Salvator merianae</i>	Black and white tegu	x	1, 2		LC	AP. II		Terrestrial	
Tropiduridae Family									
<i>Tropidurus hispidus</i>	Lava lizard	x	1, 2		LC			Terrestrial	
Amphisbaenidae Family									
<i>Amphisbaena alba</i>	double-headed snake		1		LC			Terrestrial	
SERPENTS									
Boidae Family									
<i>Boa constrictor</i>	boa constrictor		1		LC	Ap. II		Arboreal/terrestrial	
<i>Epicrates cenchria</i>	Slender boa		1		LC	Ap. II		Arboreal/terrestrial	
Colubridae Family									
<i>Philodryas nattereri</i>	Green racer	x	1		LC			Arboreal/terrestrial	
<i>Philodryas olfersii</i>	Green racer		1		LC			Arboreal/terrestrial	
<i>Oxyrhopus trigeminus</i>	False-coral		1		LC			Arboreal/terrestrial	
<i>Spilotes pullatus</i>	Rat snake		1		LC			Arboreal/terrestrial	
Elapidae Family									
<i>Micrurus sp.</i>	Coral snake		1		LC			Terrstrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
Viperidae Family									
<i>Bothrops sp.</i>	Lance head snake	x	1		LC			Arboreal/terrestrial	
<i>Crotalus durissus</i>	Tropical rattlesnake	x	1, 2		LC			Terrestrial	
MAMMALIA									
ARTYODACTYL									
Bovidae Family									
<i>Bos taurus</i>	ox	x	1		LC			Terrestrial	
<i>Capra aegagrus</i>	goat	x	1		LC			Terrestrial	
PERISSIODACTYL									
Equidae Family									
<i>Equus caballus</i>	horse	x	1		LC			Terrestrial	
<i>Equus asinus</i>	donkey	x	1		LC			Terrestrial	
DIDELPHIMORPHIA									
Didelphidae Family									
<i>Didelphis albiventris</i>	opossum	x	1, 2		LC			arboreal/terrestrial	
<i>Monodelphis domestica</i>	Short-tailed opossum		1		LC			arboreal/terrestrial	
PILOSA									
Myrmecophagidae Family									
<i>Myrmecophaga tridactyla</i>	Giant anteater		2	VU	VU			Terrestrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
CINGULATA									
Dasypodidae Family									
<i>Dasypus novemcinctus</i>	armadillo, long-nosed armadillo	x	1, 2		LC			Semifossorial	
<i>Euphractus sexcinctus</i>	Six-banded armadillo	x	1		LC			Semifossorial	
<i>Tolypeutes tricinctus</i>	Three-banded armadillo		2	EN	VU			Semifossorial	
PRIMATES									
Callitrichidae Family									
<i>Callithrix jacchus</i>	white-tuffed marmoset	x			LC			arboreal	
<i>Callithrix penicillata</i>	marmoset, black-tuffed marmoset	x			LC			Arboreal	
RODENTIA									
Caviidae Family									
<i>Galea spixii</i>	Yellow-toothed cavy		1, 2		LC			Terrestrial	
Cuniculidae Family									
<i>Cuniculus paca</i>	Low-land paca	x			LC	Ap. III		Terrestrial	
CARNIVOROUS									
Canidae Family									
<i>Cerdocyon thous</i>	bush dog, forrest fox, fox	x	1, 2		LC	AP. II		Terrestrial	
<i>Canis familiaris</i>	domestic dog	x	1		LC			Terrestrial	
Felidae Family									
<i>Felis catus</i>	domestic cat	x			LC			Terrestrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
Procyonidae Family									
<i>Procyon cancrivorus</i>	Crab-eating raccoon		1		LC			Terrestrial	
BIRDS									
TINAMIFORMES									
Tinamidae Family									
<i>Crypturellus parvirostris</i>	Small-billed tinamou	x			LC			Terrestrial	
PELECANIFORMES									
Family Ardeidae									
<i>Bubulcus ibis</i>	Cattle egret	x			LC			Terrestrial	
<i>Egretta thula</i>	Little egret	x			LC			Terrestrial	
CATHARTIFORMES									
Cathartidae Family									
<i>Cathartes aura</i>	Turkey Vulture	X	1		LC			Terrestrial	
<i>Cathartes burrovianus</i>	Yellow-headed vulture	X			LC			Terrestrial	
<i>Coragyps atratus</i>	Black-headed vulture	X	1		LC			Terrestrial	
ACCIPITRIFORMES									
Accipitridae Family									
<i>Heterospizias meridionalis</i>	Savanna hawk	x	1		LC	Ap. II		Terrestrial	
<i>Rupornis magnirostris</i>	Roadside hawk	X	1		LC	Ap. II		Terrestrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
CHARADRIIFORMES									
Charadriidae Family									
<i>Vanellus chilensis</i>	Southern lapwing	x	1		LC			Terrestrial	
COLUMBIFORMES									
Columbidae									
<i>Columbina minuta</i>	Plain breasted ground dove	X	1		LC			Terrestrial	
<i>Columbina talpacoti</i>	Ruddy ground dove	X	1		LC			Terrestrial	
<i>Columbina picui</i>	Picuí ground dove	X	1		LC			Terrestrial	
<i>Patagioenas picazuro</i>	Picazuro pidgeon	X			LC			Terrestrial	
CUCULIFORMES									
Cuculidae Family									
<i>Piaya cayana</i>	Squirrel cuckoo	X			LC			Terrestrial	
<i>Crotophaga ani</i>	Smooth-billed ani	X	1		LC			Terrestrial	
<i>Guira</i>	Guira cuckoo	X	1		LC			Terrestrial	
<i>Tapera naevia</i>	Striped cuckoo	X	1		LC			Terrestrial	
STRIGIFORMES									
Strigidae Family									
<i>Athene cunicularia</i>	Burrowing owl	X	1		LC	Ap. II		Terrestrial	
PICIFORMES									
Picidae Family									
<i>Colaptes melanochloros</i>	Green-barred woodpecker		1		LC			Terrestrial	
<i>Picumnus limae</i>	Caatinga piculet		2		LC		End. NE	Terrestrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
APODIFORMES									
Trochilidae Family									
<i>Eupetomena macroura</i>	Scissor-tailed hummingbird	X			LC	Ap. II		Terrestrial	
<i>Amazilia fimbriata</i>	Glittering-throated Hummingbird	X			LC	Ap. II		Terrestrial	
CARIAMIFORMES									
Cariamidae Family									
<i>Cariama cristata</i>	Crested seriema	x	1		LC			Terrestrial	
FALCONIFORMES									
Falconidae Family									
<i>Caracara plancus</i>	Crested caracara	x	1		LC	Ap. II		Terrestrial	
<i>Milvago chimachima</i>	Yellow-headed caracara	X	1		LC	Ap. II		Terrestrial	
<i>Herpetotheres cachinnans</i>	Laughing falcon	X			LC	Ap. II		Terrestrial	
<i>Falco sparverius</i>	Sparrow hawk	X			LC	Ap. II		Terrestrial	
PSITTACIFORMES									
Psittacidae Family									
<i>Eupsittula cactorum</i>	Cactus parakeet	X	1		LC	Ap. II	End. Caa	Terrestrial	
<i>Forpus xanthopterygius</i>	Blue-winged parrotlet	X	1		LC	Ap. II		Terrestrial	
PASSERINES									
Thamnophilidae Family									
<i>Taraba major</i>	Great antshrike		1		LC			Terrestrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
Furnariidae Family									
<i>Furnarius figulus</i>	Band-tailed hornero	X			LC			Terrestrial	
<i>Furnarius leucopus</i>	Pale-legged hornero		1		LC			Terrestrial	
<i>Pseudoseisura cristata</i>	Caatinga cachelote	X	1		LC		End. NE	Terrestrial	
<i>Certhiaxis cinnamomeus</i>	Yellow-chinned spinetail	X			LC			Terrestrial	
Rhynchocyclidae Family									
<i>Todirostrum cinereum</i>	Tody flycatcher	X			LC			Terrestrial	
Tyrannidae Family									
<i>Camptostoma obsoletum</i>	Beardless tyrannulet	X			LC			Terrestrial	
<i>Pitangus sulphuratus</i>	Great kiskadee	X	1		LC			Terrestrial	
<i>Machetornis rixosa</i>	Cattle tyrant	X			LC			Terrestrial	
<i>Megarynchus pitangua</i>	Boat-billed flycatcher	X			LC			Terrestrial	
<i>Myiozetetes similis</i>	Social flycatcher	x			LC			Terrestrial	
<i>Tyrannus melancholicus</i>	Tropical kingbird	X	1		LC			Terrestrial	
<i>Fluvicola nengeta</i>	Masked water tyrant	x			LC			Terrestrial	
Corvidae Family									
<i>Cyanocorax cyanopogon</i>	White naped jay	x	1		LC			Terrestrial	
Hirundinidae Family									
<i>Pygochelidon cyanoleuca</i>	Blue and white swallow	X			LC			Terrestrial	VM
<i>Progne tapera</i>	Brown chested martin	X			LC			Terrestrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
Troglodytidae									
<i>Troglodytes musculus</i>	Tropical wren	X			LC			Terrestrial	
Poliopitilidae Family									
<i>Poliopitila plumbea</i>	Tropical gnatcatcher		1		LC			Terrestrial	
Turdidae Family									
<i>Turdus leucomelas</i>	Pale-breasted thrush	X			LC			Terrestrial	
<i>Turdus rufiventris</i>	Rufous bellied thrush	X			LC			Terrestrial	
<i>Turdus amaurochalinus</i>	Creamy bellied thrush	X			LC			Terrestrial	
Mimidae Family									
<i>Mimus saturninus</i>	Chock browed mockingbird	X	1		LC			Terrestrial	
Passerellidae Family									
<i>Zonotrichia capensis</i>	Rufous collared sparrow	X			LC			Terrestrial	
Icteridae Family									
<i>Gnorimopsar chopi</i>	Chopi blackbird	X			LC			Terrestrial	
<i>Icterus jamacaii</i>	Campo troupial		1		LC			Terrestrial	
<i>Molothrus bonariensis</i>	Shiny cowbird	X			LC			Terrestrial	
Thraupidae Family									
<i>Coereba flaveola</i>	Bananaquit	x			LC			Terrestrial	
<i>Tangara sayaca</i>	Sayaka tanager	X			LC			Terrestrial	
<i>Corysphospingus pileatus</i>	Red crested finch		1		LC			Terrestrial	
<i>Tangara palmarum</i>	Palm tanager	X			LC			Terrestrial	

Taxonomic Classification	Common Name	Primary Data	Secondary Data	MMA	IUCN	CITES	Occurrence	Habits	Migratory
<i>Paroaria dominicana</i>	Red cowled cardinal	X	1		LC		End. Caa	Terrestrial	
<i>Sicalis flaveola</i>	Saffron finch	X			LC			Terrestrial	
<i>Sicalis luteola</i>	Grassland finch	X			LC			Terrestrial	
<i>Volatinia jacarina</i>	Blue black grassquit	x			LC			Terrestrial	
<i>Sporophila albogularis</i>	White throated seadeater	X			LC			Terrestrial	
Passeridae Family									
<i>Passer domesticus</i>	House sparrow	x	1		LC		Exotic	Terrestrial	

Appendix 07 - Compiled Floristic list

Table 1 - Floristic list compiled from four studies conducted in the region of the development.

NA = Not Rated.

Botanical Family	Scientific Name	Vernacular	Form of life
Acanthaceae	<i>Ruellia asperula</i> (Mart. ex Nees) Lindau	Ruellia asperula	Shrub Subshrub
Anacardiaceae	<i>Anacardium occidentale</i> L.	Cashew tree	Tree
Anacardiaceae	<i>Astronium urundeuva</i> (M.Allemão) Engl.	Astronium urundeuva	Tree
Anacardiaceae	<i>Spondias tuberosa</i> Arruda	Plum/umbu	Shrub Tree
Annonaceae	<i>Annona squamosa</i> L.	Sugar apple	Shrub Tree
Apocynaceae	Apocynaceae Juss.	NA	NA
Apocynaceae	<i>Aspidosperma pyriformium</i> Mart. & Zucc.	Aspidosperma pyriformium	Tree
Apocynaceae	<i>Calotropis procera</i> (Aiton) W.T.Aiton	Giant milkweed	Shrub
Arecaceae	<i>Cocos nucifera</i> L.	Coconut tree	Palm
Arecaceae	<i>Copernicia prunifera</i> (Mill.) H.E.Moore	Carnauba palm	Palm
Bignoniaceae	<i>Handroanthus impetiginosus</i> (Mart. ex DC.) Pink trumpet tree	Ípe-roxo	Tree
Bignoniaceae	<i>Tabebuia aurea</i> (Silva Manso) Benth. & Hook.f. ex S.Moore	Yellow ipe	Tree
Bixaceae	<i>Cochlospermum vitifolium</i> (Willd.) Lipstick tree	NA	Shrub Tree
Boraginaceae	<i>Cordia oncocalyx</i> Allemão	Cordia oncoca	Tree
Bromeliaceae	<i>Bromelia laciniosa</i> Mart. ex Schult. & Schult.f.	Macambira	Grass
Bromeliaceae	<i>Bromelia</i> sp. L.	NA	NA
Bromeliaceae	<i>Encholirium spectabile</i> Mart. ex Schult. & Schult.f.	NA	Grass
Burseraceae	<i>Commiphora leptophloeos</i> (Mart.) J.B.Gillett	Imburana	Shrub Tree
Cactaceae	<i>Cereus jamacaru</i> DC.	Mandacaru	Tree Succulent
Cactaceae	<i>Melocactus</i> sp. Link & Otto	Turk's cap cactus	NA
Cactaceae	<i>Xiquexique gounellei</i> (F.A.C.Weber) Lavor & Calvente	xique-xique	NA
Cactaceae	<i>Pachycladus Pilosocereus</i> F.Ritter	Tree cactus	Shrub Tree

Botanical Family	Scientific Name	Vernacular	Form of life
Cactaceae	<i>Tacinga inamoena</i> (K.Schum.) N.P.Taylor & Stuppy	palminha	Subshrub Succulent
Cactaceae	<i>Tacinga</i> sp. Britton & Rose	palm	NA
Capparaceae	<i>Cynophalla flexuosa</i> (L.) J.Presl	false teeth	Shrub
Capparaceae	<i>Neocalyptrocalyx longifolium</i> (Mart.) Cornejo & Iltis	umbuzeiro	Shrub
Celastraceae	<i>Monteverdia rigida</i> (Mart.) Biral	bom-nome	Shrub Tree
Chrysobalanaceae	<i>Microdesmia rigida</i> (Benth.) Sothers & Prance	oitica	Tree
Combretaceae	<i>Combretum glaucocarpum</i> Mart.	combretum	Shrub Tree
Combretaceae	<i>Combretum leprosum</i> Mart.	mofumbo	Shrub Tree Liana/voluble/climber
Convolvulaceae	<i>Ipomoea bahiensis</i> Willd. ex Roem. & Schult.	jitirana	Liana/voluble/climber
Convolvulaceae	<i>Ipomoea longeramosa</i> Choisy	jitirana-rosa	Liana/voluble/climber
Dioscoreaceae	<i>Dioscorea</i> sp. L.	NA	NA
Erythroxylaceae	<i>Erythroxylum rimosum</i> O.E.Schulz	NA	Shrub Subshrub
Erythroxylaceae	<i>Erythroxylum</i> sp. P.Browne	NA	NA
Euphorbiaceae	<i>Acalypha</i> sp. L.	NA	NA
Euphorbiaceae	<i>Cnidoscolus quercifolius</i> Pohl	favela	Shrub Tree
Euphorbiaceae	<i>Cnidoscolus</i> sp. Urtiga	NA	NA
Euphorbiaceae	<i>Cnidoscolus urens</i> (L.) Arthur	cansação	Grass Subshrub
Euphorbiaceae	<i>Croton campestris</i> A.St.-Hil.	velame	Shrub Subshrub
Euphorbiaceae	<i>Croton jacobinensis</i> Baill.	marmeiro	Shrub Subshrub
Euphorbiaceae	<i>Croton</i> sp. L.	NA	NA
Euphorbiaceae	<i>Jatropha mollissima</i> (Pohl) Baill.	pinhão-bravo	Shrub Tree
Euphorbiaceae	<i>Jatropha ribifolia</i> (Pohl) Baill.	pinhão-miudo	Shrub Subshrub
Euphorbiaceae	<i>Manihot carthagenensis</i> (Jacq.) Mull.Arg.	NA	Shrub Tree
Euphorbiaceae	<i>Manihot glaziovii</i> Mull.Arg.	NA	Tree

Botanical Family	Scientific Name	Vernacular	Form of life
Euphorbiaceae	<i>Sapium glandulosum</i> (L.) Morong	Gumtree	Shrub Tree
Euphorbiaceae	<i>Sebastiania</i> sp. Spreng.	NA	NA
Fabaceae	<i>Amburana cearensis</i> (Allemão) A.C.Sm.	Umburama de cheiro	Tree
Fabaceae	<i>Anadenanthera colubrina</i> (Vell.) Brenan	angico	NA
Fabaceae	<i>Bauhinia brevipes</i> Vogel	NA	Shrub
Fabaceae	<i>Bauhinia cheilantha</i> (Bong.) Steud.	NA	Shrub Tree
Fabaceae	<i>Bauhinia dubia</i> G.Don	NA	Shrub Subshrub
Fabaceae	<i>Bauhinia</i> sp. L.	NA	NA
Fabaceae	<i>Cenostigma pyramidale</i> (Tul.) Gagnon & G.P.Lewis	NA	Shrub Tree
Fabaceae	<i>Calliandra spinosa</i> Ducke	NA	Shrub Tree
Fabaceae	<i>Cenostigma macrophyllum</i> Tul.	caneleiro	Shrub Tree
Fabaceae	<i>Centrosema brasilianum</i> (L.) Benth.	jequitirana	NA
Fabaceae	<i>Chamaecrista eitenorum</i> (H.S.Irwin & Barneby) H.S.Irwin & Barneby	NA	Shrub Tree
Fabaceae	<i>Chloroleucon dumosum</i> (Benth.) G.P.Lewis	jurema-branca	Tree
Fabaceae	Fabaceae Lindl.	NA	NA
Fabaceae	<i>Libidibia ferrea</i> (Mart. ex Tul.) L.P.Queiroz	pau-ferro	Tree
Fabaceae	<i>Lonchocarpus</i> sp. Kunth	NA	NA
Fabaceae	<i>Luetzelburgia auriculata</i> (Allemão) Ducke	pau-mocó	Tree
Fabaceae	<i>Mimosa arenosa</i> (Willd.) Poir.	NA	Shrub Tree
Fabaceae	<i>Mimosa caesalpiniiifolia</i> Benth.	sábia	Shrub Tree
Fabaceae	<i>Mimosa invisá</i> Mart. ex Colla	unha-de-gato	Shrub / Liana / voluble / climber
Fabaceae	<i>Mimosa misera</i> Benth.	mimosa	NA
Fabaceae	<i>Mimosa candollei</i> R.Grether	Four-valve mimosa	Grass
Fabaceae	<i>Mimosa</i> sp. L.	NA	NA

Botanical Family	Scientific Name	Vernacular	Form of life
Fabaceae	<i>Mimosa tenuiflora</i> (Willd.) Poir.	jurema-preta	Shrub Tree Subshrub
Fabaceae	<i>Complexinsonia aculeata</i> L.	Jerusalem thorn	Shrub Tree
Fabaceae	<i>Pityrocarpa moniliformis</i> (Benth.) Luckow & R.W.Jobson	catanduva	Shrub Tree
Fabaceae	<i>Piptadenia retusa</i> P.G.Ribeiro, Seigler & Ebinger	calumbi-de-lagoa	Shrub Tree
Fabaceae	<i>Lachesi dendron viridiflorum</i> (Kunth) P.G. Ribeiro, L.P. Queiroz & Luckow	espinheiro	Tree
Fabaceae	<i>Pithecellobium diversifolium</i> Benth.	Jurema branca	Shrub Tree
Fabaceae	<i>Pityrocarpa moniliformis</i> (Benth.) Luckow & R.W.Jobson	catanduva	Shrub Tree
Fabaceae	<i>Cenostigma pyramidale</i> (Tul.) Gagnon & G.P.Lewis	catingueira	Shrub Tree
Fabaceae	<i>Prosopis juliflora</i> (Sw.) DC.	algarobeira	Tree
Fabaceae	<i>Senegalia polyphylla</i> (DC.) Britton & Rose	monjoleiro	Shrub Tree
Fabaceae	<i>Senna obtusifolia</i> (L.) H.S.Irwin & Barneby	mata-pasto-da-caatinga	Grass Subshrub
Fabaceae	<i>Senna pilifera</i> (Vogel) H.S.Irwin & Barneby	NA	Shrub Subshrub
Fabaceae	<i>Senna reticulata</i> (Willd.) H.S.Irwin & Barneby	mata-pasto	Shrub Subshrub
Fabaceae	<i>Senna</i> sp. Mill.	NA	NA
Fabaceae	<i>Senna spectabilis</i> (DC.) H.S.Irwin & Barneby	NA	Tree
Fabaceae	<i>Senna trachypus</i> (Benth.) H.S.Irwin & Barneby	NA	Shrub Tree
Fabaceae	<i>Sesbania exasperata</i> Kunth	NA	Shrub
Fabaceae	<i>Stylosanthes guianensis</i> (Aubl.) Sw.	NA	Subshrub
Fabaceae	<i>Tephrosia cinerea</i> (L.) Pers.	NA	Shrub Subshrub
Fabaceae	<i>Trischidium molle</i> (Benth.) H.E.Ireland	brinquinho	Shrub Tree
Lamiaceae	<i>Hyptidendron amethystoides</i> (Benth.) Harley	NA	Shrub Subshrub
Lamiaceae	<i>Hyptidendron</i> sp. Harley	NA	NA
Loganiaceae	<i>Strychnos parvifolia</i> A.DC.	NA	Shrub Liana/voluble/climber Subshrub
Malpighiaceae	<i>Byrsonima</i> sp. Rich. ex Kunth	NA	NA

Botanical Family	Scientific Name	Vernacular	Form of life
Malvaceae	<i>Helicteres muscosa</i> Mart.	saca-rolha	Shrub Subshrub
Malvaceae	<i>Herissantia tiubae</i> (K.Schum.) Brizicky	mela-bode	Shrub Grass Subshrub
Malvaceae	<i>Pavonia cancellata</i> (L.) Cav.	creeping mallow	Grass
Malvaceae	<i>Pseudobombax marginatum</i> (A.St.-Hil., Juss. & Cambess.) A.Robyns	imbiratanha	Tree
Malvaceae	<i>Sida cordifolia</i> L.	white mallow	Grass Subshrub
Malvaceae	<i>Sida galheirensis</i> Ulbr.	White mallow	Subshrub
Malvaceae	<i>Sida rhombifolia</i> L.	NA	Grass
Malvaceae	<i>Waltheria indica</i> L.	NA	Grass Subshrub
Malvaceae	<i>Waltheria</i> sp. L.	NA	NA
Myrtaceae	<i>Campomanesia velutina</i> (Cambess.) O.Berg	NA	Tree
Myrtaceae	<i>Eucalyptus</i> sp. L'Hér.	eucalyptus	NA
Myrtaceae	<i>Eugenia azeda</i> Sobral	NA	Shrub Tree
Myrtaceae	<i>Eugenia punicifolia</i> (Kunth) DC.	myrtle	Shrub Subshrub
Myrtaceae	<i>Myrciaria tenella</i> (DC.) O.Berg	NA	Tree
Nyctaginaceae	<i>Guapira opposita</i> (Vell.) Reitz	maria-mole	Shrub Tree
Onagraceae	<i>Ludwigia erecta</i> (L.) H.Hara	NA	Shrub
Onagraceae	<i>Ludwigia octovalvis</i> (Jacq.) P.H.Raven	NA	Shrub Subshrub
Orchidaceae	<i>Trichocentrum cebolleta</i> (Sw.) M.W.Chase & N.H.Williams	NA	NA
Orchidaceae	<i>Oeceoclades maculata</i> (Lindl.) Lindl.	NA	Grass
Passifloraceae	<i>Passiflora foetida</i> L.	NA	Liana/voluble/climber
Poaceae	<i>Aristida setifolia</i> Kunth	NA	Grass
Poaceae	<i>Cenchrus echinatus</i> L.	Tspiny sandbur	Grass
Poaceae	<i>Chloris barbata</i> Sw.	NA	Grass
Poaceae	<i>Dactyloctenium aegyptium</i> (L.) Willd.	Egyptian crowfoot grass	Grass

Botanical Family	Scientific Name	Vernacular	Form of life
Poaceae	Poaceae Barnhart	NA	NA
Polygonaceae	<i>Coccoloba ramosissima</i> Wedd.	NA	Shrub Tree
Primulaceae	<i>Jacquinia armillaris</i> Jacq.	NA	Shrub
Rhamnaceae	<i>Sarcomphalus joazeiro</i> (Mart.)Hauenschild	juazeiro	NA
Rubiaceae	<i>Alseis pickelii</i> Pilg. & Schmale	goiabinha	Tree
Rubiaceae	<i>Guettarda angelica</i> Mart. ex Mull.Arg.	NA	Shrub Tree
Rubiaceae	<i>Randia armata</i> (Sw.) DC.	indigoberry	Tree
Rubiaceae	<i>Richardia grandiflora</i> (Cham. & Schltld.) Steud.	poaia	Grass Subshrub
Rutaceae	<i>Zanthoxylum</i> sp. L.	NA	NA
Salicaceae	<i>Banara</i> sp. Aubl.	NA	NA
Salicaceae	<i>Casearia luetzelburgii</i> Sleumer	pau-vidro	Tree
Salicaceae	<i>Prockia crucis</i> P.Browne ex L.	NA	Shrub Tree
Sapindaceae	<i>Cardiospermum corindum</i> L.	chumbinho	Liana/volute/clumpy
Sapindaceae	<i>Cardiospermum</i> sp. L.	NA	NA
Sapotaceae	<i>Sideroxylon obtusifolium</i> (Roem. & Schult.) T.D.Penn.	NA	Shrub Tree
Turneraceae	<i>Piriqueta guianensis</i> N.E.Br.	NA	Grass
Turneraceae	<i>Turnera subulata</i> Sm.	boa-noite	Shrub Shrub Subshrub
Verbenaceae	<i>Stachytarpheta sessilis</i> Moldenke	rabo-de-Tatu	Grass
Verbenaceae	<i>Stachytarpheta</i> Vahl	NA	NA
Ximeniaceae	<i>Ximenia americana</i> L.	NA	Shrub Tree

Appendix 08 - Flora photo report



Source: Ecology Brasil.

Figure 1 - Esperança Farm.
Date: 28/04/2021.



Source: Ecology Brasil.

Figure 2 - Umbu (*Spondia tuberosa*).
Date: 28/04/2021.



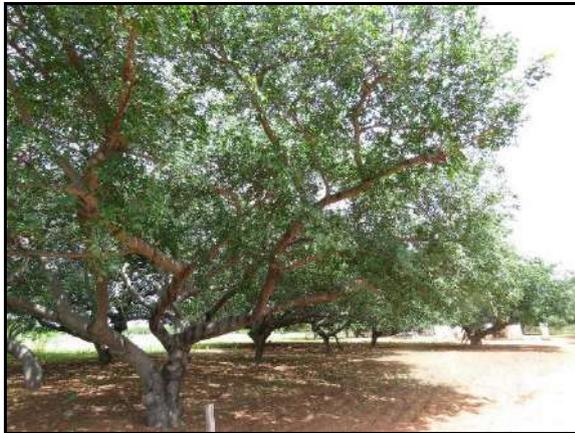
Source: Ecology Brasil.

Figure 3 - Inflorescence of umbu (*Spondia tuberosa*).
Date: 28/04/2021.



Source: Ecology Brasil.

Figure 4 - Inflorescence of pau-ferro (*Libidibia ferrea*).
Date: 28/04/2021.



Source: Ecology Brasil.

**Figure 5 - Linda-Flor Farm, Planalto Farm and Novo Horizonte Farm, detail of umbu (*Spondia tuberosa*).
Date: 28/04/2021.**



Source: Ecology Brasil.

**Figure 6 - Pasture.
Date: 28/04/2021.**



Source: Ecology Brasil.

Figure 7 - Modelo Farm, São Pedro Farm and Nobreza Farm. Date: 29/04/2021.



Source: Ecology Brasil.

**Figure 8 - custard applefruit (*Annona squamosa*).
Date: 29/04/2021.**



Source: Ecology Brasil.

**Figure 9 -Wooded Steppe Savanna,
detail of a xique-xique (*Xiquexique gounellei*).
Date: 29/04/2021.**



Source: Ecology Brasil.

**Figure 10 -Palminha (*Tacinga inamoena*).
Date: 29/04/2021.**



Source: Ecology Brasil.

**Figure 11 - Boa Esperança Farm, Baixa
dos Taques I Farm and Baixa dos Taques II farm.
Date: 29/04/2021.**



Source: Ecology Brasil.

**Figure 12 - Anthropized Wooded Steppe Savanna.
Date: 29/04/2021.**



Source: Ecology Brasil.

**Figure 13 - Artificial channel.
Date: 29/04/2021.**



Source: Ecology Brasil.

**Figure 14 - Ephemeral drainage channel.
Date: 29/04/2021.**

Appendix 09 - Settlements Description

1.1.1.1.1 - Settlement Prof. Maurício de Oliveira

The settlement Prof. Maurício de Oliveira will be strongly impacted by the installation of the complex. Besides the plots destined for production and animal husbandry by the settled families neighboring the area where the photovoltaic panels will be placed, the access road to the project passes by the back of their houses and yards. As a result of a series of projects developed in the settlement by NGOs, religious organizations, the World Bank and even energy companies like Engie, the backyards of the houses are called Productive Backyards (the name of one of the compensations paid by Engie), because in them the families develop a varied set of activities, such as fruit farming, raising smaller animals like pigs, chickens and ducks, growing beans, corn, cassava, horticulture, and a seedling nursery. It is in the backyards where the cisterns of the houses are installed. In other words, the access road passes between two productive areas: the plots and the backyards of half of the settled families. The distance between the access road and the houses is small. **Figure 1** shows the location of the productive backyards in the Mauricio de Oliveira settlement.

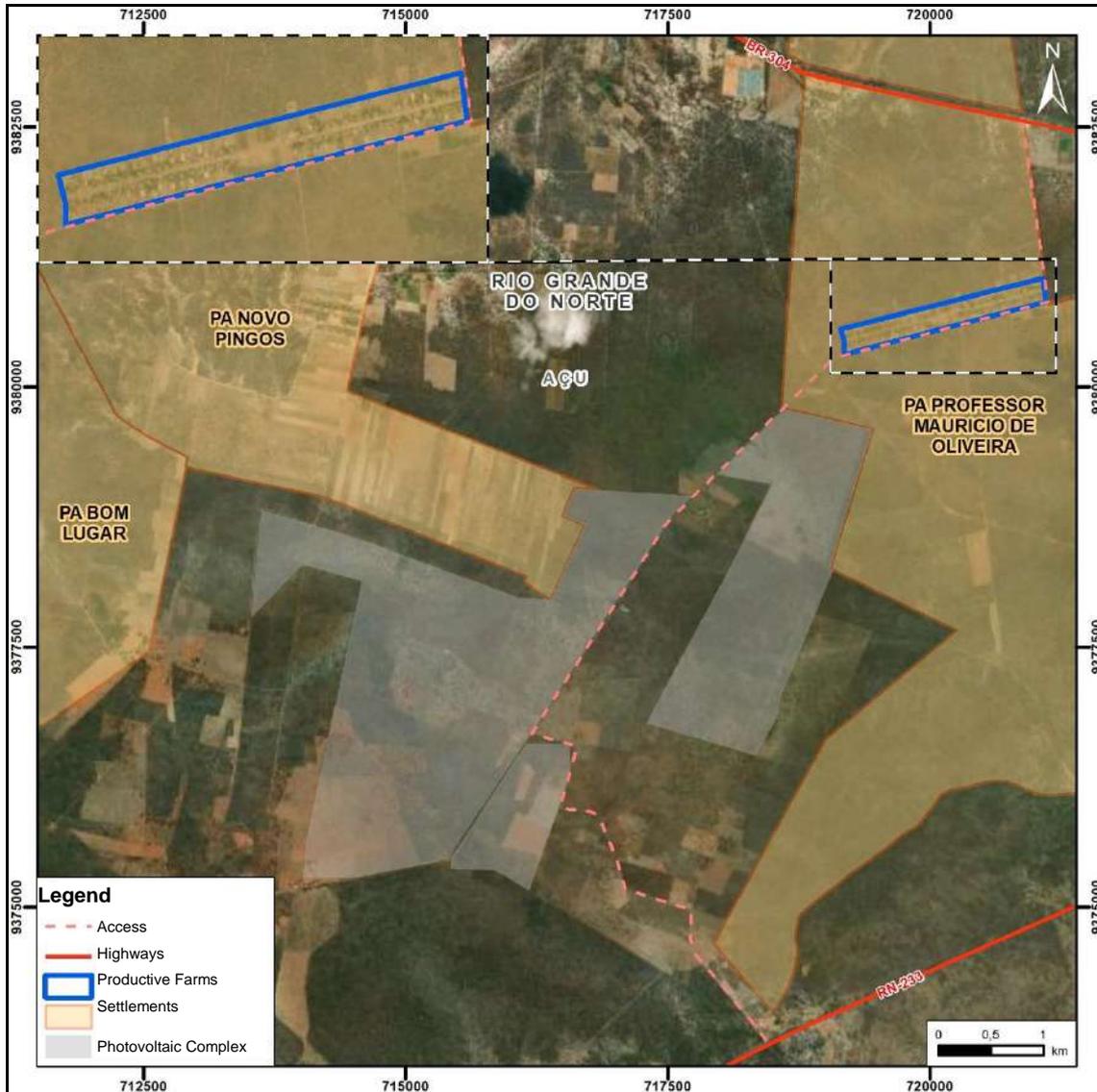


Figure 1 - Location of the productive backyards in the Mauricio de Oliveira Settlement.

Considering the risks of using the access for the development, the settlers suggest that the times for the trucks to circulate should be agreed upon and informed to the community.

During the field survey, Ecology Brasil's team identified an alternative access to the project, but for unknown reasons it was not presented in the RAS.

As shown on Figure 24 the pink dashed line indicates the access to the complex that shows the existence of two roads to access the complex, one entering by BR-304 and crossing the Prof. Maurício de Oliveira Settlement, the other by RN-233 and that does not interfere in any settlement.

The Settlement has a very active neighborhood association that is articulated with other associations and local networks, and is recognized as legitimate by the settled families. Both members of the Association's board of directors and some other settled families knew about Enerlife's complex, and even knew details of the negotiation with the landowners. In March or April, the company that was doing soil analysis came through the settlement to access Raimundo's areas and drilled soil from the settlement, but provided no explanation as to who they were and which company they were working for. Since they receive a lot of visits, from many different companies that do not formally introduce themselves, they do not know if they have already been approached by Enerlife. One company has already shown interest in installing panels in the area where their lots are, the land surrounding the complex, they believe may be Enerlife. They have been approached recently (April or March) by a company that wants to run a transmission line through the settlement, they believe it could be Enerlife or the company that will run the transmission line in the complex.

They are not satisfied with the lack of communication on the part of the companies. They would like the Association to be formally contacted and schedule a meeting in the settlement to present the project and its impacts on the settlement, clarifying all the doubts of the settlers.

The Settlement Project appeared in 2008 (another version, they said it was in November 2006), from an occupation that took place on the lands of the company Frunorte in 2004 (another version, 2002), which owned 17 non-productive farms. The camp that originated the settlement was composed of 180 families and was organized in dialogue with the Pastoral Land Commission (CPT). Most of the families who carried out the occupation were living as squatters on the lands of the National Department of Works Against Droughts (DNOCS) around Açu. All the camped and settled families are from the region. Among the camped families, 110 have not been settled because their registration was not approved by the National Institute for Colonization and Agrarian Reform (INCRA). Despite the divergences as to dates, the narratives converge on the fact that they were camped for two years on the edge of the BR-304 road in tents, under sun, rain, and bullets (a reference to the threats they suffered).

The origin of the name is a tribute to the professor at the Mossoró College of Agriculture (ESAM) Maurício de Oliveira, author of the counter report that made the formation of the settlement possible. At first, INCRA claimed that it would not expropriate the area, because there was no water at the location. Mauricio conducted a new study and presented a counter report showing that there was water and, therefore, the settlement was feasible.

The families were evicted twice (they suffered two repossessions). When the expropriation process was completed, the judge in charge needed to go to the owner's house to get him off the land. The property, besides being unproductive, was deforested to serve as pasture for cattle, and the settlers are recovering the area. The CPT supported the families during the entire process, sending a lawyer from Recife and contributing to the organization, especially of the women, through its articulation with the Feminist Center March 8th (CF8).

The settlement has 3,324 hectares, adding up to 70 families, with a community ranging from 250 to 300 people. Among these, 53 families have already received their titles, 12 still have only the Use Concession Contract (CCU), and another 5 are squatters (relatives of settlers or people who could not pass INCRA's registry and live in the area in common agreement with settlers). The settlement area is organized in an agrovillage consisting of one street, of approximately 2 km, in which all the families live - it occupies an area of approximately 40 hectares. The legal reserve area is approximately 649 hectares (informed value), is on the other side of the BR-304 highway, and is cut by a transmission line connected to the Engie power plant, a company that neighbors the settlement's RL.

The settlement is divided into 68 lots, each of which has 28 hectares, plus two lots that have 31 hectares and 35 hectares, occupying an area of approximately 1,970 hectares. The settlement's collective area, located between the agrovillage and the BR-304 highway, was divided by the settlers themselves and is used for agriculture. They chose this division because the area is already deforested, has more appropriate soil for agriculture and is close to the houses; each settler has the right to cultivate 7 hectares. This collective area totals 496 hectares (informed value).

For the construction of the houses, they organized a community work system that dispensed with INCRA's hiring of a company; the families who owned the houses were the labor force and offered food to the masters and bricklayers from the settlement itself, who coordinated the construction work. The first houses were ready in 2008, when the installation credit arrived. By 2009, all the houses were ready.

There is no school in the settlement, nor a daycare center, there are few children of school age, not reaching the number required by the municipality of Açu. There is a school bus for the city of Açu. They have never accessed the National Program for Education in Agrarian Reform (PRONERA). They receive visits from health agents, but they do not have a doctor who gives constant consultations in the community. Reportedly they have been without a doctor for 2 months and it is normal for them to go longer periods without a doctor. They go to the Açu

medical post, when they need to get a consultation. All the families in the settlement are beneficiaries of the Bolsa Família Program. The narratives converged on the emphasis that the families' income, in general, is very low, a situation aggravated by the Covid-19 pandemic, which resulted in the loss of jobs in the city of Açu. The families are in a vulnerable situation, even needing the provision of food baskets.

In the settlement, there are no bars, bodegas, grocery stores or parties because INCRA would have forbidden them.

The settled women are organized in a group called Sementes da Terra (Seeds of the Land), and since the beginning of the land occupation they count on the support of CF8 and CPT to self-organize themselves as women. Since 2018 and 2019, they are developing a collective plot with creole seeds and agroecological practices. They grow corn, jerimum, watermelon, sesame, wheat, and fava beans in this field. The group started with 40 women, and currently has 20 active women, but only 5 participate in the collective plot. The women of the settlement want to build a space/seat just for them, to hold meetings, store working materials such as pipes, loom machines, canvas, seeds, etc. In addition, they plan to expand the area they cultivate together, forming a garden with coriander, lettuce, cabbage, and chives, but have not yet started, because they do not have the necessary seeds and seedlings, nor the income to acquire them. A big obstacle for them to increase the production of both agricultural goods in natura, as well as processed goods and handicrafts, is the lack of money. To expand and maintain the collective growing areas they need to install an irrigation system, which will involve the purchase of more hoses and water tanks, as well as shade cloths. Installing an irrigation system will also increase the energy expense. They want to organize weaving courses (hammock, rug, towel) and acquire equipment and raw materials to diversify the women's sources of income. They already make cakes, they have a collective kitchen that has started to be built in the association's headquarters, but it is small and lacks the necessary equipment to reach industrial scale. When the women cannot acquire the raw materials needed to make the cakes, they stop producing.

All the settled families are dedicated to agriculture, in most, there is at least one member who performs activities outside the settlement, consisting of construction jobs for the men and domestic work and general services for the women.

The settlement is articulated to an extensive network of partners that have already developed different projects, programs, and training and qualification courses in the settlement. Petrobras has offered courses for seed collectors and nurserymen to learn how to make seedlings, but it is very expensive to set up a nursery. Have already taken a marketing course, agricultural family empowerment (income generation)

The settlers encounter a series of difficulties to maintain themselves as farmers and earn enough income to support their families. Among these, we highlight the commercialization, as they are not inserted in direct commercialization circuits, they are hostages of middlemen. We were given some examples that demonstrate the disadvantage of trade intermediated by distributors: for a box of mangoes they pay R\$ 5.00, while a kilo of acerola is bought for R\$ 1.00. They see as an alternative the formation of a cooperative; they have already tried, but the process was interrupted by internal issues. There is yet another limiting factor for the commercialization of the settlement's production: in Açu, the seal that releases products made in settlements or by family agriculture to be commercialized without a license and ANVISA permit is not adopted. This stamp already exists in Rio Grande do Norte, without it they cannot commercialize free-range chicken, eggs, sweets, frozen pulps, etc. Some families have managed to open a firm to commercialize these products, the others are held hostage to sell their products informally. During the pandemic, institutional purchases through PAA and PNAE were interrupted, being suspended for a long period, which greatly affected the income of the settlers.

Another difficulty is the high production costs. At Conab, they pay R\$ 80.00 for a sack of corn, while, in Açu, a free-range chicken doesn't even cost R\$ 25.00.

Another major obstacle for the production of the families is energy, whose tariff is considered very high, and the municipality does not have differentiated tariffs for rural areas. This prevents them from installing irrigation systems on the plots, which would allow them to establish crops even during dry periods.

Water is a major bottleneck for the settlement, even though approximately 50 families have cisterns, most of them built through the federal government's 1 Million Cisterns Program. Most of the houses have two cisterns, a small one of 16 thousand liters (used for family consumption), and a large one of 54 thousand liters (used for cultivation and animal breeding). Water they store lasts for more than 1 or even 2 years. Although they have cisterns and wells, they are unable to send water to the plots, because setting up an irrigation system is expensive, particularly because of the price of the energy tariff. The agriculture practiced in the settlement is limited

to small areas or to crops like beans and corn that grow only with rainwater. Fruit production is reduced because irrigation is required for this. Situations of water shortage are rare, since they receive piped water from an artesian well implemented by the city. The Mendubim project to transfer water from the Armando Ribeiro dam has been known and discussed for more than 30 years, but construction has not even begun.

The youth of the settlement (the children of the settlers) suffer from the lack of paid, permanent jobs (CLT).

1.1.1.1.2 - Novos Pingos Settlement

The Novos Pingos Settlement is adjacent to the complex, the complex boundaries are approximately 1 km from the settlement area. The area closest to the complex is the settlement's collective area, used by the settlers to grow winter crops (mainly beans and corn). As this area was already deforested when the settlement was formed, they made an informal subdivision of it, preserving the areas covered by native vegetation in the lots. In addition, the water that feeds the farms located in the complex region comes from an artesian well drilled in this settlement.

The construction process of the settlement goes back to the year 2000, when INCRA inspected the Pingos farm to verify the possibility of building a settlement there. The former employed residents of the farm (called colonos) who requested this survey. To this end, they formed an internal commission to negotiate with the landowner and INCRA. The current president of the Association was one of the members of this committee. The negotiation process with INCRA started in 2000, but only in 2002 did the expropriation process begin. They consider that the most difficult issue in the history of the settlement was precisely negotiating with INCRA. The settler families had priority in the settlement, the other families are from the Açu region itself.

The settlement has a total area of 1,771 hectares, of which 250 hectares are for the collective area and the other 371 hectares are divided among the settlers' plots. Only 100 hectares are being cultivated. The Novos Pingos settlement totals 56 settled families, and another 11 families live in an undefined situation; they are the daughters and sons of the 'colonos' (as the settlers are called) who built their houses in a new street formed in the settlement's agrovillage to receive them. They have already suffered with the possibility of being evicted, an association that opened dialogue channels with deputies, the Açu city hall and the state government to avoid it. In all, the settlement is formed by 67 families, adding up to more than 400 people. None of the families have titles; this settlement is not yet titled.

The credit for installation arrived in 2004, the construction of all the houses took two years. There was no hiring of a company; the masons in the settlement coordinated the construction work, and the families were their helpers. There was R\$ 27 thousand left over, which were invested in the construction of the settlement's school, concluded in 2007.

The settlement is formed by an agrovillage, a set of 3 streets (one of them is for the settlers' children). It has 1 elementary school built by the Association itself, 1 digital center for access to computers and wi-fi internet, 2 churches (1 catholic and another evangelical), a health center support point (every Thursday they receive a medical visit). The high school is in Açú, Manoel is the one who drives the school bus and picks up students from the rural area.

The settlement has a cooperative called Coopingos and a cashew nut agro-industry. They are buying machinery to adapt it to also become a pulp mill and industrial kitchen for making cakes. One of the biggest hindrances is the lack of money to do so. To adapt the agro-industry headquarters for pulp production, they need to remodel the building.

The nut agro-industry is at a standstill. The farm that was expropriated had more than 50 thousand cashew trees, when the settlement was formed, they preserved the trees. Through a partnership with Sebrae and Banco do Brasil Foundation, who financed the construction of the agro-industry, they built the building and acquired the necessary machinery. The construction of the agro-industry was part of an initiative by the Banco do Brasil Foundation, which has built 9 other similar units in Rio Grande do Norte aimed at processing family farming products.

It was completed in 2009. It employed everybody in the settlement: harvesting, processing and selling. The Coopingos Cooperative bought the nuts from the settled families, processed them and sold them, and emerged precisely so that the settlement could access and implement the agro-industry project. Coopingos is affiliated to Coafarn, and is part of the production and commercialization network of Apodi.

After a drought that lasted seven years, they lost more than 50,000 cashew trees. For 3 years they made seedlings waiting to replant the following year, but since it did not rain they lost the seedlings. Finally, they stopped producing seedlings. They are unable to resume this production because each cashew seedling costs between R\$ 4.00 and R\$ 5.00. At the peak of production, they had as much as 100,000 kg of nuts in stock. They sold the nuts in towns in the region and in Natal.

Since the agro-industry stopped, settlers have sought other types of employment and sources of income. About 40 young people from the settlement work in the mineral water springs in the region. In the last few, 7 new ones have opened in the municipality of Açú. Other settlers work

in quarries and construction. There are also those who work for Agrosolo, a fruit manufacturer and exporter.

Women in the settlement: some work outside as cleaners or at the water fountains. Ten years ago women got together to bake cakes, but since the profit is very low, they cannot invest to equip an industrial kitchen. About 7 women are still mobilized in this production. In 2020, the state government, through PAA and PNAE made a few collective purchases of cakes. They made 500 cakes in 2 days. This year there was only one government purchase.

The settlement has many partnerships with Sebrae, and they have held many courses with the community, including organic gardening, cake making, and nut processing.

The non-completion of the Mendubim Project to transfer the waters of the Germano Ribeiro dam, which was scheduled to be delivered in 2014, greatly affects life in the settlement. They do not have water to produce using irrigation, given the high energy costs and the lack of capital to implement an irrigation system. Houses do not have cisterns. They experienced a very prolonged period of drought: between 2012 and 2019 there was no rain.

They grow beans, corn and sorghum, mainly for their own consumption, and sell the leftovers. Animals raised are oxen, sheep and goats, for milk and meat. They are extensively farmed, and they are marked as there are no fences or divisions in the part of the lots. Many settlers are selling animals, because animal theft has increased.

About the land situation in the region: Forty years ago, most of the land in the region was not fenced, that is, it was open land with undefined ownership status. Those who had the most power began to encircle the land. Nowadays, nobody breeds loose animals anymore, that is, in an area without a fence.

Manoel (president of the association) knew that there was a photovoltaic power plant to be built on the land of Cassimiro, Vandick etc., but he did not know about the project and does not know if he has been approached by any of the companies involved in it. They are visited by many energy companies, but since their representatives do not leave company names or contacts, they do not know who contacted them. A company was interested in using 500 hectares of the settlement's collective area, but they could not inform which one.

1.1.1.1.3 - Bom Lugar II Settlement

PA Bom Lugar II was formed in 1997 or 1998 and is composed of 26 families. They occupied the farm in 1997, and the owner negotiated with INCRA, because he was no longer producing on the land. The local Rural Workers Union supported the organization of the occupation. The farm's headquarters is in Bom Lugar III Settlement, in Upanema (a neighboring municipality). Between 1998 and 1999, they started building the houses. The well was only built in 2007, when they started to have piped water. With the program Light for All came energy for the well. The plots measure approximately 14 hectares, the Legal Reserve approximately 100 hectares. They did not know the total size of the settlement. The settlement has no irrigated area. They could build another well and install an irrigation system, but they have no money. All families have cisterns built by the '1 Million Cisterns' program, they are 16,000 L cisterns. Some houses have two cisterns. Houses are arranged in a street forming an agrovillage.

They go to school at Novos Pingos Settlement or study in Açú. Consultations with doctors also take place at the Novos Pingos Settlement. They always receive a visit from a health agent. A female settler works as a school lunch lady at the Novos Pingos school. All the families receive Bolsa Familia, she believes all of them received Emergency Aid, although they do not know if anyone got the extension in 2021. They receive technical assistance from Emater, which, besides issuing DAP, distributes seeds. It has already offered courses on production management, silage, however, in Açú, which makes it difficult for settlers to participate because there is no transportation. Emater also helped in selling the products, mainly animals, from the settlement to PAA and PNAE - these programs pay more than middlemen. The settlement has an evangelical church. They organized parties for São João when there were more young people in the settlement, many of whom left seeking work.

In case of financing, they also receive assistance from a Northeast Bank technician, who was described as a very available person, always present when requested.

The well in the settlement also has no photovoltaic energy panel, but they have never tried to negotiate with companies.

In the settlement, they also had many cashew trees, approximately 300 to 400 for each settler family, but a few years ago a plague appeared and killed most of the trees and they have no money to buy seedlings. They did not work together with the agro-industry of Novos Pingos, although they were encouraged by the association there to also set up an agro-industry.

Settlers raise animals: cows, sheep, goats and chickens. There is enough water for herds to drink. There is a family of beekeepers that distributes honey throughout the region, sell to Natal and export. Settlers plant beans, corn, sorghum (hardy crops planted in winter), pumpkin, and watermelon in winter as well. There are many fruit trees in the backyards and even in the streets of the agrovillage: mango, cashew, coconut, acerola, guava, lemon, tamarind, orange (in smaller quantities). They once sold a lot of cashew and imbu to Natal and Fortaleza, but this trade has been reduced.

The settlement is cut by a Sime transmission line, which passes over the lots of 16 families, each of whom received R\$ 1,900.00 as compensation. INCRA received R\$ 17,000.00 for the association, but this money has not yet been spent. They intend to install a new pump in the well and renovate the pipes. They only attended one meeting in Patú (another municipality) when the line was still under negotiation/discussion, they were told that when the line was to be built, it would pass anyway, no matter if they wanted it or not. The line was built between 2019 and 2020, it connects Compa to Cajaseira (Paraíba).

There are predictions that another transmission line passing through the settlement area will reach a legal reserve.

Biggest difficulty in the settlement: not having water to produce using irrigation. When it does not rain, there is a lack of silage and the acquisition cost is high.

Appendix 10 - Photographic Report - Socioeconomics

Mr. Antônio Almeida Farms:

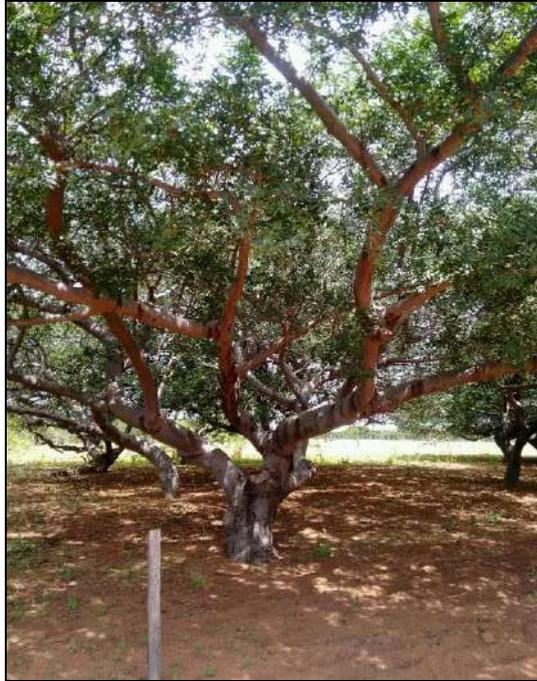


Photo 1- Imbu trees planted at the access to Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. April 28, 2021. Ecology Brazil



Photo 2 - House and imbu trees planted at the access to Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. April 28, 2021. Ecology Brasil.

Mr. Antônio’s Caretaker:



Photo 3 - Caretaker's residence (front) - Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 4 - Caretaker's residence (backyard) - Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 5 - Caretaker's residence (side) - Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 6 - Herd and pasture of the caretaker of Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021



Photo 7 - Pasture and farmyard of the caretaker of the Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 8 - Caretaker's corral at Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 9 - Caretaker's corral at Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 10 - Mare owned by the caretaker of Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 11 - Cropping of beans, corn and sesame by the caretaker of the Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 12 - Cattle herd of the caretaker of Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 13 - View of the corrals and yard (where the vegetable garden is planted) of the caretaker of the Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 14 - farmyard of beans of the caretaker of Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 15 - Beans planted by the caretaker of Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 16 - Corn planted by the caretakers of Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 17 - Sesame by the caretaker of Linda Flor Farm, Planalto Farm, and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.



Photo 18 - Backyard where the caretaker's wife plants her vegetable garden (potatoes and tomatoes) - Linda Flor Farm, Planalto Farm and Novo Horizonte Farm. Ecology Brasil. April 28, 2021.

Mr. Vandick Farms:



Photo 19 - Sorghum plantation Boa Esperança Farm. Ecology Brasil. April 28, 2021.



Photo 20 - Herd of goats and chickens - Boa Esperança Farm. Ecology Brasil. April 28, 2021.



Photo 21 - Chicken coop - Boa Esperança Farm. Ecology Brasil. April 28, 2021.



Photo 22 - Entrance to the Boa Esperança Farm. Ecology Brasil. April 28, 2021.



Photo 23 - Corral and herd of goats - Boa Esperança Farm. Ecology Brasil. April 28, 2021.



Photo 24 - View of the back and side of the Boa Esperança Farm house. Ecology Brasil. April 28, 2021.



Photo 25 - Boa Esperança Farm House. Ecology Brasil. April 28, 2021.



Photo 26 - Herd of goats - Boa Esperança Farm. Ecology Brasil. April 28, 2021.



Photo 27 - Corral and cattle herd (left corner of photo) - Boa Esperança Farm. Ecology Brasil. April 28, 2021.



Photo 28 - Front view of the house, corral, field, and imbu trees - Boa Esperança Farm. Ecology Brasil. April 28, 2021.

Mr. Cassimiro Farms:



Photo 29 - View of the family house (left), shed and caretakers' house - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.



Photo 30 - Headquarters - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.



Photo 31 - Shed - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.



Photo 32 - Corral for sheep and goats - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.



Photo 33 - Inside the sheep and goat pens - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.



Photo 34 - Chickens - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.

Cassimiro's housekeeper:



Photo 35 - House of the caretakers - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.



Photo 36 - Cattle under tamarind trees - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.



Photo 37 - Roçado of beans and corn of the caretakers - Modelo Farm, São Pedro Farm and Nobreza Farm. Ecology Brasil. April 29, 2021.

Novos Pingos Settlement:



Photo 38 - Agro-industry and cooperative headquarters - Novos Pingos Settlement. Ecology Brasil. April 29, 2021.



Photo 39 - Telecenter - Novos Pingos Settlement. Ecology Brasil. April 29, 2021.



Photo 40 - Municipal school built by the Novos Pingos Settlement Association. Ecology Brasil. April 29, 2021.



Photo 41 - View of one of the streets and houses in Novos Pingos Settlement. Ecology Brasil. April 29, 2021.



Photo 42 - Lajeiro, Legal Reserve of Novos Pingos Settlement. Ecology Brasil. April 29, 2021.



Photo 43 - Corn and bean field in the collective area next to the park - Novos Pingos Settlement. Ecology Brasil. April 29, 2021.

Prof. Maurício de Oliveira Settlement



Photo 44 - State of conservation of the park's access road, backyards (right) and plots (left) - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 45 - "Poços" (deep holes opened by water) in the access road to the park - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 46 - Width of the park access road - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 47 - Chapel built on the margins of the park's access road - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 48 - Backyard with a bean field planted on the edge of the access road to the park - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 49 - Nursery implemented in the backyard on the side of the park's access road - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 50 - Overview of the agrovillage of Settlement - Prof. Mauricio de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 51 - Front view of one of the houses of Prof. Mauricio de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 52 - Front view of one of the houses of Prof. Mauricio de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 53 - Headquarters of the Prof. Mauricio de Oliveira Settlement association. Ecology Brasil. April 30, 2021.



Photo 54 - Soccer field at Prof. Mauricio de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 55 - Cattle loose on the central road of Prof. Mauricio de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 56 - Patio where water flows into the 54 thousand liter cistern, backyard where in the background there is an access road to the park - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 57 - Chickens raised in one of the backyards located at the edge of the park's access road - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 58 - Pigs raised in one of the backyards located on the side of the park's access road - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 59 - Fruit stalks and cistern of one of the backyards located on the edge of the access road to the park - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 60 - Access road to the lots (used as grazing areas), edge of the park access road - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 61 - Collective plot of the women from Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 62 - Collective plot of the women from Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 63 - Access (side of BR-304) to Prof. Maurício de Oliveira's Settlement agrovillage. Ecology Brasil. April 30, 2021.



Photo 64 - Edge of the access road (BR-304) and fence bordering the collective area of Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 65 - First initiatives of installation of productive farms, seedling nursery of a settled family - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.



Photo 66 - Handicraft made by a settler - Prof. Maurício de Oliveira Settlement. Ecology Brasil. April 30, 2021.

ENGIE advertisements at Prof. Maurício de Oliveira Settlement



Photo 67 - ENGIE advertisements

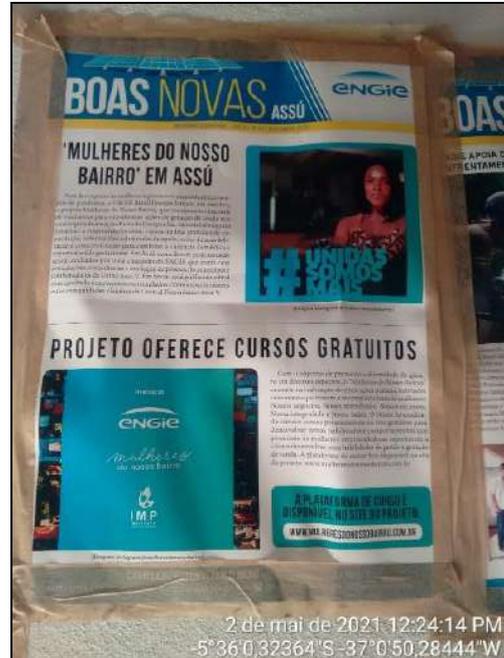


Photo 68 - ENGIE advertisements



Photo 69 - ENGIE advertisements

Appendix 11 - Impacts Assessment Methodology

1 - IMPACT ASSESSMENT METHODOLOGY

The environmental impact assessment was conducted based on recognized references commonly used in this type of analysis. In addition to the nature of the impact, the study evaluated the following attributes: scale, incidence, reversibility, duration, temporality, significance, and magnitude. The attribute probability of occurrence of the impact and the conditions of the affected environmental component were not considered, thus weighting the degree of sensitivity of the environment to the identified transformations.

The impacts were evaluated focusing on the activities of the project (Installation of the Construction Site, Earthmoving and construction of access roads, Civil Construction, Construction of the Substation, Assembly of the base structures and placement of the panels, Electrical Cabling, and Demobilization and general cleaning of the site) and not by the impacts themselves, which increases the number of impacts considerably. From this analysis by transformative activity, many impacts are repeated and evaluated according to the classification criteria. With this, many impacts will have different Magnitudes for each transforming activity. It is noteworthy that some impacts affect more than one environment, but there is a certain generalization in the analysis.

In addition, there is an apparent repetition of certain impacts, since their nomenclatures are similar, as is the case of the impacts "Tax Revenue", "Increased Tax Revenue from Services", "Increased Tax Revenue", "Increased Tax Revenue", "Tax Revenue from Energy Sales".

It is also observed that in a specific activity an impact is generated (e.g., change in air quality) and then, during decommissioning, the reduction of this impact is considered as a positive impact (reduction of negative impacts on air quality). One cannot consider as a positive impact the reduction of a negative impact caused by the project itself.

Another factor that influences the significant amount of impacts generated by the project is the consideration of the elaboration of studies and projects, as well as research and monitoring as positive aspects. The preparation of environmental diagnostics is part of the licensing process and essential for impact assessment, but not an impact in itself. Added to this is the fact that the availability of research and monitoring is almost always restricted to the environmental agency itself, not being so easily disseminated and/or systematized in databases that contribute to scientific knowledge. Not infrequently, numerous Environmental Studies redo research due to lack of knowledge or inability to access studies already carried out.

In **Table 1** it is possible to observe that the matrix elaborated for the RAS is overdimensioned, totaling 73 environmental impacts, being 35 positive and 38 negative. It is known that any intervention for the implementation of projects generally manifests a higher occurrence of negative impacts (most of them temporary and reversible), as illustrated in the matrix of impacts proposed by Ecology Brasil, totaling 26 environmental impacts (05 positive and 21 negative).

Table 1 - Environmental Impacts Matrix Analysis (EAT)

Evaluation	Environmental Impacts	RAS	Ecology Proposal
By type	Positive	35	05
	Negative	38	21
	Overall Total	73	26
By phase	Planning	15	01
	Implementation	87	26
	Operation	13	06
	Total per Phase	115	30
By medium	Physical	22	08
	Biotic	13	06
	Socioeconomics	38	12
	Total	73	26

When one observes the number of impacts per phase (planning, implementation and operation), the quantity is even higher - 115 impacts, since the same impact is accounted for considering its occurrence in each generating activity. The **Table 2** presents the environmental impacts mapped in the RAS.

Thus, the impacts that were identified as not applicable to the project were removed from the matrix. One point of attention is that the impact of the operation phase "Occupational accident risk" is indicated as positive in nature. Besides this impact being considered as negative, since it is a risk totally linked to the worker's health and the preservation of human life, it is wrongly established. The justification for changing each impact can be found in **Table 3**.

Table 2 - Environmental Impacts Mapped in the RAS (Simplified Environmental Report)

Medium	Impacts	Planning	Deployment							Operation
		Studies and Projects	Installation of the seedbeds	Earthmoving and Construction of Access Roads	Civil Buildings	Substation Construction	Assembling the Base Structures and Placing the Panels	Electric Cabling	Demobilization and General Cleaning of the Site	Operation and Maintenance of the Photovoltaic Plant
Physical Environment	Geological Characterization									
	Geomorphological Characterization									
	Pedological Characterization									
	Hydrogeological Characterization									
	Landscape Alteration									
	Air Quality Alteration									
	Alteration of the Sonority									
	Appearance/Erosive Processes									
	Alteration in Surface Water Runoff									
	Geomorphological Changes									
	Soil Contamination									
	Risk of Soil Contamination									
	Water Contamination									
	Water Contamination Risk (Surface and Underground)									
	Geotechnical Changes									
	Risk of Siltation of Water Bodies									
	Minimizing Negative Effects on Soil Quality									
	Reducing Negative Impacts on Air Quality									
	Risk of Intervention in Permanent Preservation Areas									
	Research and Monitoring									
Reducing the Risk of Water Contamination										
Reducing the Risk of Soil Contamination										

Medium	Impacts	Planning	Deployment							Operation
		Studies and Projects	Installation of the seedbeds	Earthmoving and Construction of Access Roads	Civil Buildings	Substation Construction	Assembling the Base Structures and Placing the Panels	Electric Cabling	Demobilization and General Cleaning of the Site	Operation and Maintenance of the Photovoltaic Plant
Biotic Environment	Risk of Accidents with Fauna									
	Risk of Accidents with Avifauna									
	Flora Characterization									
	Characterization of Fauna									
	Air Quality Alteration									
	Alteration of the Sonority									
	Fauna Scavenging									
	Loss of Vegetation Cover									
	Environmental Discomfort									
	Risk of Intervention in Permanent Preservation Areas									
	Risk of Burial of Aquatic Species									
	Research and Monitoring									
	Reducing the Risk of Fauna Accidents									
Anthropic Environment	Population Uncertainty									
	Population Expectation									
	Acquisition of Specialized Services									
	Rational and Planned Land Use									
	Technological Increment of the Region									
	Tax Collection									
	Increase in Services Tax Revenue									
	Higher Tax Revenue									
	Increased Tax Revenue									
	Tax Revenue from the Sale of Energy									
	Job Generation									
	Labor Hiring									
	Increased Demand for Jobs in the Region									

Medium	Impacts	Planning	Deployment							Operation
		Studies and Projects	Installation of the seedbeds	Earthmoving and Construction of Access Roads	Civil Buildings	Substation Construction	Assembling the Base Structures and Placing the Panels	Electric Cabling	Demobilization and General Cleaning of the Site	Operation and Maintenance of the Photovoltaic Plant
Anthropic Environment	Service Sector Growth									
	Trade Growth									
	Increased Circulation of Currency in the Local Market									
	Increase in the Local Economy									
	Dynamism in the Economy									
	Generation of Solid and Liquid Waste, including Civil Construction									
	Increased Vehicle Traffic									
	Increase in the Movement of People/Workers									
	Higher Prices for Local Products and Services									
	Environmental Discomfort									
	Traffic Accident Risks									
	Workplace Accident Hazards									
	Air Quality Alteration									
	Alteration of the Sonority									
	Risk of Intervention in Permanent Preservation Areas									
	Dust and Particulate Generation									
	Release of Dust and Particulates									
	Reduction of Noise Emission Levels									
	Environmental Quality Stabilization									
	Decrease in Job Supply/Income									
Reduction in Economic Dynamics										
Reduction in Job Generation										
Increase in Energy Supply										
Utilization of Renewable Energy Source										
Preservation of Areas of Environmental Interest										

Table 3 - RAS (Simplified Environmental Report) Impacts Change Justification

	RAS	CHANGE (Ecology)
Physical Environment	Geological Characterization	Remove. We understand that the preparation of the study is part of the process and essential to the assessment of impacts, but not an impact in itself.
	Geomorphological Characterization	Remove. We understand that the preparation of the study is part of the process and essential to the assessment of impacts, but not an impact in itself.
	Pedological Characterization	Remove. We understand that the preparation of the study is part of the process and essential to the assessment of impacts, but not an impact in itself.
	Hydrogeological Characterization	Remove. We understand that the preparation of the study is part of the process and essential to the assessment of impacts, but not an impact in itself.
	Landscape Alteration	Ok
	Air Quality Alteration	Ok
	Alteration of the Sonority	Ok
	Appearance/Erosive Processes Aggravation	Ok
	Alteration in Surface Water Runoff	Ok
	Geomorphological Changes	Remove. The impacts Appearance/Erosion Processes Aggravation, Alteration in Surface Water Runoff and Landscape Alteration already contemplate effects of this impact.
	Vibrations	Added impact.
	Soil Contamination	Ok
	Risk of Soil Contamination	Remove. There is already the impact of Soil Contamination.
	Water Contamination	Ok
	Water Contamination Risk (Surface and Underground)	Remove. There is already the impact of Water Contamination.
	Geotechnical Changes	Remove. The impacts Appearance/Erosion Processes Aggravation and Alteration in the Runoff of Surface Waters already contemplate effects of this impact.
	Risk of Siltation of Water Bodies	Remove. There are no bodies of water directly affected by the project.
	Minimizing Negative Effects on Soil Quality	Remove. One cannot consider as a positive impact the reduction of a negative impact caused by the enterprise itself.
	Reducing Negative Impacts on Air Quality	
	Risk of Intervention in Permanent Preservation Areas (APP - Area de Preservação Permanente)	Remove. There is no APP interfered with.
Research and Monitoring	Remove. The availability of these monitoring/research efforts is almost always restricted to the environmental agency itself and is not easily disclosed and/or systematized in databases that contribute to scientific knowledge.	
Reducing the Risk of Water Contamination	Remove. One cannot consider as a positive impact the reduction of a negative impact caused by the enterprise itself.	
Reducing the Risk of Soil Contamination		

Biotic	RAS (Simplified Environmental Report)	CHANGE
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Environment	Risk of Accidents with Fauna	<p>OK. Remove the "Risk" from the name of the Impact. There is a possibility of the impact occurring and the probability assesses the "size of the risk of it occurring".</p> <p>Remove from the planning stage.</p>
	Risk of Accidents with Avifauna	<p>The RAS does not describe the dynamics of this impact, but we understand that it refers to accidents arising from the Lake Effect.</p> <p>Replace with Polarized Light Pollution - "Lake Effect".</p>
	Flora Characterization	<p>Remove. We understand that the preparation of the study is part of the process and essential to the assessment of impacts, but not an impact in itself.</p>
	Characterization of Fauna	
	Air Quality Alteration	<p>Remove. Impacts on environmental factors of the Physical Environment.</p>
	Alteration of the Sonority	
	Fauna Displacement	<p>Remove. The Fauna Accidents impact already contemplates the effects of this impact.</p>
	Loss of Vegetation Cover	<p>Ok.</p>
	Environmental Discomfort	<p>Remove. This impact is already indicated in the Socioeconomics item and, still, other impacts indicated in the Biotic Environment already signal changes that pressure/disturb/influence the fauna in some way.</p>
	Risk of Intervention in Areas of Permanent Preservation (APP)	<p>Remove. There is no APP interfered with.</p>
	Risk of Burial of Aquatic Species	<p>Remove. There is no direct interference with aquatic species.</p>
	Research and Monitoring	<p>Remove. The availability of these monitoring/research efforts is almost always restricted to the environmental agency itself, and is not easily disclosed and/or systematized in databases that contribute to scientific knowledge.</p>
	Reducing the Risk of Fauna Accidents	<p>Remove. One cannot consider as a positive impact the reduction of a negative impact caused by the enterprise itself.</p>
	Alteration and/or Loss of Habitats	<p>Impact added.</p>
	Increased Hunting and Capture of Wildlife	<p>Impact added.</p>
Disturbance to Fauna by Alteration of Sound Pressure Levels	<p>Impact added.</p>	

	RAS	CHANGE
Socioeconomic Environment	Population Uncertainty	Ok. Replace name with Generation of Expectation.
	Population Expectation	Remove. Generating expectations is something negative (not positive as indicated), since it is not possible to meet all of them. Being considered a negative impact, it would be associated with the impact Uncertainty of the population, repeating itself.
	Acquisition of Specialized Services	Remove. The contracting of specialized services is normally done by consultants and companies from outside the region, which does not have a positive impact on the population of the project's areas of influence.
	Rational and Planned Land Use	Remove. Unless there is a trend of encroachments and possible non-regularized uses of the land (this being an abandoned area), this impact does not proceed.
	Technological Increment of the Region	Remove. Depending on the profile of the region's commerce and services, this increase is unlikely. Parts and materials are usually imported and/or purchased in specialized regions.
	Tax Collection	Ok. Remove from the planning stage.
	Increase in Services Tax Revenue	Remove. Repeated Impact - Tax Collection.
	Higher Tax Revenue	Remove. Repeated Impact - Tax Collection.
	Increased Tax Revenue	Remove. Repeated Impact - Tax Collection.
	Tax Revenue from the Sale of Energy	Remove. Repeated Impact - Tax Collection.
	Job Generation	Ok. Remove from the planning stage. The hiring of consultants and companies from outside the region are normally contracted at this stage, which does not have a positive impact on the population of the project's areas of influence.
	Labor Hiring	Remove. Repeated Impact - Job Generation.
	Increased Demand for Jobs in the Region	Remove. Repeated Impact - Job Generation.
	Growth of Service Sector	Remove. Effect associated with the impact Dynamism in the Economy.
	Growth in Commerce	Remove. Effect associated with the impact Dynamism in the Economy.
	Increased Circulation of Currency in the Local Market	Remove. Repeated Impact - Dynamism in the Economy.
	Increase in the Local Economy	Remove. Repeated Impact - Dynamism in the Economy.
	Dynamism in the Economy	OK.
	Generation of Solid and Liquid Waste, including Civil Construction	Remove. Action generating impact, not impact itself.
	Increased Vehicle Traffic	OK. Replace name with Pressure on Traffic and Road Infrastructure.
Increase in the Movement of People/Workers	Remove. The impact Alteration of the Daily Life of the Population already contemplates effects of this impact.	

	RAS	CHANGE
Socioeconomic Environment	Population Uncertainty	Ok. Replace name with Generation of Expectation.
	Higher Prices for Local Products and Services	Remove. Or we run the risk of invalidating the impact of Dynamism on the economy.
	Environmental Discomfort	The RAS does not describe the dynamics of this impact, but we understand that it refers to the nuisance generated to the population residing in the vicinity of the development. Replace name with Alteration of the Daily Life of the Population.
	Risks of Traffic Accident	Remove. The impacts Pressure on Traffic and Road Infrastructure and Alteration of the Daily Life of the Population already contemplate effects of this impact.
	Workplace Accident Hazards	Remove the "Risk" from the name of the Impact. There is a possibility of the impact occurring and the probability assesses the "size of the risk of it occurring". Remove from the planning stage.
	Air Quality Alteration	Remove. Impacts on environmental factors of the Physical Environment.
	Alteration of the Sonority	
	Risk of Intervention in Permanent Preservation Areas	Remove. Biotic Environment Impact and there is no interference in an APP.
	Dust and Particulate Generation	Remove. Actions that generate altered air quality - indicated in the Physical Environment.
	Release of Dust and Particulates	
	Reduction of Noise Emission Levels	Remove. One cannot consider as a positive impact the reduction of a negative impact caused by the enterprise itself.
	Environmental Quality Stabilization	
	Decrease in Job Supply/Income	
	Reduction in Economic Dynamics	
	Reduction in Job Generation	
	Increase in Energy Supply	Ok
	Utilization of Renewable Energy Source	Ok
	Preservation of Areas of Environmental Interest	Remove. The development itself will cause interference, there is no provision for preservation.
	Change of Land Use and Occupancy	Impact inserted.
	Pressure on the Public Services Infrastructure	Impact inserted.
Direct Interference in the Settlement Prof. Maurício Oliveira	Impact inserted.	

On the other hand, it is understood that the presentation of the analysis of impacts was not deepened, being restricted only to the matrix of impacts presented, and addressed in a generic way in the phases of the project. An example of inconsistency is related to the impacts to the

activities of Earthmoving and Construction of Access Roads for the implementation phase. The description of this change does not consider important impacts, especially those related to the residents of the settlement Prof. Mauricio de Oliveira, who will be affected by the construction of the main access to the project. There are also no measures proposed in the RAS to minimize the effects of this impact on the residents of the settlement, only activities related to interference with the physical and biotic environment, such as drainage systems, earth movement, signaling of permanent preservation areas, among others.

And, still, it was observed that some impacts, of the nature of this type of project, were not incorporated.

Appendix 12 - ESAP - Problems and Solutions

1. ENVIRONMENTAL AND SOCIAL ACTION PLAN - PROBLEMS AND SOLUTIONS

1.1. PHYSICAL ENVIRONMENT

As presented in the Physical Environment Action Plan, the analysis of the studies already conducted for the Mendubim Photovoltaic Complex, together with field observations made by Ecology Brasil's team in April 2021, made it possible to list the main issues associated with impacts on the Physical Environment, as well as the dynamics of their influence on the daily lives of residents living in the vicinity of the project.

Thus, the analysis of the Physical Environment made it possible to identify issues related to IFC Performance Standard 1 and 3 for water consumption and erosion processes, and issues related to IFC Performance Standards 1, 3 and 4 for noise and vibration, as well as changes in air quality.

Thus, the problems and solutions presented in this study seek, within the scope of performance standard 1 of the IFC, to achieve the following objectives:

- Identify and evaluate the socio-environmental impacts, both positive and negative, within the project's area of influence;
- Avoid or, where this is not possible, minimize or compensate for negative impacts on workers, affected communities, and the environment;
- Ensure that affected communities are appropriately included in issues that have the potential to affect them;
- Promote better social and environmental performance of companies with effective use of management systems.

In this context, it is important to highlight that this Performance Standard, according to IFC (2006), applies to projects that promote social and environmental impacts and risks, as in the case of the Mendubim Photovoltaic Complex, which must be managed continuously, from the early stages of project development, by means of an Environmental and Social Management System (ESMS).

IFC Performance Standard 3, in turn, aims to:

- Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution resulting from project activities;
- Promote more sustainable use of resources, including energy and water;
- Reduce project-related GHG emissions.

According to IFC (2006), the applicability of this Performance Standard is established during the process of identifying socio-environmental risks and impacts, while the implementation of the actions required to meet the requirements of this Performance Standard is managed by the SMS. In addition, Environmental, Health, and Safety (EHS) guidelines or other internationally recognized sources should be consulted in evaluating and selecting resource efficiency and pollution prevention and control techniques for the project. The EHS Guidelines contain the performance levels and measures that are normally acceptable and applicable to the project, and should always achieve the most stringent levels.

IFC performance standard 4, on the other hand, aims to:

- Anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project's life cycle arising from routine or non-routine circumstances.
- Ensure that the protection of employees and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risk to Affected Communities.

According to IFC (2006), this Performance Standard involves the potential risks and impacts arising from project activities on Affected Communities, while its applicability is established during the identification process of risks and socio-environmental impacts and the implementation of the actions required for its fulfillment is managed by the SMS.

Based on the standards and objectives exposed, the problems and possible solutions identified are listed below, in topics.

Problem 1: Water Consumption by the Development

Regarding water consumption at the Mendubim Photovoltaic Complex, it is worth noting that the item characterizing the project in the RAS does not present information about the water consumption required for construction and operation.

With regard to the availability of water in the area of the project, it should be noted that there are no surface water courses that allow its use, while the data presented in the RAS for groundwater present a favorability for its exploitation.

In this sense, it is important to highlight that the selection of the supply source requires a strategic analysis, in view of the water scarcity scenario in the region, and that this theme is superficially mentioned in the Environmental Control Program in the RDPA.

Thus, there is no information about the actions that will be taken to mitigate possible conflicts associated with water consumption, since the RDPA, in relation to water supply, only indicates that the water supply must be carried out by an external supplier, duly licensed and authorized by the competent bodies or, when new wells are drilled, they must present the appropriate licenses and use right permits.

Regarding the observations made during the technical inspection, it is important to point out that the residents reported that there have been several attempts to use groundwater in the area of the project, but all were unsuccessful, even in deep wells. Furthermore, the assessment presented in the RAS that the project will not promote changes in the hydrogeological dynamics of the region, since rainwater will continue to infiltrate and percolate naturally, is an assessment that is valid for free aquifer dynamics and not for confined aquifers, as in the case of the Açu aquifer, which is possibly the aquifer system exploited through wells by the region's residents.

Solution

According to the evaluation performed, it is necessary, first of all, to define the consumption estimates and the source that will be used for the water supply, be it a water truck or a well. If groundwater is to be used through the drilling of wells, the developer must conduct hydrogeological studies that evaluate both the capacity to meet the estimated water consumption of the project in its construction/operating phases and the possible impact on existing wells in the communities surrounding the project.

Therefore, if the company opts for groundwater consumption, it is important that the studies required to obtain the use permit for this resource from INEMA include an evaluation of the possible impact on existing wells in the communities surrounding the project.

Therefore, studies that evaluate the water consumption of the project during the construction and operation phases in relation to the local hydrogeological availability are of fundamental

importance for the project not to generate impacts associated with the use of this natural resource.

Problem 2: Noise and Vibration Emission

According to the Installation License, there is the need to present the Noise and Vibration Level Monitoring Program, however, there is no specific program in the RDPA, as stipulated in the license.

Noise control, however, is presented in the RDPA within the Construction Site Environmental Control Program. Despite the activities listed to mitigate the impact associated with noise, it is important to point out that the measures presented are not entirely sufficient and require more detail.

The national legislation used as reference in the text of the RDPA, for example, is wrong. The indication of ABNT NBR 10.152/87 must be replaced by ABNT NBR 10.151/19 Ar1:20, as specified in CONAMA 01/90.

Likewise, it is important to note that the noise control measures contemplated in the RDPA do not fully comply with the IFC EHS Guideline for noise control.

With regard to vibrations, it should be noted that the circulation of trucks and heavy machinery during the implementation of the project will produce this type of emission, which has the potential to cause annoyance to the population and damage to buildings and improvements, particularly in the settlement Prof. Mauricio Oliveira, and there are no measures to mitigate this impact within the RDPA. This impact has been observed in similar developments in the northeast of the country, due to the successive vibration and/or trepidation caused by excessive heavy vehicles traveling on the streets and near residences and other buildings (Costa, 2019¹).

Solution

According to the evaluation carried out, it is recommended that a Noise and Vibration Levels Monitoring Program be prepared as stipulated in the Installation Permit, containing the details of the measures associated with noise control already presented in the RDPA, and to insert control

¹ <https://doi.org/10.1590/0102-7786343049>

measures related to vibrations, observing both national legislation and the eventual provision of civil defense advisory services for vibrations, and international best practices, including the IFC EHS Guidelines.

Problem 3: Air Quality Alteration

Regarding the sources associated with the implementation of the Mendubim Photovoltaic Complex, the circulation of machinery, equipment and vehicles on unpaved roads can generate emissions of gases and dust particles, causing impacts on the population living in the vicinity of the project, especially in the settlement Prof. Mauricio Oliveira.

In the Installation License there is no indication of a specific program to mitigate this impact, however, there is a request to implement methods that result in the elimination and/or maximum reduction of the emission of dust particles into the atmosphere.

In this sense, it is worth pointing out that such measures were inserted in the RDPA within the Environmental Control Program of the project. These measures, however, need more detail, as they do not indicate monitoring locations and methods, the conduct of baseline campaigns, or reference standards and associated legislation. Regarding the legislation, it should be noted that the Environmental Control Program of the Project indicates the use of CONAMA Resolution 03/90 in the legal requirements item, while the current legislation pertinent to the theme is CONAMA Resolution 491/18, which revoked CONAMA 03/90. Likewise, the program does not indicate the use of international norms and standards, such as the IFC's EHS Guidelines.

Solution

According to the evaluation carried out, it is necessary to specify the measures indicated in the Environmental Control Program of the project through the development of a specific program that contains the details of the measures associated with the emission control of particulate material already presented in the RDPA, observing both the national legislation and the best international practices and the IFC EHS Guidelines.

Problem 4: Erosive Processes

To mitigate the impacts associated with soil erosion, the Erosive Processes Monitoring and Control Program was presented in the RDPA, in compliance with the stipulations of the Installation License. Regarding soil erosion, despite the low slope of the site, it is important to

pay attention to the dynamics of sheet runoff, which is originated from diffuse rainwater runoff and will be intensified by the vegetation suppression.

In relation to the measures indicated in the RDPA to mitigate this impact, it should be noted that these need to be detailed in terms of control measures and monitoring methodology, for example. Furthermore, the Program does not indicate the use of international norms and standards, such as the USEPA (United States Environmental Protection Agency) methodology for erosion control at construction sites.

Solution

According to the evaluation carried out, it is necessary to detail the measures indicated in the Erosive Processes Monitoring and Control Program by specifying the identification, control, and monitoring measures already presented in the RDPA, observing both the national legislation and the best international practices, such as the USEPA methodology for erosion control at construction sites.

1.2. FAUNA

As presented in the Fauna Action Plan, the analysis of the studies already carried out for the Mendubim Photovoltaic Complex, together with the field observations made by Ecology Brasil's team in April 2021, made it possible to list the main problems associated with impacts on fauna, as well as the dynamics of their influence on the daily lives of the residents living near the project.

Thus, the Fauna analysis made it possible to identify issues related to IFC Performance Standard 6 Preservation of Biodiversity and Sustainable Management of Living Natural Resources.

In this context, it is important to highlight that this Performance Standard, according to IFC (2006), applies to projects that promote social and environmental impacts and risks, as in the case of the Mendubim Photovoltaic Complex, which must be managed continuously, from the early stages of project development, by means of an Environmental and Social Management System (ESMS).

Based on the above, the problems and possible solutions identified follow below in topics.

Problem 1: Construction Activities and Vegetation Suppression

The Fauna Monitoring Program inserted in the RDPA proposes the monitoring, by non-invasive methods (no capture), of the Herpetofauna and Mastofauna groups (medium and large mammals). The avifauna and chiroptera will be monitored by capture with mist nets, as well as complementary non-invasive methods.

These methods are adequate for the groups, but require more sampling effort, considering the size of the project and the importance of sampling affected and unaffected areas.

Solution

According to the evaluation carried out, the proposal of only three field days per campaign is insufficient for robust data collection and analysis, and using only non-invasive methods (no capture) to monitor the herpetofauna and non-flying mammal groups is also insufficient. Therefore, it is recommended that at least six field days be conducted, with sampling in the ADA/AID and All, with equivalent effort between them, and the use of trapping methods for herpetofauna and non-flying mammals, such as pitfall and live traps (sherman and tomahawk).

Problem 2: Polarized Light Pollution - "Lake Effect".

During the operation phase of Photovoltaic Power Plants (PV Plants), the main risk of accidents for fauna is the collision of birds with the generating panels. There are different studies reporting deaths of winged animals caused by collisions with photovoltaic generator panels, with Polarized Light Pollution (Lake Effect) being a relevant factor, as it can attract the animals directly to the Photovoltaic Plants during the operation phase. During the operation phase of Photovoltaic Power Plants (PVP), the main accident risk for fauna is the collision of birds and potentially also bats with the generating panels. There are different studies reporting deaths of winged animals caused by collisions with photovoltaic generator panels (HORVÁTH et al., 2010; KAGAN et al., 2014; MANVILLE, 2016), with Polarized Light Pollution (Lake Effect) being a relevant factor, as it can attract the animals directly to the Photovoltaic Plants (HORVÁTH et al., 2010; KAGAN et al., 2014).

It is important to point out that the effects of photovoltaic plants on avifauna are little known, and restricted to biogeographical regions different from the one found in Assú. Therefore, there is a possibility that more species may interact with the panels, just as there is a possibility that, even if present, the species may not interact with the generating panels. In this context, monitoring is necessary to generate information about potential impacts of the operation of photovoltaic plants in Brazil.

There was no indication of this impact in the diagnosis document, which in turn, there was no indication of a specific program in the RDPA.

Solution

According to the evaluation carried out, a specific program for this impact with monitoring of the avifauna is necessary.

One way to mitigate the impact of bird collision is to use devices and/or equipment that prevent birds from getting close to the photovoltaic panels. The choice of equipment and its installation depends on the engineering evaluation of the project, which will determine if the equipment can be installed, the appropriate location, its dimensions, and the quantity to be installed on the structures or open areas of the photovoltaic plants.

Some examples of bird repellent devices that could be adopted in the plants are presented below, along with a brief description of how they work. It is reiterated that there are no studies that have quantitatively evaluated the performance of such devices. Such methods are still experimental in power transmission projects, and therefore can be improved based on the results obtained in each location where they are used.

Laser emitters: devices used in agriculture to keep birds away from crops during day and night (24h/day). Equipped with motion sensors, the automated operating devices emit green-colored lasers in response to the movement of birds, which discourages them from approaching. It can be programmed at different intensity levels and random movements. There is also a manual model, similar in shape to a handheld flashlight. It is relatively expensive and requires importation into Brazil. However, it has proven effective against birds of different sizes when used in agriculture, airports, and photovoltaic plants, among other types of projects. Example of a laser emitting device: Agrilaser® AVIX Autonomic.

Predator models: models that simulate predatory birds are installed at strategic points to scare birds away, acting during the day and night in a similar way to the scarecrows in plantations. Some models simulate head and wing movements and emit vocalizations, in order to induce the birds to leave the site so as not to be predated. Other models simulate predators in flight. Therefore, there are fixed models and mobile ones, the latter being fixed by wire ensuring their movements with the wind and simulating in fact a bird of prey in flight. Examples of predator models: Workalp® Pigeon and Seagull Scare Owl (fixed model) and Scarybird® Flying Hawk (mobile model).

1.3. FLORA

Considerations and Recommendations Based on the Review of the Studies:

Based on the content of the submitted RAS and RAF (CASE, 2017; 2019), as well as the environmental licensing studies conducted in the region (ESPERANZA/ECOLOGY BRAZIL, 2015;2016) and in consultation with existing literature, it is possible to state that the flora present in the area planned for implementation of the Mendubim Photovoltaic Complex reflects an anthropized environment, with a predominance of species of wide distribution and common in the region, being important to emphasize, however, the difficulty in obtaining information on the flora of the state.

The *Amburana cearensis* (cumaru-de-cheiro), classified as near threatened (CNCFlora, 2021) and endangered (IUCN, 2021), and the *Handroanthus impetiginosus*(ipê-roxo), classified by CNCFlora (2021) as near threatened.

According to the guidelines of the IFC Standard, the data obtained reflect the characteristics of an area composed mostly of anthropized habitat, but with some natural habitat sites, possibly (but not restricted) in the Legal Reserve areas of some properties. Such characteristics allow us to determine the IFC Performance Standard 6 for the area.

As for the socio-economic impacts caused by vegetation suppression (the main negative impact caused to flora by the project), we can consider IFC Performance Standards 1 and 6.

The details of the problems analyzed, which allowed such classifications, can be seen in the action plan and in item 4.2.2.6 Final Considerations and Recommendations.

According to the RAS (2017), for the implementation phase, only the Deforestation Control Plan was proposed, and it presents methodology and objective guidelines for the control of vegetation suppression and the Degraded Areas Recovery Plan, aimed at the control, mitigation, and recomposition of the areas degraded by the implementation and operation in the project area.

Thus, in order to meet the principles of IFC Performance Standard 6, it is necessary to prepare a Germplasm Rescue and Plant Conservation Plan, allowing the rescue of species of ecological importance present in the area and their conservation. It is also necessary to prepare a Forest Replacement Plan, in order to comply with the state legislation (Complementary Law 380/2008, which considers mandatory the forest replacement of the liabilities caused by the project), and the Ethnobotanical Diagnosis, which will be carried out in the communities surrounding the project.

Final Considerations and Recommendations

As mentioned throughout this report, the studies presented to obtain the project's Preliminary License (RAS and RAF) have an information deficit that can be filled throughout the subsequent licensing stages. Thus, the objective of this topic is to present the problems to be solved in the scope of the studies required to obtain the Operation License, as well as the adequacy to the IFC performance standards, thus allowing: the reduction of possible impediments with the environmental agency, adequacy to the IFC Performance Standard and Ecuador principles, and the mitigation of socio-environmental impacts.

The joint analysis of the secondary data and the information collected in the field by the Ecology Brasil team, in the month of April 2021, allowed us to list the main problems related to the impacts of the flora, as well as their influence on the daily lives of the landowners. As mentioned before, the joint analysis of these factors allows us to consider the issue raised as IFC Performance Standard 1 and 6, simultaneously, according to the Flora Action Plan.

In this way, the problem and the solutions presented seek, within the scope of performance standard 1 of the IFC, to achieve the following objective:

- Identify and evaluate the socio-environmental impacts, both positive and negative, within the project's area of influence;
- Avoid or, where this is not possible, minimize or compensate for negative impacts on workers, affected communities, and the environment;
- Ensure that affected communities are appropriately included in issues that have the potential to affect them;
- Promote better social and environmental performance of companies with effective use of management systems.

This Performance Standard applies to projects that, like the Mendubim Photovoltaic Complex, promote social and environmental impacts and risks. These risks must be managed, from the first stages of project development and continuously, by establishing a social and environmental management system.

IFC performance standard 6, on the other hand, aims to:

- Protect and preserve biodiversity;
- Promote the sustainable management and use of natural resources through the adoption of practices that integrate preservation needs and development priorities.

According to IFC (2006), the applicability of this Performance Standard is defined during the Social and Environmental Assessment process, while the implementation of the actions necessary to meet the requirements of this Performance Standard is managed through the company's Social and Environmental Management System, and these management and assessment system requirements are described in Performance Standard 1. Based on the Assessment of risks, impacts and the vulnerability of biodiversity and natural resources present, the requirements of this Performance Standard are applied to projects in all habitats, even if these habitats have not been previously disturbed and are not legally protected.

Based on the stated standards and objectives, the following are topics that are considered problematic and possible solutions.

Problem 1: Knowledge gap about the diversity of local species and in the state of Rio Grande do Norte.

Although the ADA of the project consists of anthropized environments, with a predominance of species of wide distribution and common in the region, it is important to emphasize the low degree of knowledge about the regional flora and of the state of Rio Grande do Norte as a whole. Such a statement is evidenced by the analysis of the regional flora presented in the RAS (CASE, 2017) and the RAF (CASE, 2019), which do not faithfully represent the regional diversity, especially when comparing the floristic lists produced for the region by ESPERANZA/ECOLOGY BRASIL (2015 and 2016) and by the Ecology Brasil team, during a survey in April 2021.

Considering what is cited in IFC Performance Standard 6 - Scope of Application - paragraph 3, and also in IFC Performance Standard 1, although they are not cited directly in the objectives, partnerships should be sought with the scientific community of the state, favoring the elevation of knowledge about the regional flora. Next, Solution 1 offers possible solutions to the problem presented.

Solution 1

- Greater sampling coverage for future licensing, with a significant number of sampling units being employed;
- Application of specific methods for studies of the herbaceous stratum and epiphytic species;
- Destination of exsiccata to herbaria;

- Enter into agreements and partnerships with Universities and botanical research centers, promoting the financing of scientific research capable of increasing the knowledge of the state's flora; and
- Development of the Germplasm Rescue and Plant Conservation Plan.

Problem 2: Suppression of trees belonging to the species *Spondia tuberosa* (umbu).

Considering the economic importance of the species, as it provides subsistence for regional human populations, it is necessary to evaluate the impact of the removal of these individuals on the local community, in addition to the development of an Ethnobotanical Diagnosis, which can be contemplated in the Environmental Education Plan, to support regional farmers, thus allowing the expansion of their productive capacity and crop diversification.

Such indications are in line with the objectives proposed by performance standard 1:

- Identify and evaluate the socio-environmental impacts, both positive and negative, within the project's area of influence;
- Avoid or, where this is not possible, minimize or compensate for negative impacts on workers, affected communities, and the environment;
- Ensure that affected communities are appropriately included in issues that have the potential to affect them;

As well as the goals proposed by performance standard 6:

- Protect and preserve biodiversity;
- To promote the sustainable management and use of natural resources through the adoption of practices that integrate preservation needs and development priorities.

Solution 2

According to the problem presented, it is necessary: a) to open a dialogue with the owners, prior to the suppression; b) an evaluation of the economic impact caused by the suppression of these individuals and; c) the elaboration of financial compensation plans for the affected ones. Another measure capable of subsidizing the generation of regional income is the construction of

a technical support program for regional farmers, allowing the expansion of their productive capacity and crop diversification. In addition to the development of an ethnobotanical diagnosis.

Issue 3 - Endangered species occurring in the region of the project.

The analysis of the combined floristic list, constructed by compiling regional studies, indicated the occurrence of numerous species classified in some category of threatened with extinction, according to official lists consulted. Among these are *Amburana cearensis* (cumaru-de-cheiro), classified as near threatened (CNCFlora, 2021) and endangered (IUCN, 2021), and the species *Handroanthus impetiginosus* (ipê-roxo), classified by CNCFlora (2021) as near threatened.

Solution 3

In order to minimize impacts to the local flora, resulting from the suppression of vegetation in the area of the development, it is recommended that environmental plans capable of minimizing socio-environmental impacts and of fitting the development into the IFC 1 and 6 performance standards be constructed and implemented.

- Deforestation Control Plan - Planning of the suppression process to avoid removal beyond the necessary area, adapting, when possible, the implantation of the installations in such a way as to suppress the minimum of native vegetation.
- Germplasm Rescue and Plant Conservation Plan - Rescue of plant propagules, with emphasis on endangered, rare and endemic species previously indicated in this RCA and later in other studies, for seedling production and/or sowing with the intention of recomposing degraded areas, promoting the enrichment of plant communities and, in this way, promoting the preservation of part of the genetic variability of the vegetation to be suppressed;
- Degraded Areas Recovery Plan - Recovery of degraded areas, with plans for forest reset and enrichment or natural regeneration, using only native species, according to the condition of each area to be recovered;
- Forest Replacement Plan - Perform compensatory planting of native species in an area at least equal in size to that suppressed, preferably in the same hydrografic basin and vegetation physiognomy impacted.

In addition, it should be done new floristic and phytosociological inventories, with robust sampling, capable of estimating and characterizing the populations of threatened species in the project's areas of influence.

Issue 4 - Disposal of suppressed plant material.

After suppression of the vegetation present in the area directly affected by the project, the woody material needs to be properly disposed of. Considering the estimated volume, the simple accommodation of this material in piles in the area of the project will not be possible, thus requiring the release of the area destined for the structures and improvements of the project in an adequate manner, thus avoiding possible legal disputes and/or financial burden to the project.

Such indications are in line with the objectives proposed by performance standard 1:

- Identify and evaluate the socio-environmental impacts, both positive and negative, within the project's area of influence;
- Avoid or, where this is not possible, minimize or compensate for negative impacts on workers, affected communities, and the environment;
- Ensure that affected communities are appropriately included in issues that have the potential to affect them;

As well as the goals proposed by performance standard 6:

- Protect and preserve biodiversity;
- To promote the sustainable management and use of natural resources through the adoption of practices that integrate preservation needs and development priorities.

Solution 4

Considering the problems presented, it is recommended that the Deforestation Control Plan be adapted, thus allowing the project to meet IFC performance standards 1 and 6.

After obtaining the Vegetation Suppression Authorization (ASV), and after cutting the plant communities present in the project area, the appropriate destination of the suppressed woody material must be considered, with the following measures being proposed, considering the peculiarities and regional conditions:

- For the elimination of the suppressed woody material, stacking and subsequent grinding is recommended, and the wood shavings produced are spread and incorporated into the soil, favoring the immobilization of carbon and the improvement of its physical and chemical conditions. This incorporation can be done in the project's own area or donated to local farming communities for incorporation into the soil of their productive areas, thus favoring the increase in local agricultural productivity.

- As for the removal of woody material from the project area, in the form of donation to local communities or ceramics companies that use firewood as an energy source, it is necessary to obtain the DOF - Document of Forest Origin.

This document is necessary to remove the suppressed material from the area of the project and transport it to the appropriate destination, and is established by MMA Ordinance No. 253, August 18, 2006, establishing the Forest Origin Document - DOF to replace the Authorization for Transport of Forest Products - ATPF; and IBAMA Normative Instruction No. 112, August 21, 2006, which deals with the definitions and concepts used in issuing the Forest Origin Document - DOF;

To comply with the legislation and due to the great variety of the material, it must be classified before the removal, storage, and handling operations.

To obtain the DOF it is also necessary to prepare technical forestry reports, which in cases of semi-mechanized harvesting, should occur immediately after the piling up. These reports should be prepared, reviewed and signed by the Responsible Forest Engineer (include in the report the number of the CREA and the ART duly paid for the professional who will make the reports during the activity).

The forestry technical report, in spreadsheet form, should contain general information such as: municipality/state/coordinates/tower/coal (service belt or selective logging)/access/address of the rural property where the suppression occurred/contact/name of the engineer/CREA/date/number of the report/year; as well as information related to the suppressed material: species/vol. in m³/type - log or forest residue/number of trees/suppressed area/individual species/total volume, among others that may be identified as important by the responsible technician who will prepare them.

General DOF Guidelines

As general guidelines, we can mention the following:

- The removal of native vegetation necessary for the project must be subject to environmental licensing by IBAMA, and can only occur after the issue of the Authorization for Vegetation Suppression (ASV). The suppression of vegetation will be carried out strictly in the areas described in the ASV;

- After the removal of the vegetation, it will be necessary to issue the DOF for the transport and final destination of the removed wood
- It is important to highlight that the information related to the transport of timber forest products should be collected through the Electronic System contained in IBAMA's site (www.ibama.gov.br), in the on-line services item, where the person responsible can get to know the previous procedures for issuing the Forest Origin Document (DOF) (for the cases of wood removal such as forest residues and firewood from the property where it was suppressed);
- Before the vegetation suppression activities, the owner of the area must be informed of the forest inventory results, so that he is aware of the quantification and qualification of the material that will be placed at his disposal. With this prior knowledge, he will be able to decide about the sectioning of the woody material, already thinking about the intended destination;
- The suppression activities will be accompanied, integrally, by a qualified technical team, carrying a copy of the Vegetation Suppression Authorization and a copy of the Environmental License, as well as a copy of the owner's registration of the chainsaws being used;
- The use of personal protection equipment (PPE) will be mandatory for all activities on the site;
- The personnel involved must be informed that the removal of flora material for commercialization and/or personal use will be forbidden, as well as the disturbance of fauna that may arise during suppression. If this action occurs, it must be informed to the Coordinator and the Environmental Supervisor; and
- The use of fire is forbidden under any circumstances. In case of fire, the team must proceed according to instructions given in specific training. The use of any chemical products should only be used with a prescription prepared by a competent professional, with prior approval from the environmental agency responsible for issuing the Authorization for Vegetation Suppression (ASV).

Issue 5 - Rectification of the legally protected areas in the area of the development (APP and RL).

The previous analysis of the permanent preservation areas (APP) present in the area of the project indicated the occurrence of two possible drainages. However, as per field activity conducted by the Ecology Team in April 2021, it was found to be one artificial drainage constructed manually by local landowner and another classified as ephemeral drainage. Such conditions allow the rectification of the classification previously adopted for such APP areas, thus making it possible to increase the useful area of the project.

Solution 5

According to the above, the rectification of the CAR that includes these areas as permanent preservation by the company/owners should be considered, thus making it possible to increase the useful area of the project and reduce possible environmental liabilities related to the maintenance and recovery of the APP.

Regarding the legal reserve, it is worth checking with landowners the possibility of rectifying the CAR and compensating the Legal Reserve.

The compensation consists of setting aside an area outside the rural property for conservation. It must be equivalent in extent and ecological standards to the area to be compensated, be located in the same biome and, in the case of being located in another Unit of the Federation, it must be an area identified as a priority for conservation by the Union or the States (priority areas were defined by Decree No. 8,235/2014).

1.4. SOCIOECONOMICS

In the evaluation of the current report, the IFC Performance Standards applied are 1 and 5.

Performance Standard 1 has the following objectives:

- Identify and assess the project's socio-environmental risks and impacts.
- Adopt a mitigation hierarchy to predict and avoid or, where avoidance is not possible, minimize and, where residual impacts remain, offset/neutralize risks to workers, Affected Communities, and the environment.

- Promote better social and environmental performance of clients through the effective use of management systems.
- Ensure that complaints from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.
- Promote and provide means of appropriate engagement with Affected Communities throughout the project life cycle regarding issues that would have the potential to affect them and ensure that pertinent social and environmental information is disseminated and disseminated.

Stakeholder Engagement

Stakeholder engagement is the basis for the formation of solid, constructive, and responsive relationships that are essential to the successful management of a project's social and environmental impacts. Stakeholder engagement is an ongoing process that may involve, to varying degrees, the following elements: stakeholder analysis and planning, information disclosure and disclosure, consultation and participation, grievance mechanism, and ongoing reporting to Affected Communities. The nature, frequency, and level of stakeholder engagement effort will vary considerably and will be proportional to the project's risks and adverse impacts and the stage of project development.

Stakeholder Analysis and Engagement Plan

Companies should identify the potential stakeholders in their actions and consider how external communications can facilitate dialogue with all stakeholders. Where the project involves physical elements, aspects and/or facilities specifically identified as having the likelihood of causing adverse overall social and environmental impacts to Affected Communities, the client shall identify these Affected Communities and comply with the relevant requirements of the standard.

The company will develop and implement a Stakeholder Engagement Plan scaled according to the risks and impacts and the development stage of the project, and will be adapted to the characteristics and interests of the Affected Communities. Where applicable, the Stakeholder Engagement Plan will include differentiated measures to enable the effective participation of those identified as disadvantaged or vulnerable. Where the stakeholder engagement process relies substantially on community representatives, the developer shall make all reasonable efforts to

ensure that such persons in fact represent the views of the Affected Communities and that they can be relied upon to communicate faithfully to their constituents the results of the consultations.

Problem 1: Stakeholder Engagement and Relationship Plan

For the development and implementation of the Stakeholder Engagement and Relationship Plan, the first activity to be carried out by the company in the environmental licensing process is the Preliminary Stakeholder Mapping.

Stakeholder Identification and Analysis studies are conducted to obtain a "snapshot" of the potential stakeholders associated with the activities, facilities, and operations of a company or proposed project at a specific point in time. Stakeholders and their networks of relationships and interests are not static. They have a dynamism capable of changing the situations in which they find themselves, according to facts that occur over time, or by changes in the perceptions and actions of other stakeholders.

Mapping is a systematic study, based on secondary data and field work, that aims to assist the relationship and engagement processes with stakeholders. The analysis is carried out in successive steps and if conducted properly, helps to improve the stakeholders' confidence in the consultation and relationship processes with the Company.

Solution

In the elaboration of the RAS a Preliminary Stakeholders Mapping list was not performed. The consultancy Case Soluções Ambientais (RAS, 2017), in May 2016, conducted fieldwork in the area of direct influence, with the aim of raising information with the residents of the three (3) settlements, regarding the ways of life, access to infrastructure, goods and services, habitat social security, leisure, cultural, tourism and organizations, among other aspects.

In order to produce this report, Ecology Brasil's team conducted fieldwork between April 26 and May 2021, with the objective of interviewing the owners and residents of the farms and the 3 settlements.

Based on the cross-referencing of the secondary data survey and the interviews conducted, Ecology Brasil's team mapped out a preliminary list of important stakeholders to be consulted for the development of the Engagement and Relationship Plan.

As a first activity it is recommended that the company consults with these stakeholders in order to outline the guidelines and increase the company's capacity in managing the relationship with these stakeholders.

Based on the systematization of the information gathered from the interviews and the document analysis, the company must consolidate a table contemplating the priority themes, the stakeholders, the processes underway, the spatial scope, and the associated risks.

The Relationship Plan will establish the design of relationship strategies and activities, considering the specific treatment of themes presented in the field interviews, the relationship networks observed, and the relevance of the stakeholders to **Scatec** 's relationship as a whole.

Based on the results of the interviews, the company must develop a Stakeholder Engagement and Relationship Plan containing the company's action strategies, in order to guide **Scatec** 's positioning in relation to the positioning, interest, and influence of the IPs, as per the example below:

Relationship Strategy	Relationship Activity	Action	Responsible	Interface Area	Frequency	Start Date	Completion Date	Budget	Goal	KPI

Information disclosure

Disclosing relevant project information helps Affected Communities and other stakeholders understand project risks, impacts, and opportunities.

The developer shall provide Affected Communities with access to pertinent information regarding: (i) the purpose, nature and size of the project; (ii) the duration of proposed project activities; (iii) any risks and potential impacts to such communities and relevant mitigation measures; (iv) anticipated stakeholder engagement process; and (v) the complaint mechanism.

Consultation

Where Affected Communities are subject to identified risks and adverse impacts caused by a project, the client will undertake a consultation process in order to provide Affected Communities with the opportunity to express their views on the project's risks, impacts and mitigation measures and allow the client to analyze and respond to them. The extent and degree of engagement required by the consultation process should be commensurate with the risks and adverse impacts of the project and the concerns expressed by Affected Communities. Effective consultation is a two-way process that should: (i) begin at the earliest stages of the environmental and social risk and impact identification process and continue uninterrupted as risks and impacts emerge; (ii) be based on prior disclosure and disclosure of relevant, transparent, objective, meaningful, and easily accessible information in the local language(s) and in a format that is culturally appropriate and understandable to the Affected Communities; (iii) focus on the inclusive engagement of directly affected people as opposed to those not directly affected; (iv) be free from external manipulation, interference, coercion, or intimidation; (v) allow for meaningful participation where relevant; and (vi) be documented. The client will adapt its consultation process to the language preferences of the Affected Communities, their decision-making process, and the needs of disadvantaged or vulnerable groups. If clients are already engaged in this process, they should provide adequate and documented evidence of such engagement.

The consultation process should: (i) capture the views of men and women, if necessary through separate forums or engagements; and (ii) reflect the different concerns and priorities of men and women regarding impacts, mitigation mechanisms, and benefits, if appropriate. The client will document the process, particularly the steps taken to avoid or minimize risks and adverse impacts to Affected Communities and inform affected people how their concerns are being considered.

Stakeholder consultation is key to achieving the overall goals of any project implementation and sustainable development. Participatory approaches help to establish bonds of relationships, trust, transparency, the politics and sustainability of the project. And also to empower the beneficiaries in particular, women, children and other vulnerable groups.

Stakeholder consultation helps the company to:

- Identify key social, economic, human rights, and health issues that need to be managed;
- Obtain feedback on the effectiveness and relevance of existing impact management measures and other initiatives (e.g. social investment activities);
- Increase the understanding between the operation and its stakeholders;
- Obtain a balanced perspective on key issues, and test internal views against external perceptions of the operation;
- Improve understanding of stakeholder needs, priorities, expectations, and perceptions;
- Ensure greater accountability in managing issues of concern; and
- Define performance indicators, which have relevance for stakeholders and operation.

Problem 2: Information Disclosure and Consultation

According to the documents made available by the client, mainly the Simplified Environmental Report (2017), there was no consultation and disclosure to the affected stakeholders directly and indirectly, regarding the development in question, according to the requirements of this standard, the ESIA and the IFC.

The consultancy Case Soluções Ambientais (RAS, 2017), in May 2016, conducted fieldwork in the area of direct influence, with the aim of raising information with the residents of the three (3) settlements, regarding the ways of life, access to infrastructure, goods and services, habitat social security, leisure, cultural, tourism and organizations, among other aspects.

In order to produce this report, Ecology Brasil's team conducted fieldwork between April 26 and May 2021, with the objective of interviewing the owners and residents of the farms and the 3 settlements.

The interviews with the owners aimed at understanding the negotiation process, their current situation after signing the first contract with the developer, obtaining information on how the relationship with the developer was established, what information about the project was passed

on, and ascertaining the mechanisms of communication channels established between the developer and the owners.

Regarding the formal and informal workers, the interviews aimed to understand their daily lives, to verify what information the owner has passed on to the workers about the project, and how their lives may be or are being affected.

Finally, in the settlement projects, the objectives of the visit were: to reconnoiter the Settlement Projects, identifying the residents' ways of life, to survey what information they obtained about the project/project, and what mechanisms of communication channels they would like the company to establish.

The developer's failure to apply the Consultation and Disclosure Standard was evidenced in the fieldwork as described *Erro! Fonte de referência não encontrada.* In general lines, the affected parties directly and indirectly interviewed do not have information about the project, they are dissatisfied by the lack of current information about the progress of the undertaking, the non-establishment of established communication channel mechanisms, and the uncertainties about the future.

The lack of consultation with the interested parties can bring risks to the project, such as the possibility of opposing mobilization and resistance to the project, or even, the search for the Public Prosecutor's Office. Consultation is fundamental for the company to have knowledge about the perception, doubts, expectations, yearnings, and desires of the interested parties in relation to the project. In addition, the consultations are an opportunity to share opinions and identify important contributions to the development of the project.

Solution

The team at Ecology Brasil recommends that the company, before beginning construction, hold consultations and meetings with the interested parties to present the project, with a timeline, the impacts in the different phases and their mitigation measures, the opportunities arising from the project, and also to clarify how they can or cannot be impacted in their daily lives. Inform the complaint mechanisms and channels.

It is critical that all stakeholder questions are answered while observations and concerns should be noted and documented.

In addition, as a best practice after the consultations, it is fundamental that the company holds feedback meetings for all the interested parties with the objective of presenting a document with the company's commitments, what socio-environmental actions will be developed, what are the ways to clarify doubts about the company's activities, in short, the relationship strategy with all the interested parties.

External Communications and complaint Mechanisms

External Communications

Developers will implement and maintain a procedure for external communications that includes methods to: (i) receive and record external communications from the public; (ii) examine and evaluate the issues raised and determine how to address them; (iii) provide, monitor, and document responses, if any; and (iv) adjust the management program as appropriate. Furthermore, companies are encouraged to make periodic reports about their socio-environmental sustainability available to the public.

Complaint Mechanism for Affected Communities

Where there are Affected Communities, the developer will establish a grievance mechanism to receive and facilitate the solution of Affected Communities' concerns and complaints about the developer's socio-environmental performance. The complaint mechanism should be commensurate with the risks and adverse impacts of the project and the Affected Communities should be its primary users.

The complaint mechanism should seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate and readily accessible and without cost or retaliation to the party that raised the issue or concern.

The mechanism should not impede access to judicial or administrative measures. The developer will inform the Affected Communities about the mechanism throughout the stakeholder engagement process.

Problem 3: External Communications and Complaint Mechanisms

From the analysis of the documents made available, so far the developer has neither made any disclosure nor implemented any complaint mechanisms.

This issue is evident in the reports of those interviewed by Ecology Brasil's team, such as, for example, the dissatisfaction regarding the lack of information and the non-establishment of periodic meetings to pass on information about the project's progress.

Solution

It is recommended that the company, as soon as mobilization begins, implement and disseminate the communication channel mechanisms and establish a Stakeholder Engagement and Relationship Plan for disclosure about the project.

It is important that the company takes into consideration the communication difficulties in the region of the project, such as internet access for the interested parties.

From experience in other similar projects, sometimes whatsapp can be considered more efficient and effective for information disclosure.

Performance Standard 5 - Land Acquisition and Involuntary Resettlement

Performance Standard 5 recognizes that project-related land acquisition and restrictions on its use can have adverse impacts on the communities and people who use that land. Involuntary resettlement refers to both physical displacement (relocation or displacement) and economic displacement (loss of assets or access to assets resulting in loss of sources of income or other livelihoods) resulting from project-related land acquisition and/or restrictions on the use of that land. Resettlement is considered involuntary when the affected people or communities do not have the right to prevent the acquisition of land or restrictions on its use resulting in physical or economic displacement. This occurs in cases of (i) legal expropriation or temporary or permanent restrictions on land use; and (ii) negotiated agreements where the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.

Performance Standard 5 has the following objectives:

- Avoid, and when not possible, minimize displacement by exploring alternative project designs.
- Avoid forced dumping.
- Anticipate and avoid or, where not possible, minimize adverse environmental and social impacts arising from land acquisition or restrictions on its use (i) through compensation for loss of assets at replacement cost and (ii) by making sure that resettlement activities are carried out after appropriate information disclosure, consultation, and the informed participation of affected parties.
- Improve or restore the livelihoods and standards of living of displaced people.
- Improve the living conditions of physically displaced people by providing adequate housing with secure tenure at resettlement sites.

The applicability of this Performance Standard is determined during the process of identifying environmental and social risks and impacts. The implementation of the actions required to meet the requirements of this Performance Standard is managed by the company's Socio-environmental Management System.

This Performance Standard applies to the following physical and/or economic displacement of land transactions:

- Rights over land or over the use of land acquired through expropriation or other compulsory procedures according to the legal system of the host country;
- Rights over land or over the use of land acquired through negotiated agreements with property owners or with those legally entitled to it, if expropriation or other compulsory procedures applied have resulted from failed negotiations;
- Project situations where involuntary restrictions on land use and access to natural resources cause a community or groups within it to lose access to resource use if they have traditional or recognizable use rights;
- Certain project situations that require eviction of people occupying land without formal, traditional or recognizable use rights; formal, traditional or recognizable use;
- Restriction on access to land or use of other resources, including community property and natural resources such as marine and aquatic resources, timber and non-timber forest products, fresh water, medicinal plants, land, and farming.

Where project impacts on land, assets, or access to assets become significantly adverse at any stage of the project, the developer should consider applying the requirements of this Performance Standard, even in cases where there is no land acquisition or restriction on its use.

Physical displacement is defined as "the relocation of people resulting in loss of shelter, production assets, or access to production assets (e.g., land, water, and forests)" (IFC)

Economic resettlement results from "an action that interrupts or eliminates people's access to production assets without physically relocating people" (IFC). For example, a landowner or squatter may have a portion of his land expropriated for the development of an access road, yet still remain in his dwelling, thus impacting the crops he may produce. Similarly, the acquisition of water resources for a project can negatively impact the livelihoods of people residing in the area.

The primary goal of resettlement planning is to ensure that all affected people are compensated equitably in accordance with local laws and international guidelines, providing the opportunity to fully restore or improve their living standards and income-generating capacity to at least the standards they had prior to resettlement.

Resettlement is highly intrusive and can involve significant adaptation and disruption for the impacted community. The key principles that form the basis for planning for resettlement are:

Involuntary resettlement should be avoided or minimized whenever possible.

Where involuntary resettlement is unavoidable, all affected people should be fully and fairly compensated for all their asset losses.

Involuntary resettlement should be seen as an opportunity to improve the livelihoods of affected people - assistance should be provided to displaced people to achieve this goal, including the provision of adequate housing with security over tenure at resettlement sites.

The communities where displaced people are settled must be consulted and included in the decision-making process.

Similarly, governments and providers of basic services (such as energy, water, sanitation) should play an important role in resettlement, and should be consulted from an early stage, even where they are not responsible for implementing the resettlement.

All people affected by resettlement should be consulted before, during and after resettlement occurs, and actively involved in planning for resettlement to ensure that mitigation of adverse impacts as well as resettlement benefits are appropriate and sustainable.

The consultation should allow for the development of a vision for resettlement that all stakeholders can agree on. This vision should be used to provide continuity even when people change.

All legal obligations must be fulfilled.

Land acquisition, compensation payments for affected assets, and resettlement associated with a project (or component of a project) must be completed before resettlement occurs (e.g., people must be resettled before any land clearing takes place).

Operations should consider themselves responsible for all phases of the resettlement process, from planning to post-resettlement monitoring - regardless of the number of people being relocated or the significance / severity of anticipated impacts.

International best practices share the fundamental goal of ensuring that resettlement-induced impoverishment risks are addressed.

A poorly managed resettlement process poses a number of risks, such as:

- Restrictions for further development due to dissatisfactions in the community;
- Reputational risks (local, national and international);
- Damage to community relations and the operation's 'social license to operate'; and
- Financial costs associated with remediation of bad practices, litigation, leading to conflicts and difficult negotiations with affected residents (resulting in costly delays).

Problem 4: Project does not provide for the Relocation of Affected Parties.

In the real estate properties object of interest for the implementation of the photovoltaic complex, we found two workers and their respective families living in the condition of residents. One of these is Mr. [REDACTED] and his wife Mrs. [REDACTED] who live on Mr. [REDACTED] property.. The other family is Mr. [REDACTED] and his wife Mrs. [REDACTED], who work and live on Mr. [REDACTED] property..

In the case of the resident [REDACTED] and [REDACTED], they have a Partnership Contract that has also been notarized. Mr. [REDACTED], on the other hand, receives a minimum wage to work for [REDACTED] taking care of the farm, and is registered as a general service worker in [REDACTED] ceramics factory, not as a farm laborer.

The current situation of these two residents is detailed in item 5 - Existing Environmental and Social Conditions.

From the information gathered and the requirements of the Standard the two residents and their families will be affected by the physical and economic dislocation regarding the establishment of the complex. Regardless of whether or not these workers have a formalized work situation, it is the company's responsibility to ensure the perpetuation of their livelihoods.

It is important to point out that one of the families is in a situation of vulnerability.

It is worth saying that these families will be affected by the loss of housing and a source of income or means of survival. This situation can result in impoverishment and long-term difficulties for these people.

Solution

It is recommended that the developer dialogue with the landowners with this situation present to ascertain the actions and commitments being made between these stakeholders.

Based on the information obtained, it is recommended that the company initiates direct dialogue with the workers to establish and define the best relocation modality that will satisfy these families and guarantee the means to perpetuate their livelihoods.