IFAD
Investing in rural people

Brazil

Planting Resilience in Rural Communities of the Northeast (PCRP)

Social, Environmental and Climate Assessment Procedures (SECAP) Note

GCF Additional Financing

March 2020

TABLE OF CONTENTS

FIGURES

TABLES

1. EXECUTIVE SUMMARY

The project will take place in the semiarid region of Northeast Brazil (NEB), a region with a population of 21.3 million people (12% of the national population).[1]The states in this region are home to the poorest population in the country; IFAD has been supporting rural development there for the past 25 years. The Northeast region has experienced periodic droughts and chronic problems related to water scarcity. Nonetheless, the 2011–2016 drought that affected this region is considered the worst in the past 100 years; it has exacerbated many social problems through farmers' indebtedness, migration, disease, and malnutrition.[2,3] Estimated economic losses from the drought event in the agricultural sector alone are on the order of US$ 6 billion.[4]

Family farmers are the most affected by climate change. There is a significant correlation between average precipitation and agricultural production, but statistically, the effect is significantly higher for crops produced by family farmers than average agricultural production. The average crop area lost due to droughts from 1990 to 2016 was 221,973 hectares per year.[5]

The Planting Climate Resilience in rural communities of the Northeast (PCRP) project will work towards paradigm shift: it is possible to transform family farmers' productive systems in the semiarid NEB by increasing production while simultaneously improving farmers' capacity to face the challenges posed by ongoing climate change. The project will result in resilient and productive farming systems performing restored ecosystem functions, which, in turn, both increase and stabilize family income and food security while incentivizing young generations to stay active in rural activities. The partnerships between IFAD, GCF, the Government of Brazil (GoB), and BNDES will mobilize resources and disseminate lessons to many levels of government in other regions in Brazil and abroad.

The project will consist of three components that reinforce one another to promote climate resiliency as well as emission mitigation: 1) Climate Resilient Productive Systems (CRPS); 2) Water access; and 3) Knowledge Management and Scaling-Up.

The project will directly benefit a total of approximately 1,000,000 people in 250,000 family farms (of which 40% are women and 50% youth), increase the resilience of agricultural production systems over 84,124 ha and restore degraded ecosystems of importance for the provision of environmental services. It will increase the water access to 36,000 families, increasing their resilience to droughts. The project will mitigate between 11 086 999 tCO2eq and 11 621 173 tCO2eq over a 20 years period.

The project is included in the Brazilian National Strategy for the Green Climate Fund and is aligned with the Brazilian National Policy on Climate Change, Nationally Determined Contribution (NDC), programs to strengthen family agriculture (such as PRONAF), the National Plan for Food and Nutrition Security, the National Policy for the Sustainable Development of Traditional Peoples and Communities, and the Food Purchase Program. It has been approved by the Commission for External Financing (COFIEX) of the Ministry of Economy in September 2019 and received the No Objection from the National Designated Authority (NDA) within the Ministry of Economy, confirming its alignment with national development priorities and strategies.

Stakeholder engagement was guided by subsidies derived from the empirical reality, captured from field visits to communities in the semiarid region of the Northeast States and through meetings and public consultations with potential stakeholders, both governmental and non-governmental organizations. The design team (i) held a series of field visits to the semiarid states of Bahia and Pernambuco; (ii) A series of meetings where held with Federal

1 Banco do Nordeste, O Novo Perfil do Nordeste Brasileiro no CensoDemográfico 2010 : https://www.bnb.gov.br/documents/88765/89729/novo_perfil_nordeste_brasileiro_censo_demografico_2010.pdf/34cfcc2e-1048-4dc1-9342-46b13eda208b

2 Gutiérrez APA, Engle NL, De Nys E, Molejon C, Martins ES (2014) Drought preparedness in Brazil. Weather Clim Extremes 3:95– 106. doi:10.1016/j.wace.2013.12.001

3 Marengo, Jose A., et al. "Climatic characteristics of the 2010-2016 drought in the semiarid Northeast Brazil region." Anais da Academia Brasileira de Ciências 90.2 (2018): 1973-1985.

4 Marengo, J. A., et.al, "Drought in Northeast Brazil—past, present, and future." Theoretical and Applied Climatology 129.3-4 (2017): 1189-1200.

5 Young, C.E. et. Al.. Drought in the Brazilian Semi-Arid. Study commissioned by IFAD (please see Annex 23)

Government institutions in Brasília, such as the Secretariat of Family Agriculture and Agrarian Development (SEAD), the Ministry of Social Development (MDS) - actual Ministry of Citizenship (MC), the Ministry of the Environment (MMA), the Secretariat of International Affairs (SAIN), the Ministry of Science, Technology, Innovation and Communications (MCTIC), and the General Coordination of Policies for Women, Youth, Peoples and Traditional Communities (CEGAT); and (iii) two public consultations.

The current document, the Social, Environmental and Climate Assessment Procedures (SECAP), is IFAD's social and environmental safeguard instrument, equivalent to IFC's Environmental Social Management Framework (ESMF). It is an overarching framework for achieving improvements in environmental and social outcomes while addressing any unintended adverse impacts of the project's activities.

The project is classified as Category B. The Project has minor to moderate risks of adverse environmental impacts. The main impacts that can be caused by this project activities are (i) Pressure on land ownership, (ii) Irregular occupation of indigenous lands, quilombolas or settlement, (iii) Erosion processes induction and soil impoverishment, (iv) Contamination of water resources and soil, (v) Interferences with vegetation, (vi) Increased scarcity of water resources, (vii) Increase in salt content of the soil, (viii) Gender discrimination, and (ix) Impact on the health and safety of farmers.

All possible impacts are reversible in nature, and can be readily remedied by appropriate preventive actions and/or mitigation measures as outlined in the ESMP. PCRP project does not envisage adverse social impact and a free and prior informed consultation (FPIC) plan has been developed (see Appendix I) to ensure indigenous people's participation in project development and to prevent any potential conflict during implementation.

2. INTRODUCTION

The International Fund for Agricultural Development (IFAD) and the Government of Brazil (GoB), and the Brazilian Development Bank (BNDES) are committed to enhancing environmental sustainability and climate resilience for families in Northeastern Brazil (NEB). Family agriculture plays a major role in the Brazilian economy as a generator of income and employment.

The Planting climate resilience in rural communities of the Northeast (PCRP) project will work to transform poor family farmers' productive systems in the semiarid by increasing production while simultaneously improving their capacity to face the challenges posed by ongoing climate change. The project will result in resilient and productive farming systems and restored ecosystem functions, increasing and stabilizing family income and food security and nutrition, while supporting young generations to stay active in rural activities. The partnership between IFAD, GCF, the GoB, and BNDES will mobilize resources and disseminate lessons to many levels of government and other regions in Brazil.

PCRP will enable farmers to take a longer-term perspective in anticipation of the significant financial, economic and livelihood benefits achievable through the application of adaptation measures relative to the declines in production and income that are anticipated to result from the effects of climate change. It responds to the urgency which climate change projections give to the application of these practices, and recognizes that for them to function effectively as adaptation measures, they must be applied as part of a larger scale program and be directed and adjusted considering the needs, priorities and cultural specificities, both regional and at the level of family productive units.

The project components aim to contribute to overcome the barriers faced by the family farmers in their agriculture, animal husbandry, extractivism and productive activities. While the practices to be supported have the potential to yield sustainable land management benefits and increase production, they require a social and environmental safeguards to be in place to avoid unintended consequences.

The current document, the Social, Environmental and Climate Assessment Procedures (SECAP), is IFAD's social and environmental safeguard instrument, equivalent to IFC's Environmental Social Management Framework (ESMF). It is an overarching framework for achieving improvements in environmental and social outcomes while addressing any unintended adverse impacts of the project's activities.

The SECAP goes beyond the social and environmental considerations to include climate impacts associated with projects and programs. It mainstreams environmental, social and climate change considerations into the project cycle, and demonstrates IFAD's commitment to go beyond "doing no harm" to maximizing development gains. It also seeks to ensure that IFAD's policies and strategies and its investments are designed to leave no one behind since sustainable development must be achieved for all – especially the poorest and most vulnerable to climate change.

The SECAP aims to:

- set a priority to adopt guiding values and principles to promote high social, environmental and climate adaptation benefits;
- define the process and suitable entry points in the project cycle; mainstreaming social, environmental and climate adaptation sustainability considerations into all its activities; and
- ensure effective stakeholder engagement, including a procedure to respond to alleged complaints from project-affected individuals.

The SECAP is underpinned by IFAD's Policy on the Disclosure of Documents and IFAD Complaints Procedures (to respond to alleged complaints of non-compliance with IFAD's environmental and social policies and mandatory elements of SECAP).

Likewise, the GCF has a safeguard system that had been adopted from the International Finance Corporation (IFC) Performance Standards as its safeguard standards on an interim basis. In addition, it adopted requirements related to gender. The IFC Performance Standards (PS) are widely recognized as good practice in the international community. The Performance Standards consist of one overarching standard (PS 1) and seven standards covering specific issue areas (PS 2-8). PS 1 covers the elements that need to be in place to help ensure that the remaining seven standards are implemented. Together these elements are called the environmental and social management system (ESMS).

According to the GCF the environmental and social management system of the accredited entities needs to be in accordance with the requirements of the GCF ESS standards and applicable policies of GCF as determined in the accreditation and appropriate to its role as an implementing entity. Therefore, institutions seeking to be accredited to the GCF need to be able to show that they can implement the Performance Standards or comply with those standards and the GCF Gender Policy.

IFAD has gone through a fit-for-purpose approach accreditation process in which its own safeguards (SECAPs) have been validated to comply with International Finance Corporation (IFC) Performance Standards. The accreditation process considered the capacity, competency and track record of IFAD in applying its own environmental and social safeguards, and the consistency with the GCF ESS standard. As a result, IFAD was accredited with the GCF as a grant and loan implementing entity for medium-sized projects (USD 50-250 million) with a medium level of environmental and social risk. Therefore, there is consistency between the SECAP with the environmental and social requirements of GCF.

The SECAP environmental and social management framework triggers a process equivalent to other multilateral organizations safeguard systems that carefully analyze programme, projects, loans and grants before implementation. An initial project screening that outlines the social, environmental and climate issues that are likely to be associated with an IFAD-supported project is done. The purpose is to identify the main social, environmental and climate risks associated with a potential project. Thus, the aim is to avoid activities that may cause harmful health impacts, involve any involuntary taking or restriction on the use of land resulting in physical or economic displacement. Furthermore the aim is to ensure that indigenous peoples and other traditional communities are involved and that the project does not damage or destroy physical resources of historic, religious or cultural significance. This assessment exercise allows IFAD to define the necessary steps for further analysis and propose relevant measures to minimize potential risks.

The exercise screens against the SECAP but also covers the IFC Performance Standards with an added view on climate risks providing an overarching framework for achieving improvements in environmental, social and climate related outcomes while addressing any unintended adverse impacts.

3. PROJECT COMPONENTS

3.1 COMPONENT 1. Climate-Resilient Productive Systems (CRPS)

The main objectives of Component 1 are to implement diversified agroforestry systems that will increase local water availability in the productive system and empower beneficiaries (especially women and youth leaders) in sustainable management of these systems. Investment strategies have been designed to meet the diverse demands of family farmers, given the range of sizes of land areas, climate-resilient adaptation requirements, target beneficiaries, and productive objectives.

Through the implementation of CRPS and relevant cross-cutting activities, the project will deliver ***Output 1.1. Increase climate resilience for family farmers and traditional communities while mitigating carbon emissions by applying CRPS.***

3.1.1 Activity 1.1.1. Selection of Project Areas and development of Territorial Resilience Investment Plans (TRIPs)

Through Activity 1.1.1, the project will select its implementation area and develop Territorial Resilience Investment Plans (TRIPs) which will act as a "master plan" to guide collective and individual investments in components 1 and 2. As sole Executing Entity (EE), BNDES will have the final decision making power on project activities including: i) use of funds; ii) State selection and criteria for project implementation area; iii) criteria to select final beneficiaries; iv) criteria to define eligible practices and interventions; v) criteria for TRIPs approval; vi) requirements to procure TA teams and service providers. BNDES will verify the application of the criteria and requirements and will provide final approval

Sub-activity 1.1.1.1. Develop a baseline study to select project area

Step 1. Selection of states and PMEL. Through a public call, BNDES will conduct a selection of pre-proposals, for both the state-level implementation and the PMEL project. At a preliminary stage, the States taking part on the public call prepared by BNDES would be ranked through an in-depth analysis based on the following established criteria:

(i) verification of borrowing capacity;
(ii) state qualification;
(iii) verification of counterpart capacity;
(iv) incidence of rural poverty;
(v) climate vulnerability index and historical exposure to drought;
(vi) food and nutritional security index;
(vii) water quality and availability;

It is expected that States with prior IFAD project experience or other similar implemented projects may present greater implementation project capacity and increased readiness. Two to four States will be pre-selected as eligible to present a State Proposal (Carta Consulta) to the Executing Entity (EE) – BNDES. Through the "Carta Consulta" the project proposal will be formally submitted to BNDES. The document is the basis to verify the eligibility of proposal to BNDES' Operational Policies and does not constitute a promise of financing.

Similarly, the institutions/organizations that participate in the competitive public call to implement activities of PMEL Unit, would be ranked through an analysis based mainly on the following criteria, and the pre-selected ones will present a consultation letter to the EE that will be thoroughly analysed by BNDES technical team and will be subject to the approval of BNDES Board of Directors:

(i) client qualification;
(ii) experience with knowledge management and south-south and triangular cooperation;
(iii) experience with similar projects and themes as contained in the FP´s component 1 and 2; and
(iv) experience with implementation of similar budget.

Step 2 – Confirmation of states and PMEL – analysis and approval of the Project Proposal (Carta Consulta). For both processes, BNDES will publish all the instructions and selection criteria for the formulation of consultation letters and in collaboration with IFAD will promote a workshop or similar event to present the PCRP. This proposal qualification and selection will follow BNDES' internal objectives, functions, policies, and procedures, which include a thorough technical analysis. The project analysis will be subject to BNDES Board of Directors approval before the signature of the agreements with the states and sub-grant agreement with the PMEL´s organization. The final selection process will involve IFAD's no objection.

The consultation letter (Carta Consulta) to be submitted by pre-selected states will include, among others, information on states qualification and experience, governance and implementation arrangements, geographical targeting, priority activities and key targets to be achieved, duly aligned with the targeting criteria, intervention approach and logframe indicators of the PCRP, selected municipalities, as well as compliance with applicable legislation. The relationship between the loan and grant funded activities and results for components 1, 2 and 3 will mirror exactly the relationship for the overall project for components 1, 2 and 3. Each one must proportionally mirror all components of the PCRP. Therefore, state projects will differ mainly in the definition of territories and geographic areas (and thus also in overall size), as well as the specificities that may arise from the environmental characteristics of those territories. This design will also be part of the Carta Consulta that will be submitted to BNDES.

Step 2.1 Define project area in each selected state. During the preparation of the State´s proposal, the municipalities within states will be ranked through an analysis based on the following criteria: (i) rural poverty incidence; (ii) climate vulnerability index and historical exposure to drought; (iii) food and nutritional security index; and (iv) water quality / availability. Technical Assistance (TA) will be selected per area, with one extensionist serving an average of four communities (total of about 140 families) over a three-year period for Component 1 activities and two-year period for Component 2 activities. This step will occur during the preparation of the State´s proposal.

Step 3. Select beneficiary groups. As defined in the PIM (Annex 21), in the beginning of the implementation phase at state level, each state will propose the beneficiary groups, focusing on those with the greatest climatic, socioeconomic and environmental vulnerability.[6] A baseline survey will be conducted to collect information on agricultural production, herds, local climate, water availability, gender issues, nutrition, among others of the target population. Priority will be awarded to marginalized groups, youth, and women. Participation is not mandatory, so public awareness campaigns (see activity 3.1.1) and stakeholder engagement (Annex 7) are necessary. For indigenous peoples' communities, the project will also follow Indigenous People's Planning Framework (IPPF) plan as presented in Annex 6.

Sub-activity 1.1.1.2. Develop TRIPs. TRIPs are the planning tool for all activities proposed under Components 1 and 2. They include investments, resources, capacity building, and other initiatives to achieve the objectives. Each TRIP will cover an average of four territorially contiguous communities. To implement TRIPs, selected states will provide non-reimbursable funds (grants) to community organizations/associations. Final beneficiaries will only access such grants through community organizations/associations. The sub-grant agreements will be signed by the States with community organizations and associations; with which IFAD has in-depth experience with its operations and accountability. Final beneficiaries will provide 10% in-kind contribution of the total TRIP and this will be captured in the sub-grant agreement. Technical assistance (TA) teams will be contracted by the States to design TRIPs with full involvement of beneficiaries based on the Manual for Designing Productive Investment and Business Plans. TA teams" are private or public service providers to be selected and procured by the states, following the guidelines of BNDES. Under component 1, four types of Investments in Systems of

6 These selection criteria will be applied: (i) the environmental precariousness rate of its property (signs of deforestation, erosion, and soil degradation); (ii) food and nutritional insecurity rates (malnutrition and chronic degenerative diseases); and (iii) tangible effects of drought and level of access to quality water.

Agroforestry (ISAs) will be considered for: families (ISA Familia), backyard gardens (ISA Quintais), communities (ISA Coletivo), schools (ISA Escola) as well as a pilot on Bio saline agriculture. Once completed, the TRIPs will be submitted by the SIU for validation and evaluation of the state-level Consultative Council and then will be submitted for final approval by the states to BNDES. This mechanism will ensure greater involvement, participation and empowerment.

3.1.2 Activity 1.1.2. Implement CRPS in family farms and backyard gardens

Through activity 1.1.2, CRPS will be implemented in Family farms and in backyard gardens. Investments will receive TA for development, implementation, and initial monitoring.

Sub-activity 1.1.2.1. Implement CRPS in family farms

Objective: Reduce vulnerability of production to droughts and increase income, developing a progressive culture of multiple sustainable uses of productive areas.

Selection criteria: Target beneficiary families (sub-activity 1.1.1.1) that already have water for production.

Investments (ISA Familia): Resources to implement the CRPS.[7]

Area: 31,000 plots with an average of 1/2 hectare each (total 15,500 hectares)

Sub-activity 1.1.2.2. Implement backyard gardens using CRPS

Objective: Develop irrigated, diverse and productive backyards in conjunction with activities in Component 2, applying CRPS principles to reduce families' food and nutrition insecurity from droughts, increase access to nutritious food as well as value and strengthen the role of women in production.

Selection criteria: Beneficiary group families (sub-activity 1.1.1.1) that don't have water for production. Same beneficiaries that will receive water access investments in Component 2.

Investments (ISA Quintais): Resources to implement CRPS.

Area: 36,000 gardens with an average size of about 1/5 hectare each (7,500 hectares expected)

3.1.3 Activity 1.1.3. Implement Collective Resilient Investments

The funds for collective investments are also non-reimbursable and will follow the same co-funding and TA as individual investment in Activity 1.1.2.

Sub-activity 1.1.3.1. Implement Collective Areas Sustainable Management (CASM)

With increasing population and land use in the Semiarid, there is a real threat that these communities could gradually deplete the Caatinga, mainly due to timber extraction for firewood and overgrazing.

Objective: The main objective is to improve the ecosystem services provided by the Caatinga, such as micro-climate regulation, carbon sequestration and fixation, pest and disease control, provision of water, decomposition of waste, natural pollination of crops and other plants, and provision of raw materials (timber, seeds, nuts, fruits, etc.). The system will stabilize and, if possible, increase the supply of forage. The enhanced ecosystem services

7 Seeds, seedlings, fertilizers, equipment rental or purchase, irrigation systems, tools, fences, etc.

help ensure that the community will be the main stakeholders in the conservation and recovery of the system in which they live in.

New options for income generation are needed, especially for women and youth, and the increase of forage for the herd, so that the animals gain more weight and compensate for possible loss of income due to the herd's reduction. It is possible to develop a slow and progressive culture of multiple and sustainable uses of the Caatinga and reduce extensive grazing, while increasing income, encouraging family succession, and conservation and recovery of the ecosystem services offered by the Caatinga.

Selection criteria: Communities that have a collective use area of around 500 hectares or more.

Undertakings:

- Recover degraded areas using CRPS;
- Decrease timber demand by implementing eco-efficient stoves and biodigesters;
- Increase supply and efficient use of water for production;
- Structure community seedbanks and nurseries;
- Promote low-impact productive activities in collective areas (e.g., beekeeping).
- Strengthening community governance of access and sustainable use of the areas.

Area: 60 CASM with an average size of 600 hectares each (total 36,000 hectares).

Investments (ISA Coletivo): Tools and materials for implementing CRPS, nurseries, eco-efficient stoves and bio-digesters.

Sub-activity 1.1.3.2. Implement CRPS in Schools

Rural schools are where young people, children of farming families, acquire knowledge on various subjects, such as rural life and agricultural production. The project will seek to enable these educational institutions to work on CRPS, rational use of water for production, renewable energies, and other climate resilience practices.

Objective: Enable rural educational institutions for youth to experiment and teach CRPS, rational use of water for production, renewable energies, and other resilience practices to students. Target the cooks who prepare school meals, encouraging them to use native fruits and vegetables, reinforcing children's food and nutritional security.

Selection criteria: Rural schools within a range of the target areas (sub-activity 1.1.1.1). Preference will be awarded to Family Agriculture Schools (EFAs).

Undertakings:

- CRPS teaching and experimentation;
- Development and maintenance of nurseries and seedbanks;
- Promotion of entrepreneurship in CRPS; and
- Training for cooks and students on the nutritional value of native fruits and vegetables to diversify and enrich diets.

Area: 1,000 schools (100 families per school) with 1/10 hectare each (total 100,000 families and 100 hectares).

Investments (ISA Escola): Resources to implement the CRPS, such as seeds, seedlings, organic fertilizers, equipment rental or purchase, irrigation systems, tools, fences, nurseries, training materials, computers, etc.

Sub-activity 1.1.3.3. Test productive models of Bio saline agriculture

In the Semiarid, brackish or salty groundwater is common. Around 25% of wells have freshwater (< 500 mg/l TDS[8]), 33% are brackish (501–1,500 mg/l TDS), and 42% salty (>1,500 mg/l TDS).[9] An estimated 75% of the wells in the Semiarid are unfit for human consumption. There are over 500 desalinization units operating in NEB, which produce residual water that currently accumulates in evaporation tanks with no productive use.

Objective: Develop pilot testing of productive activities using effluent from the desalination process.

Selection criteria: Communities benefitted from collective desalinization systems.

Undertakings: Fish breeding and irrigation of halophyte plants in small areas.[10]

Investment: Fish, tanks, irrigation equipment, resources to implement the CRPS, soil laboratory tests, etc.

Number of bio-saline production systems: 24 bio-saline system each irrigating 1 hectare and benefiting 50 families (total 1200 families and 24 hectares).

3.1.4 Activity 1.1.4. Build a Farmers Network and Promote local entrepreneurship for products and services that support family farming[11]

To facilitate the replication of CRPS, support will be provided: i) TA teams will build a territory-based intervention strategy identifying properties demonstrating exemplary experiences of CRPS and water access technologies and building a network to exchange these good practices; and ii) Small grants and business management support to microenterprises that innovate and produce specific tools and equipment to facilitate the implementation of CRPS.

Sub-activity 1.1.4.1. Build a Farmers Network; the following tools will be used:

Task 1.1.4.1.1. Train Farmers; TA teams will train interested farmers and young promotersin CRPS principles and practices, water access technologies and gender-transformational approaches (see Annex 8), appropriate for indigenous and traditional communities (Annex 6) and that attract youth.

In addition, farmers who already implement aspects of CRPS will be invited to be farmer-trainers. Their selection will not be limited by the criteria of target group or property size. They can have several roles in the project; from integrating TA teams, allowing visits to their farms as demonstration plots, or participating in local farmer network, trainings and workshops. The Project will ensure both women and men become farmer-trainers.

Task 1.1.4.1.2. Hold exchange visits; an important source of practical information and knowledge sharing. They involve organizing a group of farmers to visit another farmer or group. Although usually the visit is done to a 'more advanced' group, it is not a one-way process, because visitors discuss and comment what is being observed. These initiatives are often more effective than courses or lectures on the same topics due to language similarity and experience of real-life situations. Farmers from 5000 medium-sized farms (at least 5 hectares) located in the project's region will be invited to participate in the exchange visits. There will be an active participation of Young Communicators in these exchanges (sub-activity 3.1.1.1). Messaging apps are widely used in Brazil and can be applied to bridge communication gaps in farming communities. TA can create and manage online social-media

8 TDS – Total dissolved solids.
9 MME-CPRM-SERVIÇO-GEOLÓGICO-DO-BRASIL. **Projeto Cadastro da Infra-Estrutura Hídrica do Nordeste**. Relatório Preliminar - 1ª Etapa - 225.000 km2 - Versão Beta. Brasília: MME-CPRM-Serviço-Geológico-do-Brasil. Available at: https://www.cprm.gov.br/publique/media/hidrologia/m apas_publicacoes/cadastramento_fontes_semiarido_brasileiro.pdf. 2003.
10 Hoffman and Shannon, 1985
11 The definition by the Brazilian Family Farming Act (Law n. 11.326) is that it is an agricultural producer which is directly responsible for farm management, using mainly family labor and earn a substantial part of the total family's income from agricultural activities

tools to share experiences on specific topics and solve problems promptly. These tools can further the sharing of the knowledge learned in the exchange visits.

Sub-activity 1.1.4.2. Promote local entrepreneurship for products and services that support family farming

Most small-scale products and tools available to farmers are directed towards traditional large-scale monoculture, creating a vicious cycle that makes farmers turn to non-resilient production practices. Specialized small-scale equipment and mechanization can make farmers more productive and able to add value to their production.

The few scattered farmers who dare challenge the model must develop or adapt their own tools. During visits to Bahia and Pernambuco, the design team witnessed several examples of these innovations: forage palm chopper and feeder, long-arm pruning shears, wood chipper, and low-tech water reuse facility, among others. This thriving creativity and potential demand face high barriers to their widespread use. Microentrepreneurs in this sector are mostly small and lack the management capacity for commercial financing, making efforts to scale up or even start their businesses nearly impossible. Their innovations usually never go beyond their plot.

With greater access to capital – especially capital with management assistance and sustainability conditions tied to it – microentrepreneurs with businesses that have a direct impact on climate resilient agricultural production can scale up their operations and influence family farmers beyond the project's direct beneficiaries to improve their practices. A dynamic business environment can also attract youth.

The project will support investment in small-scale mechanization[12] of microenterprises that provide services or products for improving family farmers' CRPS thereby enhancing rural entrepreneurship. Small grants may support microenterprises that innovate and produce specific tools and equipment, nurseries, composting services, apps to manage production, organic fertilizers, pest control, and market platform, etc. These enterprises will also receive business management support. The GCF grant will cover the incremental costs associated with higher-than-average screening, evaluation and technical assistance costs of the fund's investments.

Expected results of **Component 1** include:

- 575 TRIPs designed and approved;
- 31,000 families benefiting from Family Farms Investments and TA;
- 36,000 families benefiting from backyard gardens investments and TA;
- 1,000 schools teaching CRPS;
- 1,800 families from 60 communities benefiting from CASM;
- 540 eco-efficient stoves installed;
- 540 biodigesters built;
- 540 income-generating and resilient production-based activities in collective areas;
- 1,200 families benefiting from 24 bio-saline productive systems;
- 5,000 medium-sized (at least 5-hectare) productive units participating in farmers networks;
- 550 TA and farmer trainers trained;
- 24,000 farmers participate in exchange events / workshops;
- 84,124 hectares under sustainable management;
- 11 $MtCO_{2e}$ emissions reduced; and
- 70 micro enterprises supported to supply small-scale equipment for CRPS.

12 According to Brazilian Law, "microenterprise" is defined as a company with annual gross revenue of less than R$ 360,000.

3.2 COMPONENT 2. Water access for production

The purpose of this component is to disseminate practices in efficient water capture, harvesting, storing and use to decrease vulnerability of livestock / crops to rainfall irregularity and prolonged droughts. All investments in this component will be financed as determined in the TRIPs for beneficiary groups (described in Activity 1.1.1.).

Component 2 beneficiaries are selected from a pool of families that will implement backyard gardens (described in Sub-activity 1.1.2.2) but do not have water for production. Irrigation in small plots allows diversified production, mainly with fruits and vegetables, for family consumption and to sell surpluses. The TA provided to the beneficiaries will focus on addressing issues of efficient water management, good irrigation practices, techniques for limiting evapotranspiration, and precautions to prevent soil salinization. All pumping systems will use renewable energy (photovoltaic or wind).

All water infrastructure methodologies selected in the PCRP are widely disseminated in NEB and are extremely simple to build, known in Brazil as "social technologies". Construction of the water infrastructure technologies listed below is usually carried out by trained community masons, beneficiary families, and their neighbours with oversight from TA teams.[13] In addition to creating an activity for local workers, it also ensures future maintenance of the cisterns without relying on outside services. Technical training and training in water management will be systematically provided in association with the construction process. For further description of these technologies, see Feasibility Study in Annex 2.

Through the use of water technologies, the project will deliver ***Output 2.1 Improve water access to family farmers and traditional communities to reduce the impact of severe droughts by investing in small-scale technologies for harvesting, reuse, treatment and storage.***

3.2.1 Activity 2.1.1. Build boardwalk cisterns for backyard gardens[14]

Investment: Materials to construct cisterns; irrigation equipment; tools and materials for implementing CRPS. Construction of a plate tank with storage capacity of 52 m^3, coupled with a 200 m^2 concrete water-catchment area (boardwalk or *calçadão).*

Application: Irrigate small plots to support short-cycle crops (mainly vegetables) during dry season. The role of women in this production is fundamental. Impact on family food security and nutrition are significant.

Total: 20,000 cisterns.

3.2.2 Activity 2.1.2. Implement social technologies to increase water in the field

Sub-activity 2.1.2.1. Build small farm ponds [15]

Investment: Small-width deeply excavated reservoirs that store at least 500 m^3 of rainwater to reduce evaporation and retain water for longer periods.

Application: Irrigate plots and support short-cycle crops during dry season.

Total: 500 farm ponds.

13 The same technique has been used for construction of cisterns in the One Million Cisterns Program.
14 Cisterna Calçadão - Instruction regulated by Law number 12.873, dated October 24, 2013. Decree number 8.038 of July 4, 2013 and Ordinance number 130 of November 14, 2013.
15 Instruction regulated by Law 12,873 of 24 October 2013, Decree number 8,038, of 4 July 2013 and Ordinance number 130, of 14 November 2013.

Sub-activity 2.1.2.2. Construct small groundwater storage basins

Investment: Construction of small underground dams through a transversal blocking system along temporary streams and river banks, with flexible plastic sheeting lining a trench (from surface to rock or impermeable layer).

Application: Capable of irrigating larger areas and storing a significant quantity of water for several months.

Area: 500 small underground dams.

3.2.3 Activity 2.1.3. Implement treatment and reuse systems for household wastewater

For rural families, untreated water represents risks to the environment, soil, and human health. Only 27% of the NEB population (mostly in urban areas) has access to sewage collection and treatment.[16] The treatment systems selected use simple and affordable technology based on cycling water and nutrients for food production. These technologies adapt forms of rural sanitation to the household level and contribute significantly to sanitary improvement of environmental and living conditions of beneficiary families.

Sub-activity 2.1.3.1. Implement systems for grey water reuse

Investment: Construction of treatment system consists of filtering grey water residues through physical and biological mechanisms, in which organic matter is biodegraded by microorganisms and earthworms.

Application: Irrigate small plots, such as backyard gardens and nurseries.

Area: 10,000 greywater treatment systems irrigating 1/5-hectare plots (2000 hectares).

Sub-activity 2.1.3.2. Implement green septic tanks

Investment: Construction of evapotranspiration tank (or green septic tank). Anaerobic digestion, which occurs in septic bed, consumes organic matter from household waste in the root zone of the plants.

Application: Can irrigate trees (usually banana trees, which are part of the treatment systems) and non-edible plants.

Area: 5,000 blackwater treatment systems irrigating 0.05-hectare plots (250 hectares).

Expected results of **Component 2 include**:

- 20,000 cisterns with walkway;
- 500 trench barriers;
- 500 small underground dams;
- 10,000 greywater reuse systems;
- 5,000 blackwater treatment systems.

16 Instituto Trata Brasil, see: http://www.tratabrasil.org.br/saneamento/principais-estatisticas/no-brasil/esgotoE

3.3 Component 3. Knowledge management and scaling-up

Component 3 supports and expands on the activities in Components 1 and 2. The activities described below will be explored in the project so that information flows serve both to consolidate learning among families who will experience new approaches in CRPS and water access as well as to scale to a regional and international level the adaptation and mitigation measures that the project will propel. Strategies developed will drive upscaling and deliver ***Output 3.1 CRPS and small-scale water harvesting system disseminated in the NEB semiarid and abroad to increase climate resilience of vulnerable communities.***

3.3.1 Activity 3.1.1. Raise awareness and build capacities of women, youth and traditional communities

This activity combines several strategies: i) highlight the leading role of youth and women as 'knowledge managers and generators' and 'local talents'; ii) consolidate laboratories for learning, exchange and replication of sustainable practices in communities through a set of printed and audiovisual materials; iii) facilitate dynamic M&E of socio-environmental impacts, which will be registered in materials that allow effective influence in spaces dedicated to public policy making.

Sub-activity 3.1.1.1. Develop a young communicators network

A total of 414 young people will be selected to participate in a media resource empowerment program focusing on successful experiences in accessing water resources and CRPS. In addition to being responsible for registering activities and facilitating production of audiovisual and printed materials, Young Communicators (YCs) will act as "social mobilizers", fulfilling a crucial role in social organization processes.

Another important initiative in which YCs will take part, together with the farmers' network (see activity 4.1), is the construction of a participatory monitoring model with audiovisual resources.

Local and regional exchanges between YCs will be promoted. YC will work closely with TA teams and community-based partner organizations. Each will receive a scholarship through a "learning grant" and have access to equipment (mobile phones and notebook computers).

Sub-activity 3.1.1.2. Strengthen capacity for women, youth, and traditional communities

All educational activities (workshops, courses, exchanges, etc.) will follow a "learn by doing" approach that explores experimentation of alternative technologies and information exchange among community members. Given that women, youth, and traditional communities tend to be on the margin of community-based organizing efforts, the project will prioritize capacity-building opportunities targeting these groups.

(i) **Rural women**: The project strengthens rural women's capacities as part of a comprehensive environmental education program that explores the connections between feminism, women's rights, the Semiarid region biomes, agroecology, and food and nutritional security.

(ii) **Youth**: In addition to YC networks, youth will be involved in short-term professional courses with a focus on diversity of production systems and CRPS. The youth will then be incorporated in TA teams and serve as liaisons with families.

(iii) **Traditional communities**: Implementation of sensitivity trainings for TA professionals in issues of race and ethnicity, with a focus on methodological approaches and instruments that address the relationship these communities have with natural resources and land management techniques. The second line of action involves conducting case studies in traditional communities.

3.3.2 Activity 3.1.2. Drive scaling-up, unlock policy barriers and experiment with CRPS and resilience participatory monitoring model

Sub-activity 3.1.2.1. Promote south-south cooperation

Another aspect of this project involves developing capacities by sharing knowledge, skills, resources and technologies among countries through the construction of a more horizontal relationship of solidarity than the classic "North-South" cooperation. At the start of implementation, the exchange sites inside and outside Brazil and the prioritized systematization methods will be identified. IFAD is currently implementing the Dryland Adaptation Knowledge Initiative (DAKI,) which will pave the way for the project implementation, among other activities, will develop distance learning online platform in foreign languages and this tool could be used in case trips cannot materialize. At the start of implementation, the project will define the exchange sites inside and outside Brazil, the method of interaction (online or in person) and the systematization methods. In addition to TA team members, farmers will be invited to participate. The project will invest in construction of a database cataloguing the practices and technologies for proper management of natural resources that have been identified in these different contexts.

Sub-activity 3.1.2.2. Facilitate discussions to unlock policy barriers

The National Forest Code requires farmers in the Northeast to preserve 20% of their land as legal reserve. Family farmers, however, can perform certain productive activities in their legal reserves such as agroforestry and beekeeping. The Forest Code anticipates that States could implement a legal reserve quota (CRA) market, where farmers that preserve above their required 20% could sell their quotas. Several policies that are constraining family farmer's CRPS were identified during project design. The most notable include: i) lack of an Environmental Reserve Quota (CRA in Portuguese) market; and ii) norms and regulations preventing family farmers from accessing markets.

As recommended by the World Bank,[17] establishing the CRA market could provide additional incentives for family farmers to increase the area covered by the climate-resilient agriculture principles laid out in the project. A CRA credit produced on a beneficiary's property could be used to offset a legal reserve (RL) debt on another property within the same biome, preferably in the same state. The RL debts represent obligations acquired by any given farmer that can be efficiently offset by environmental improvements produced by smallholder farmers with CRPS, thereby generating a transfer payment from the RL offender to the smallholders. Implementing a state CRA could create a market for forested lands, adding monetary value to a preserved Caatinga. Given the high costs of restoration/reforestation in the Caatinga and the climate-resilient agriculture principles laid out in the project, exchange of CRAs could become an effective way to facilitate Forest Code compliance, meeting NDC targets and preventing deforestation of surplus native vegetation.[18]

The Committee on World Food Security and FAO (2016) recommend that governments employ public policy to support family farmers with respect to issues such as pricing policies, public procurement, food safety and standards, and appropriate credit and infrastructure. Family farmers in Brazil are affected by top-down imposition of food safety standards designed to respond to large-scale mechanized and standardized food production for commodities and large distribution channels. As a consequence of these entry barriers, family farmers revert to informal markets with lower demand and prices.

The project will facilitate discussions in forums on marketing and market access for family agriculture. The proposal is to take advantage of existing organizational structures, reinforce them and create new ones. These working groups should involve a broad set of stakeholders (e.g., project beneficiaries, NGOs, private and public

17 The World Bank, June 2017. Brazil's INDC Restoration and Reforestation Target, Analysis of INDC Land-use Targets. Report No. AUS19554.
18 The project was designed assuming that the legal reserve markets will not be in place. Thus, there will be no impact of the project if the policy fails to be implemented.

sectors) and develop a roadmap to implement the CRA markets and improve regulatory conditions for family farmers' access to markets. It will also commission research on targeted policy and regulatory issues.

To qualify the inputs made in these forums on public policy, materials (publications and videos) will be produced that present results of the actions undertaken, in accordance with the progress indicators used in the M&E system. These publications – that present concrete social, environmental and economic results of transitioning to a model of family farmer CRPS – can influence public opinion, which in turn can contribute to the "scaling up" process.

Sub-activity 3.1.2.3. Experiment with CRPS and resilience participatory monitoring model

Since transition to CRPS is gradual and it's social / economic / environmental impact not immediately perceived, a monitoring methodology is needed that demonstrates and gives visibility to transformations promoted during implementation. Systematization processes will be published and subsidize political advocacy processes, reaching external stakeholders, such as public managers and institutions working on related topics.

3.3.3 Activity 3.1.3. Plan, Monitor, Evaluate and Learn (PMEL)

A Planning, Monitoring Evaluation and Learning System (PMEL) will be developed as part of component 3 to allow the results-based project management. The data and information collected through the use of specific tools for the implementation of Climate Resilience Productive Systems (CRPS), will contribute not only to learning, feedback and improvement of project interventions but will also build the foundations for the material relevant to the knowledge management (KM). The PMEL will be a fundamental source of inputs to the Central Project Management Unit (CPMU/BNDES) decision making and will be in particular useful to provide feedback to the State level implementing unit(SIUs) at the state level. In order to manage the state level information, the Country-based Monitoring and Evaluation system (DATA-FIDA), developed and implemented for the ongoing IFAD Brazil portfolio will be used. The system has been developed by Programa Semear Internacinoal (PSI) and all projects in Brazil have been trained on its use. It is a project-supporting tool for organizing the information so that it reflects the implemented activities contribution both to the Logical Framework (LF) and to the projects AWPB. Each SIU will carry out the physical and financial monitoring of the implemented activities in its respective state using the DATA-FIDA system and will report to the CPMU to monitor the implementation of the project as a whole. During the first year of project implementation, improvements will be made to the DATA-FIDA system to allow the aggregation of the state data and handling by the CPMU, in addition, an interface will be implemented for DATA-FIDA to dialogue with the IT system of BNDES. The CPMU will be responsible for preparing and sending to IFAD the required consolidated progress reports and other project information, based on information provided by the SIUs. IFAD will be responsible for supervising project implementation, verifying results and recommending adjustive measures if targets are not being met.

PCRP aims to increase production while improving the most vulnerable peoples autonomous capacity to face the challenges posed by ongoing climate change. The target therefore is to increase and stabilize family income and food security while incentivizing young generations to stay active in rural activities even in areas/periods at risk of climate change impacts. As such project activities tackle the main barriers that limit an increased resilience of this specific population. Project performance indicators measure access to knowledge, technology and support required to overcome said barriers and increase their resilience in the face of ongoing climate change. The project applies in tandem a series of monitoring tools and strategies to ensure result-oriented monitoring and successful achievement of project objectives. Relevant results will be reported:

1. Avoided losses during drought events as compared to the 2010-2020 baseline;
2. Increase in soil moisture during the dry season;
3. Reduced and avoided emissions;
4. Increased resilience capacities; and
5. Behavioural change (i.e. Production practices, WASH, gender empowerment, minimum diet diversity)

The main MRE tools (further detailed in Annex 11) of the Program and Projects are: :

The **Logical Framework** integrates three levels of indicators: impact (based on results of Impact Assessment Studies), result and process (Project advances). The last two types are based on the results of actions in the field and support the rethinking and realigning of strategies and activities. The M&E system is sensitive to gender and generation; thus, whenever possible, these data will be disaggregated.

Baseline and Completion studies will be developed for an objective comparison of implementation progress and adequate measurement of projects impact and results related to the Project's expected outcomes. As minimum – together with project resilience scorecard and GIS mapping of Climate Change trends/impacts-, the following indicators will be included: i) income; ii) level of assets and equity; iii) production, consumption and commercialization; iv) natural resources and environmental management; v) level of families' participation in community-based organizations; vi) valuation of gender, race and ethnic identities; vii) access to public policies; and viii) food security. The baseline involves a sample survey of treatment groups (representing the beneficiary families) and a control group (representing those who will not be served by the project). Information will be disaggregated on gender for knowledge, attitudes and practices (KAP) regarding climate change adaptation in target communities. Research questionnaire will follow the model IFAD applies for its Projects in Brazil, adapted to cover other expected impacts as per proposal.

The project will **monitor changes in the resilience capacities of farming families** considering multiple factors, linked to socioeconomic and agroecological conditions, contributing to the families' capacities to cope with climate shocks and adapt to growing tress from slowly increasing temperatures and hotter and dryer conditions. Inspired by the DFID KPI4 Methodology adapted to the IFAD and GCF project type, a resilience scorecard and index have been developed tailored to the project's theory of change. The resilience questionnaire and scorecard may be adjusted by the PMEL in consultation with project stakeholders at project start-up and will be completed as part of the baseline survey, at midterm and at project completion. The resilience scorecard will be used for knowledge generation and improved analysis of resilience dynamics by combining it with the GIS-based monitoring studies of vegetation cover and ecological quality and climate data showing if stresses or extreme weather events have occurred during the implementation of the project.

M&E using Geographic Information System (GIS), including vegetation cover and ecological quality combined with monitoring of rainfall and temperatures, demonstrates vegetation recovery and is an input to calculate carbon sequestration. To analyse the restoration of recovered areas, the following ecological indicators will be monitored: canopy and soil cover, regenerating density, and number of regenerating species. This analysis extrapolates the limits of the intervention areas, evaluating the spillover effect of project actions. Vegetation recovery will be monitored every three years and studies should be preferably performed during/after the rain season. These studies will be implemented in partnerships with expert institutes or instruments, such as GEO-BNDES, the National Institute of Space Research (INPE), MapBiomas, in addition to specific consultancies.

A quantitative systematization of interventions by thematic area informs the Project M&E unit of the most immediate impacts on households in terms of resilience capacities, income and food security in short to medium term. These activities are articulated with other Project components and include specialists of different areas - Race, Ethnicity, Gender, and Youth. Results of learning exchanges will also be systematized and reported. At least 3 thematic systematizations will happen throughout the project execution period.

Participatory and qualitative evaluation of results. The CPMU through PMEL will hold participatory meetings and develop a monitoring methodology with the participation of youth communicators. M&E data will be used to communicate Project's results to the media, governments and partners. Outcomes of exchanges and learning initiatives will also be published as part of the Project Knowledge and Results Management.

Technical Progress Reports (TPR). State Projects will submit TPRs each semester with detailed descriptions activities by component and subcomponent. TPR informs to what extent implemented activities promoted progress in reaching the goals set in the Project design and Annual Operational Plan.

Expected results of **Component 3:**

- 54 workshops for young social communicators;
- 100 systematizing workshops;
- 9 state exchanges;
- 36 regional exchanges;
- 414 youth benefited with scholarships and communication equipment;
- 300 training workshops for women about sustainable technologies;
- 70 newsletters and informative reports produced;
- 360 territorial meeting for women;
- 12 exchange programs for women;
- 27 training workshops of gender experts;
- 243 training workshops for youth;
- 4 national learning routes;
- 3 international learning routes - LAC and Africa;
- 8 thematic studies.

Project Management

The project management governance is described in section B.4 and the PIM (Annex 21).

4. SOCIAL AND ENVIRONMENTAL BASELINE

4.1 Socio-economic context

The Brazilian semiarid is located mostly in the Northeast region, occupying approximately 12% of the Brazilian territory and hosting 12% of the population, 11 million urban dwellers and 9 million rural dwellers in 1,262 municipalities, according to the official delimitation disclosed in 2017 (Sudene 2017). The Northeast is constituted of nine states: Bahia, Ceará, Pernambuco, Paraíba, Rio Grande do Norte, Piauí, Maranhão, Alagoas and Sergipe. Half of these states have more than 85% of their area characterized as semiarid.

Rural poverty is deep, the semiarid is Brazil's most impoverished region, hosting 3 million people living in extreme poverty, of which 46% belong to households in rural areas with the poor surviving through short-cycle types of subsistence farming, animal breeding in extensive systems, extractive activities (wood and non-timber products), temporary farm employment, and seasonal migration to urban areas. The semiarid region is known for its severe socioeconomic problems related to long periods of drought and dry season. For almost four centuries the economic activities developed in the region were based on delayed production technologies in comparison to those in the most dynamic areas of the country, which helped to consolidate the image of the semiarid region as a dry, poor, backward and futureless territory.

On the one hand, the impacts of extreme weather events are being felt with increasing intensity and are causing severe economic losses. Climate variability generates instability, which goes beyond the local perspective. The climate, historical relations of land tenure, political power and an increasing social protection network encourages migration to urban areas, not only exacerbating urban problems but also increasing the population of aging farmers in rural areas, which threatens the transition in the agricultural economy and the viability of family farms.

On the other hand, the semiarid is a space of great concentration of land and water, and historically has always been in the hands of a small elite. This situation generates very high levels of social exclusion and environmental degradation and are determining factors of the socio-environmental crisis and economic situation in the region. Furthermore, the semiarid has a history of political neglect and lack of public investment, especially in the rural areas. The distribution of resources across the regions of Brazil suggests regional differences in the abilities of smallholder farmers and institutions involved in accessing funds, in particular the PRONAF (National Program for the Strengthening of Family Agriculture). For instance, in the 2006-2007 agricultural year, 38% of this fund was destined to the southern region of Brazil despite only representing 19% of smallholder establishments. While the northestern region, regardeless of containing 50% of all smallholder farming establishments, only accessed 25% of PRONAF's resources[19].

According to the 2006 Brazilian Agricultural Census, smallholder farmers are responsible for the production of most of the items in the consumer basket of Brazilian families, accounting respectively for 87%, 70% and 58% of the national production of cassava, beans and milk. Despite this, in Brazil, small farmers do not share the same amount of attention in government agendas, while industrial agriculture, which was focused on commodity production, received high financial incentives from the state. This circumstance was responsible for large economic and social impacts in the Brazilian rural environment, influencing the increase in rural exodus, poverty, food insecurity and interfering in population dynamics for decades.

The poorest people and communities in semiarid are predominantly rural, and their livelihoods depend heavily on small-scale agriculture or family farming, a highly climate-sensitive sector. At the same time, people involved in family farming have limited access to financial and human resources, as well as manufacturing infrastructure, making its adaptive capacity smaller than that of corporate farming (with better access to funding and manufacturing infrastructure). Although Brazil is considered an upper middle-income country, disparities within

19 https://ipcig.org/pub/IPCTechnicalPaper7.pdf

the country at the State level reflects a stark figure of poverty and inequality. Table 1 presents the Municipal Human Development Index (MHDI); i.e. a local and more accurate measure to determine differences within counties.

Table 1. Socioeconomic rank of Brazilian States
Source: Atlas do Desenvolvimento Humano no Brasil (2010)

Rank	State	MHDI	MHDI Income	MHDI Life Expectancy	MHDI Education
1 º	Distrito Federal	0.824	0.863	0.873	0.742
2 º	São Paulo	0.783	0.789	0.845	0.719
3 º	Santa Catarina	0.774	0.773	0.860	0.697
4 º	Rio de Janeiro	0.761	0.782	0.835	0.675
5 º	Paraná	0.749	0.757	0.830	0.668
6 º	Rio Grande do Sul	0.746	0.769	0.840	0.642
7 º	Espírito Santo	0.740	0.743	0.835	0.653
8 º	Goiás	0.735	0.742	0.827	0.646
9 º	Minas Gerais	0.731	0.730	0.838	0.638
10 º	Mato Grosso do Sul	0.729	0.740	0.833	0.629
11 º	Mato Grosso	0.725	0.732	0.821	0.635
12 º	Amapá	0.708	0.694	0.813	0.629
13 º	Roraima	0.707	0.695	0.809	0.628
14 º	Tocantins	0.699	0.690	0.793	0.624
15 º	Rondônia	0.690	0.712	0.800	0.577
16 º	Rio Grande do Norte	0.684	0.678	0.792	0.597
17 º	Ceará	0.682	0.651	0.793	0.615
18 º	Amazonas	0.674	0.677	0.805	0.561
19 º	Pernambuco	0.673	0.673	0.789	0.574
20 º	Sergipe	0.665	0.672	0.781	0.560
21 º	Acre	0.663	0.671	0.777	0.559
22 º	Bahia	0.660	0.663	0.783	0.555
23 º	Paraíba	0.658	0.656	0.783	0.555
24 º	Piauí	0.646	0.635	0.777	0.547
24 º	Pará	0.646	0.646	0.789	0.528
26 º	Maranhão	0.639	0.612	0.757	0.562
27 º	Alagoas	0.631	0.641	0.755	0.520

Human Development Categories

Very High	0,800 - 1,000	**High**	0,700 - 0,799	**Medium**	0,600 - 0,699	**Low**	0,500 - 0,599	**Very Low**	0,000 - 0,499

4.1.1 Family Farmers

Family farms account for almost all (generally over 90%)[20] of agricultural properties in the semi-arid. These farms are usually smallholdings, with a significant proportion covering less than twenty hectares.[21] Despite some variants,[22] they generally mix annual dryland agriculture harvesting food crops – mainly maize, beans and manioc – from shifting cultivations (known as *roçados*) for home consumption and sale, in addition to small-scale livestock-raising.

Whenever possible, families also have backyard gardens, a few fruit trees and poultry. Some of them, although only a few, also have small irrigated areas. The shifting food crop plots (*roçados*) cover part of these smallholdings, together with areas where fodder is grown (croplands and areas set aside for producing fodder, such as palma do elefante, for example).

In general, these properties also have wilderness areas left as *caatinga* scrublands, with at least part being second-growth *capoeira* scrubgrass.[23] These scrubgrass areas may be included in shorter or longer rotation cycles with shifting food crop plots, resulting in a patchwork landscape that changes constantly, year after year. A constant source of forage, the *caatinga* scrublands are also used to harvest and produce non-timber forest products.

The vulnerabilities are a result of high poverty incidence, deforestation of the Caatinga Biome depleting the ecosystem services, inadequate productive practices which further degrade the soil, and water scarcity and poor quality. These conditions create a vicious cycle which is further aggravated by climate change stressors leading to desertification of the region. All these processes translate into losses of arable land, increased food insecurity and reduced local economic activities, lower farmers' income and rural exodus.

The last droughts have forced producers to find ways to produce more with fewer animals. Family farmers claim that, due to droughts, agriculture is no longer viable for many of them. Currently, they try to plant sorghum and corn (both crops that require high amounts of humidity) and wait for the rare rain to arrive to get something to feed the animals on the property. Honey production has become an important income for family farmers. This type of production is directly related to the conservation of forest resources, thus potentially playing a significant role in promoting the conservation of the semiarid's natural ecosystems. All produce is marketed locally through agroecological farmers markets ("ferias agroecologicas") or retail outlets. However, farmers claim that the Food Acquisition Program PAA and the National School Feeding Program (PNAE), the government food acquisition programs, created in 2003 and 2009 respectively, have not been enough and thus haven't provided a complete solution for them.

4.1.2 Youth

The population age distribution of the Northeast Region has changed, when comparing data from the 2000 to the 2010 Census it shows a reduction in the proportion of people up to 15 years old and a significantly increase in the proportion of people over 60 years of age. The proportion of young people[24] in the total population went from 33% to 26.5% in relative terms, at the same time as the proportion of people over 60 reached 10.3%, compared to 8.4% in 2000. The largest gap occurs for population ranging from 16 to 35 years of age. Whereas in 1991, no

20 A study of the São Francisco do Sertão Territory in Bahia State shows that 90.7% of the properties consist of family farms (ARTICULAÇÃO-NACIONAL-DE-AGROECOLOGIA, 2018). In the Chapada do Vale do Itaim Territory of the Sertão in Piauí State, this reaches 92.7 % (SIDERSKY, 2017).

21 Using data from the 2006 Farming and Ranching Census conducted by the Brazilian Institute for Geography and Statistics (IBGE), a study of the São Francisco do Sertão Territory in Bahia State showed that 62% of the farms and ranches in this Territory cover between 0 and 20 hectares.

22 Particularly in Piauí, Ceará and Rio Grande do Norte States, there are areas where cashew tree groves are often found on family farms, in addition to shifting food crop plots and livestock. There is a Territory in Bahia State where almost all family farms have areas set aside for perennial sisal plantations.

23 *Capoeira* scrubgrass areas may be included in longer or shorter rotations with shifting food crop plots.

24 Youth in Brazil includes people aged between 15 and 29 years, as per the Youth Law 12.852/2013.

northeast municipality presented rural population aging [25] above 20%, in 2010 indices above 25% were found in the majority of rural municipalities in the Northeast region.[26]

According to the Brazilian Institute of Geography and Statistics (IBGE) in relation to the total number of Brazilians living in the countryside, one in four are considered to be extremely poor, i.e. 25.5% or 4.1 million people, and 51% are young people (IBGE, 2010). Specifically in the North and Northeast regions, where indicators points out that 1.5 million rural young people experience situations of extreme poverty, which is equivalent to 34.88% of all young people living in the rural areas of Brazil. In a survey conducted by Unicef (2014), it was diagnosed that the majority of rural youths (45.5%) had not completed elementary school, 37.8% were in high school and 1.6% had reached university.[27]

Youth lack of interest in agriculture is based on different reasons that go from the devaluation of the agricultural occupation, low income of family farmers, and the harsh labor conditions. Changes in rural population may be explained by youth exodus to urban areas in search for better opportunities and services. The few that have managed to remain in the region had been involved in family farming and later have gotten higher education and came back mainly as extension workers. Demonstrating that there are ways to regain an appreciation of family farming and offer relevant spaces for young people in rural areas.

4.1.3 Gender

The impacts of climate change are gendered, because of the strong relationship between poverty and vulnerability to environmental change, and the stark fact that women as a group are often poorer and have less access to resources (monetary and non monetary) than men (Nelson and others 2002 Research indicates that women and young girls living in rural areas of Brazil's Northeast, the project's target region, where women are deeply engaged in cultivating and collecting food, water, and fuelwood for their families, are the most vulnerable to climate change-related risks in the country (CEPAL 2016). The vulnerability of women to climate change impacts is linked to other social inequalities (race, ethnicity, class), their level of access to resources, and their capacity to cope with other problems associated with climate change such as health and migration (Adger 1999). They also face social, economic, and political barriers that hinder their capacity for adaptation, as they have limited access to effective and lasting policies and programs that address social and environmental adversities.

In rural areas, women are deeply involved in activities within the domestic sphere as well as in the spaces dedicated towards crop production, such as backyard gardens and cultivated fields or plantations. Approximately 46.7% of rural women are involved in subsistence agricultural activities in Brazil, compared to 14.0% of rural men (IBGE, 2009). The most common types of farming activities in which rural women are engaged include: bird breeding (73.5%); mixed crop / livestock production (72.3%); horticulture / floriculture (63.0%) (IBGE, 2009). Women's daily work is made invisible by the fact that most of their transactions and actions are not monetized or calculated, given that they are often not inserted in formal markets. Although women participate in work dynamics within the productive sphere, working in almost all tasks of the property, they are generally excluded from decision making about the use of financial and natural resources, jeopardizing their personal and financial autonomy (SILIPANDRI; CITRÃO, 2011).

Gender Assessment has shown on rural farms, mostly it is women who are deeply engaged in the agroecological transition. They introduce innovations in productive arrangements, generally being the first to suggest not using pesticides and chemically-based fertilizers, which in many cases leads to intra-family conflicts, usually due to the resistance of men (husbands and sons) to adapt to new models of agricultural production initially perceived as

25 Measures the ratio between the elderly aged 65 and over and the young population aged 17 years or less
26 MAIA, A. G.; BUAINAIN, A. M.; O novo mapa da população rural brasileiraLa nouvelle carte de la population rurale du Brésil. The new map of Brazil's rural population. Confins (Paris),Vol. 2015, Fac. 25, pp.1-26, Marseille, France, 2015.
27 Indígenas, negros e nulheres são mais afetados por pobreza. **Unicef**. Available at: https://nacoesunidas.org/indigenas-negros-e-mulheres-sao-mais-afetados-por-pobreza-e-desemprego-no-brasil-diz-cepal/

more time-consuming and less profitable. Women are often the first to coordinate productive processes following a logic of diversification, seeking ways to plant “a little bit of everything" in a variety of ways within different productive agricultural spaces, and seeking sustainable practices that do not harm the environment and make full use of local resources. They also have a greater awareness of the link between productive practices and consumption (food habits) and play a key role in food security within their families and communities, as they take greater responsibility for ensuring that all family members are well fed.

The PCRP proposes a series of strategies for overcoming structural barriers to women’s participation in agriculture; providing capacities to undertake sustainable agricultural practices and subsequently increase their access to economic, social and natural resources. Within the PCRP proposal, actions are proposed that aim to reinforce and validate women’s role in food security, biodiversity and environmental sustainability. As part of the proposal package IFAD has prepared a Gender Assessment annex that provides more details on gender issues and offers solutions for integrating a gender perspective in the thematic areas and strategies within the three components.

4.1.4 Traditional communities

Besides women and young people, indigenous peoples and the traditional communities are the groups subject to great socio-environmental vulnerability . In Brazil, and more specifically in the Northeast, these traditional communities are represented by the Quilombolas and the Fundo Pasto communities. The PCRP recognizes the importance of the population of Quilombolas and Fundo Pasto in the northeast region as their presence is even bigger than the indigenous peoples and they also have official recognition from the government. The project not only ensures their involvement in the process but also prevents and mitigate any potential damage they may have during the course of the project implementation.

The Quilombola communities, descendent of African slaves, are officially recognized as traditional communities in Brazil Constitution and distributed throughout the national territory, where there are about 214 thousand Quilombola families, 63% of which are in the Northeast. According to data from the Ministry of Social Development - MDS, at least 58 thousand Quilombola families are located below the line of extreme poverty. (2016)

Quilombola communities suffer disproportionally from socio-economic disadvantages, the population has the worse morbidity profiles in relation to obesity and malnutrition in the country[28] Only 36,2% of Quilombola communities of the North Semiarid Region has running water, although the majority of municipalities in the region are reached by cisterns of the program Água para Todos[29]. In the Semiarid region, Quilombola communities also are shown to have a very low rate of involvement in the formal school system: 87.3% of Quilombola heads of family have not completed primary education[30].

On the other hand, Fundo Pasto communities represent a modality of social organization based on the traditional system of collective land occupation, which is associated with extensive livestock via grazing the natural vegetation of the Caatinga. They are represented by thousands of families (estimated in more than 20,000) of farmers in Bahia, more precisely in the north-northeast and lower São Francisco regions, although it can also be found in other Northeastern states. From a total of 638 settlements in the State of Bahia, 23.8% are considered Pasto Grande communities. However, even though recognized by the national Law the Fundo Pasto community suffer from government programs that didn’t consider their traditional ways of organization, occupation of the territory and production systems.

---

28 Neves, Félix de Jesus. **Fatores Associados ao Déficit Estrutural em crianças quilombolas menores de 5 anos na região Nordeste do Brasil**. 2017. Available at: https://www.arca.fiocruz.br/bitstream/icict/24073/2/felix_jesus.pdf.
29 Pesquisa de Avaliação da Situação de Segurança Alimentar e Nutricional em Comunidades Quilombolas Tituladas (2014). Available at: http://www.mds.gov.br/webarquivos/publicacao/brasil_sem_miseria/cadernos_de_estudos20.pdf. p.41.
30 *Idem*.

One of the most striking features of Fundo de Pasto communities refers to institutional mechanisms for access and use of native lands and pastures created from discursive and customary combinations of rules of use and hospitality reinforced in situations of adversity and pressure exerted on the group, ruling principles of vital utility and shared socio-cultural organization[31].

These communities, most of which do not own property titles, suffer from the threats of grileiros (person who takes possession of land by means of false deeds) cattle ranchers and large agribusiness entrepreneurs, who try to enter the communal territories of the pasture funds and appropriate these areas. Also, it is very recent the recognition of these communities as "traditional", so that even the specificities in their forms of territorialization in the Semiarid are little understood by institutions of Technical Assistance and Land Regularization. Some specific conditions in these communities, such as the establishment of mutually supportive forms of mutual assistance are to be taken into account in the PCRP

4.1.5 Indigenous peoples

The Northeast region is home of a total of 233,079 indigenous persons (26% of the total indigenous population), represented by 80 indigenous peoples' groups of which 51% are women and 49% are men. The state of Bahia hosts the majority of indigenous peoples of the Northeast (nearly 57,000 people), being the third state in Brazil in number of indigenous peoples, followed by Pernambuco (approximately 53,000 people[32].

Extreme poverty affects indigenous people six times more than the rest of the Brazilian population.[33] According to UNICEF the main effects are poor health care, hunger, misery and malnutrition.[34] The mortality of indigenous children up to 5 years is nine times higher than the national average.[35] The precarious nutritional situation of indigenous children is clear from the fact that anemia affects 50% of them. In 2017, in the Northeast, the total number of deaths of indigenous children reached the number of 88[36].

The PCRP will be implemented in the most drought affected semi-arid areas of up to three states of the Northeast Region of Brazil. The participation of the states will be determined based on specific criteria (e.g. borrowing capacity, expression of interest, capacity to meet the project's goal and capacity to implement the project in a timely manner, among others). At the present stage of design process it is still not possible to identify which indigenous peoples' groups and communities will be targeted. This will depend on the geographic coverage of Project's interventions that, at the same time, will depend upon states' participation.

Nevertheless, in line with the Green Climate Fund's Indigenous People Policy and with the IFAD Policy of Engagement with Indigenous Peoples, an Indigenous Peoples Planning Framework (IPPF) was prepared to ensure that indigenous peoples' rights are respected and that indigenous peoples' communities are able to actively participate and benefit from the development of project's interventions. With this objective, IFAD, together with BNDES and participating states, will define a consultation process to solicit and obtain indigenous peoples' free, prior and informed consent (FPIC) before any action is taken in indigenous peoples' communities.

---

31 DIAMANTINO, P. T. "Desde o raiar da aurora o sertão tonteia": caminhos e descaminhos da trajetória sócio-jurídica das comunidades de Fundos de Pasto pelo reconhecimento de seus direitos territoriais. 2007. 143f. Dissertação (Mestrado em Direito) – Programa de Pós-Graduação em Direito da Faculdade de Direito da Universidade de Brasília, Brasília, DF, 2007.
32 Source: IBGE, Brazilian National Census, 2010 (census for 2020 not yet available)
33 Indígenas, negros e nulheres são mais afetados por pobreza. **Unicef**. Available at: https://nacoesunidas.org/indigenas-negros-e-mulheres-sao-mais-afetados-por-pobreza-e-desemprego-no-brasil-diz-cepal/
34 Indígenas, negros e nulheres são mais afetados por pobreza. **Unicef**. Available at: https://nacoesunidas.org/indigenas-negros-e-mulheres-sao-mais-afetados-por-pobreza-e-desemprego-no-brasil-diz-cepal/
35 Para a saúde da mulher e da criança indígenas sobram promessas e faltam soluções .Mobilização Nacional Indígena. Available at: https://mobilizacaonacionalindigena.wordpress.com/2018/04/27/para-a-saude-da-mulher-e-da-crianca-indigenas-sobram-promessas-e-faltam-solucoes/
36 Relatório da Violência contra os Povos Indígenas 2017. **CIMI**. Available at: https://cimi.org.br/wp-content/uploads/2018/09/Relatorio-violencia-contra-povos-indigenas_2017-Cimi.pdf. p.137

4.1.6 Nutrition

In recent decades, the Brazilian population has undergone major social transformations that have resulted in changes in their standards of health and food consumption. From 1996 to 2007, child stunting in the Northeast of Brazil has dropped from 22.2% to 5.9% (Demographic Health Survey, 2007). Pro-poor policy initiatives helped ensuring better income distribution and increased access to services, achieving significant impact on reducing poverty and social exclusion and consequently hunger and malnutrition, by addressing the main underlying causes of malnutrition: inadequate access to food, inadequate care for children and women, insufficient health services and an unhealthy environment. Furthermore, the improvement of maternal schooling and the increased purchasing power among the poorest Brazilian families directly contributed to the decline in the prevalence of childhood stunting[37].

Despite marked reductions in chronic malnutrition, improvements in the nutritional status of the population have not been homogeneous. With the highest rates of poverty in the Northeast region, traditional and indigenous peoples' communities are also more exposed to nutrition vulnerability. As recent research from the Ministry of Health has shown, stunting in children under five still affected 9,8% of indigenous children in the Northeast in 2017 (SIASI, 2017), wasting 2%, while 16% experienced overweight and obesity, being the Northeast the region with the highest number of overweight indigenous children in Brazil[38]. At the same time, quilombola population has the worse morbidity profiles in relation to obesity and malnutrition in the country.[39] In general, there has been a steep increase in overweight in all segments of the population, pointing to a new set of problems related to food and nutrition (PNAN 2013)[40]. The growing burden of obesity, and other nutrition related non-communicable diseases Brazilian population is experiencing today, is directly related with changes in eating patterns and lifestyles and increasing consumption of ultra-processed foods, which are often the more affordable in the market.

In the Northeast semi-arid region, there is a clear correlation between poverty rates, environmental constrains and food and nutrition insecurity. Severe and recurrent droughts and the scarcity of water are threatening food and nutrition security of family farmers already living in poverty. In this context, climate change is further exacerbating existing environmental problems (disruptions of water flows and poor quality of water sources, salinization of the soils, dissemination of pests and diseases) directly affecting the health status of rural population.

In this context, the PCRP will maximize the contribution of its activities to improving nutrition, promoting the increasing and diversification of food production with attention to nutrition products, and their consumption at the household level. With the aim of increasing self-consumption of rural families and reduce the household's budget used for food purchases, PCRP promotes the implementation of Climate Resilient Productive Systems (CRPS), incorporating the production of nutrient-rich foods. In indigenous and quilombola communities, attention will be given to promote dietary diversity by integrating neglected and underutilized species (NUS) with high nutritional value while selecting species for the CRPS. To ensure that diversification of agricultural production will translate into improved diets, the project will support beneficiaries in addressing gaps in nutrition knowledge. Fundamentals on nutrition and on food safety practices will be integrated in the technical assistance trainings delivered by the service providers. Training for cooks and students on the nutritional value of native plants to diversify and enrich diets will be also included in the schools where CRPS will be implemented. The adoption of social technologies to improve water management and treatment for food production will directly contribute to increase food production and reduce risks related to unhealthy environment. Furthermore, particular attention will be given to increase women's empowerment and their decision-making, and decrease their burden of work, being women (and

37 Monteiro, 2016. What Brazil can teach the world about tackling child malnutrition. https://theconversation.com/what-brazil-can-teach-the-world-about-tackling-child-malnutrition-64652

38 Mourão, 2018. Análise do estado nutricional de crianças indígenas menores de 5 anos no Brasil, 2016. Ministério da Saúde, Secretaria Especial de Saúde Indígena. https://www.saude.gov.br/images/pdf/2018/novembro/16/Apresenta----o-Estado-nutricional-crian--as-ind--genas---Semin--rio-Sa--de-Ind--gena-em-Debate.pdf

39 Neves, Félix de Jesus. Fatores Associados ao Déficit Estrutural em crianças quilombolas menores de 5 anos na região Nordeste do Brasil. 2017. Available at: https://www.arca.fiocruz.br/bitstream/icict/24073/2/felix_jesus.pdf.

40 Source:http://189.28.128.100/dab/docs/portaldab/publicacoes/national_food_nutrition_policy.pdf

especially women heads of households) the main responsible for food production and preparation at the family level.

4.2 Natural Resources

The Caatinga is an exclusively Brazilian biome. It occurs in the sub-equatorial zone, between the Amazon Forest and the Atlantic Forest of the Brazilian Northeast. The Caatinga biome occupies an area mostly coincident with the Brazilian semiarid, which is described as the most biodiverse and the most populated semiarid region in the world (MMA, 2011). The word Caatinga originates from the Tupi indigenous language, meaning mata branca, or white forest.

The Caatinga occupies an area of about 844,453 km^2, equivalent to 11% of the national territory. It encompasses the states of Alagoas, Bahia, Ceará, Maranhão, Pernambuco, Paraíba, Rio Grande do Norte, Piauí, Sergipe and the north of Minas Gerais. The vegetation ranges from the deciduous low shrub to small patches of tall dry forests, often fragmented, with a height of up to 20 m (Prado, 2003). This region receives from 240 to 1500 mm annual rainfall, but mostly it receives less than 750 mm/year (Leal et al., 2005, Prado, 2003). The caatinga is the largest dry forest in South America. Rainfall in this region is extremely irregular, in both its temporal and geographical distribution; usually more than 75% of the total annual rainfall occurs within three months (Prado, 2003). The annual variations are large; droughts can last for years (Leal et al., 2005).

Some authors recognize two main types of Caatinga: dry caatinga ("sertão") located in the interior and more humid caatinga ("agreste") toward the coast.[41] However, others divide the Caatinga in up to eight categories[42]. The dry Caatinga biome preserves the nutrients better than the more water-rich, more dynamic (turnover) environments.[43] Thus, most plant nutrients, despite their absolute depletion, show the highest values in Caatinga soils. This result may not be surprising when considering the more rapid element cycles under wet tropical conditions (Amazon Rainforest) as compared with the semi-dry condition of the Caatinga. The geology of the caatinga is in essence originated from very old Precambrian rocks, severely degraded during the Tertiary, and overlain by more recent marine sandstones and other sediments. There are remnants of crystalline outcrops, including monolithic mesas and isolated mountain ranges.[44]

Historically, the periodic droughts, the erratic character of the rainfalls, soil limitations, and other environmental constraints did not allow the establishment of intensive agriculture, but stimulated grazing for animal production. Currently, about 19 percent of the cattle herd, 50 percent of the sheep herd, and 90 percent of the goat herds in Brazil are raised in what was once Caatinga. The grazing system is predominantly extensive, overgrazing is the dominant factor, fire is commonly used to prepare the soil for planting, and production indexes are the lowest in the country.

In the last two decades, desertification has advanced quickly, seriously threatening the Caatinga ecosystem. Main threats include the removal of vegetation for fuelwood and charcoal production for the residential, industrial, and agricultural sectors. Charcoal is used in the iron and steel industries, and fuelwood for households and gypsum kilns. Over-grazing and over-farming, soil erosion, and slash-and-burn by farmers and ranchers, are also major threats.

---

41 Lleras, Eduardo. "Caatinga of North-Eastern Brazil". Centres of Plant Diversity. 3: The Americas. Smithsonian Institute. Archived from the original on 3 March 2016

42 Eiten, G. (1983). Classificaço da vegetaço do Brasil. CNPq/Coordenação Editorial, Brasília

43 A soil geochemical background for northeastern Brazil Jörg Matschullat1*, Silke Höfle1 , Juscimar da Silva2 , Jaime Mello3 , Germano Melo Jr.4 , Alexander Pleßow1 & Clemens Reimann5

44 Ab'Sáber, A.N. (1977). Potencialidades paisagisticas brasileiras.Universidade de São Paulo, São Paulo.

Deforestation and unsustainable irrigation practices have added to the salinization of the soils and increased the incidence of drought. Desertification has resulted in disruptions of water flows and poor quality of water sources, which in turn affects the health of human and animal populations. In addition, less than one percent of the Caatinga biome is protected, and of the few established conservation units, many are inoperative due to lack of consolidation.

4.2.1 Water resources.

The northeastern region has the lowest average annual rainfall in Brazil, less than 400 mm a year. Compared with other semi-arid regions of the world, where it rains between 80 and 250 mm per year, the Brazilian semi-arid is the rainiest on the planet and the most densely populated. As is natural for semi-arid regions, this volume of rainfall is lower than the evapotranspiration index, which in the Brazilian semi-arid region is 3,000 mm per year. This causes a water deficit that is extremely challenging for those who live on agriculture and animal husbandry in the region. A large part of the smallholding farmers in this region practice rainfed, that is, unirrigated agriculture.

Another important aspect in relation to the scarcity of water relates to the irregularity of the precipitations during the year. Rainfall, besides being low, is concentrated in certain months, even days. This irregularity brings serious problems for agriculture, livestock, humans and the environment.

In a region where the rivers virtually dry for several months a year, groundwater reserves as well as built reservoirs become of utmost importance. Groundwater is relatively abundant over about 50% of the Northeast region. However, the presence of crystalline soils in 70% of the northeast limits the supply of underground aquifers, while shallow soils present problems of water storage. Since the presence of water in the context of crystalline rocks of the semi-arid is naturally limited in time and space, its retention is achieved with reservoirs of varying sizes.

The hydrological efficiency of the reservoirs is estimated in 1/5 of the stored volume, due to the high evaporation rates. In addition, intense evaporation causes salination of the stored water. It is worth mentioning that the high losses by water evaporation and salination of the reservoirs are associated with little stimulation of appropriate planning and management of the reservoirs. When properly designed and operated, salinization and evaporation rates can be significantly reduced. For instance, the installation of flushing devices at the bottom of reservoirs can extract salinized water deposits at the end of the dry periods, which creates space for accumulation of fresh water during the next rainy season. The same operating scheme could transform a salinized well water into fresh water by pumping it at the end of the dry season.

It is important to note that most existing wells do not have the expected characteristics of a geological engineering work, that is, constructed and operated within recommended technical standards. The lack of supervision and control needed at the federal, state and municipal levels undoubtedly has a great responsibility for the improvisation and empiricism, still very frequent, and lottery luck is attributed to the good result of a well.

4.2.2 Protected areas

According to the National System of Conservation Units (SNUC) framework, a protected area is a generic term that designates protected areas comprising both territorial spaces and environmental resources. The Caatinga is poorly represented in the Brazilian Conservation Area network, with only 1% in Integral Protected Areas and 6% in Sustainable Protected Areas. There are 25 federal protected areas in the Caatinga, 14 of Integral Protection and 11 Sustainable Use protected areas, which cover a little over 4% of the biome (as can be seen in Figure 1).

About 27 million people live in the region, most deprived and dependent on the biome's resources to survive. The states of Bahia and Ceará together encompass about 50 percent of the Caatinga (70 percent of Ceará's population and 50 percent of Bahia's population are within its boundaries). The caatinga biodiversity covers several economic activities geared towards agrosilvopastoral and industrial purposes.

The exploitation made by the local population since the occupation of the semi-arid region has led to a rapid environmental degradation. About 70% of the caatinga is already affected by human activities with 45% of its area deforested, the Caatinga is the third most degraded biome in the country, after the Atlantic Forest and the Cerrado. The Caatinga is a mosaic of thorn scrub and seasonally dry forests, with more than 2000 species of vascular plants, fishes, reptiles, amphibians, birds, and mammals. Endemism in these groups varies from 7% to 57%. However, only 7% of its area is protected in protected areas. Less than 1% of its area is in integral protection units (such as Parks, Biological Reserves and Ecological Stations), which are the most restrictive to human intervention.

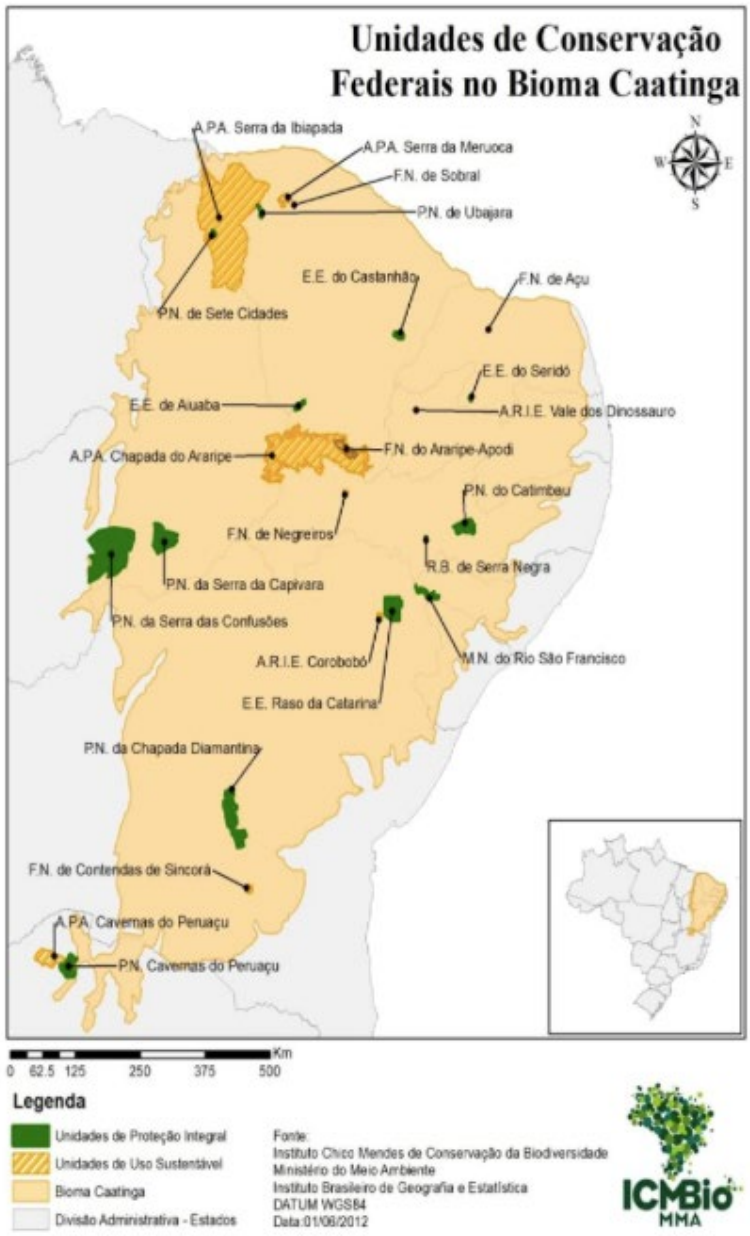


Figure 1. Map of Federal Protected Areas in the Caatinga

Economic development has fragmented the native biome in the past. Estimates on the amount of Caatinga transformed affected by economic development range 25-50%, so the PCRP will promote the protection of ecosystem services and productivity of farmers reducing the pressure over native forests.

As part of the development of the TRIPs eventual protected areas and their buffer zones will be mapped in detail, and the communities will be trained in protection and eventual sustainable use regulations and in co-management measures to ensure that all proposed intervention are in line with these. In case interventions are to be developed on areas which allow it, they must strictly follow the respective management plan or support development of one if lacking. TRIPs will include an updated ESMP to ensure monitoring and verification of compliance to respective management plans.

5. CLIMATE CHANGE

5.1 Context

The 27 million inhabitants of the Caatinga have profound problems with food production and food security, in large part because of droughts (there have been four in the last ten years). The 1977-79 drought resulted in widespread food scarcity, the death of an estimated 500,000 people (4 percent of the Brazilian population at the time), and the out-migration of three million others from the region. More recently, the drought of 1979-83 affected eighteen million people; almost 80 percent of crop yields were lost in some parts of the Northeast, and the Government spent approximately US$1.8 billion in emergency programs.

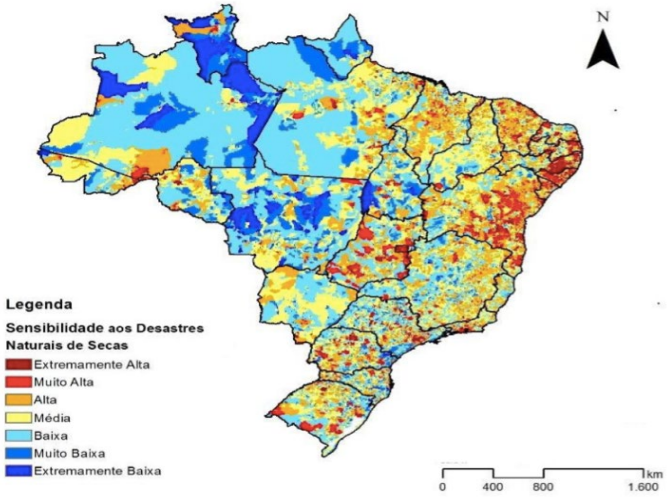


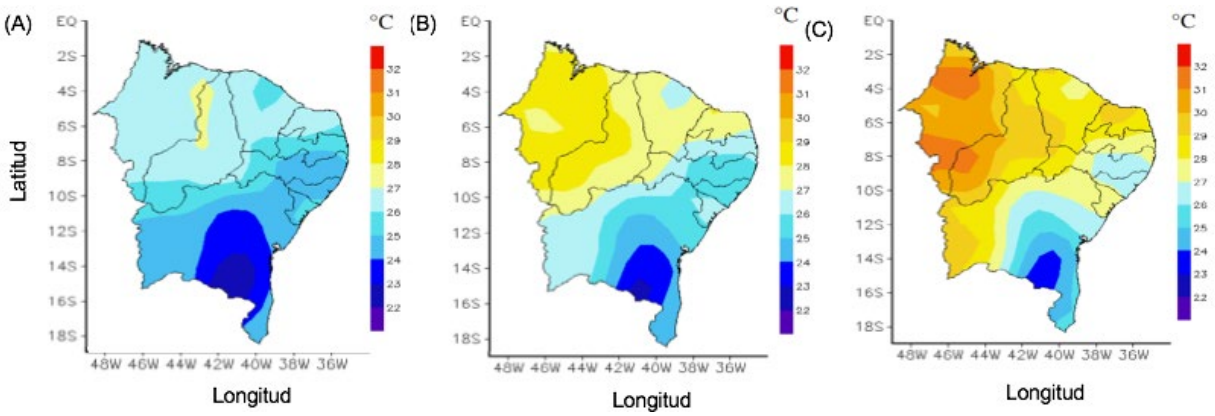
Figure 2. Sensibility to Drought Natural Disasters. (From top to bottom) Extremely High; Very High: High: Medium; Low; Very Low; Extremely Low (Source: MMA & WWW, 2017)

National and international surveys and climatic data from the Brazilian semi-arid region correlates with the happenings showing a gradual increase in average temperatures and a decrease in rainfall. Climate change affects the various areas of the semiarid with different intensity and frequency, but the regional trend shows an overall decrease in rainfall and rising temperatures as shown in Figure 1.

Moreover, spatial distribution of the annual average temperature in the Northeast region of Brazil as presented in the figure 3 also associates the severe droughts with results obtained in the COSOP 2016 document "Climate Change and Impacts on Family Farming in North and Northeast of Brazil".

Where (A) is the average annual temperature for the period 1961-2007. (B) the scenario annual average temperature for the year 2050. And (C) the scenario annual average temperature for the year 2100.

Figure 3. Droughts results 1961 - 2007



The northeast region of Brazil[45] composed primarily of the states of Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, and Bahia is semi-arid with average average minimum and maximum temperatures between 21.23°C and 30.85 °C respectively; it is qualified as a tropical dry climate. This region can get much hotter during the dry season, has a short, erratic rainy season from March to May, and annual rainfall averages of 390 to 1,550 mm. The coolest months on average are June and July and the warmest is October. Lowest minimum temperatures can be found in the central area of the State of Bahia, while maximums concentrate primarily in the most northern states.

(A) (B)

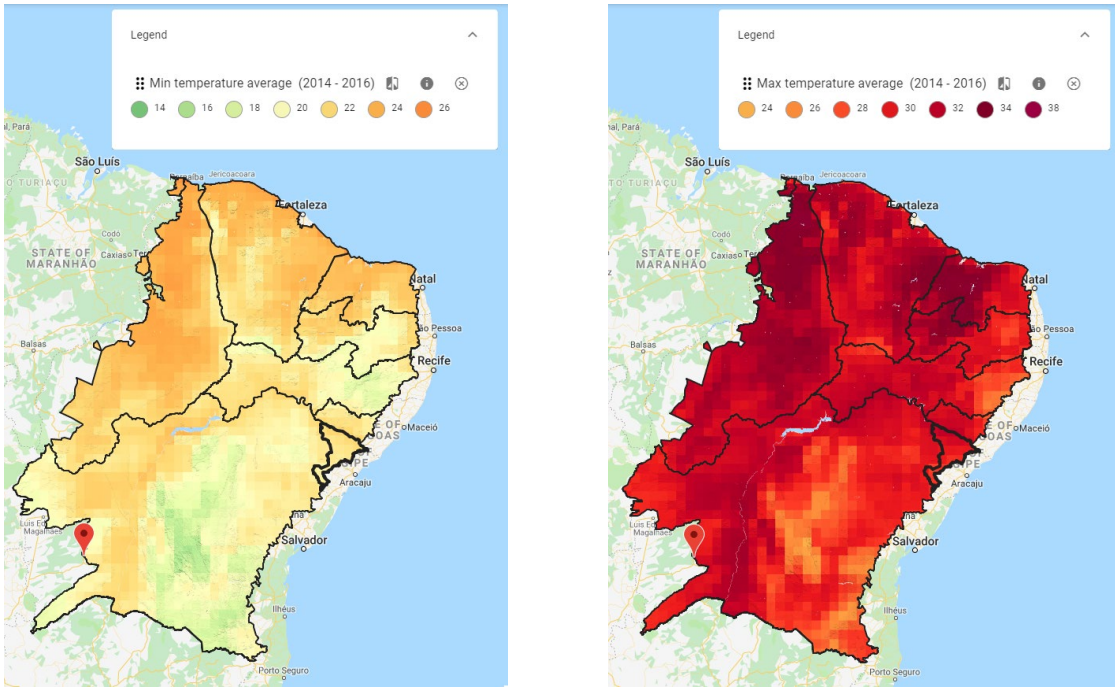


Figure 2 Min (a) and Max (B) average temperature 2014-2016

For Semiarid NEB between 1989 and 2016, minimum average temperature has increased by 0.76°C; while maximum average temperature has increased by 1.25°C. During that period the Semiarid portion of Bahia's max temperature increased by 1.58°C up to 29.9°C; of Piaui by 2.05°C up to 32.3°C; of Ceará by 0.88°C up to 31.78°C; of Rio Grande do Norte by 0.51°C up to 32.02°C; of Paraiba by 0.45°C up to 30.72°C; of Pernambuco by 0.68°C up to 30.44°C; of Alagoas by 0.70°C up to 29.63°C; and of Sergipe by 0.96°C up to 29.32°C.[46]

45 The Resolution 115 of 23/11/17 from Sudene defines the Semiarid by the following characteristics: i) Average annual rainfall of 800 mm or less; ii) Thornthwaite Aridity Index equal to or less than 0.50; and iii) Daily percentage of water deficit equal to or greater than 60%, considering all days of the year.

46 Important variations may occur at district level; information has been developed up to ADM2 and is presented in FAO EarthMap plataform for all available data sets.

(A) (B)

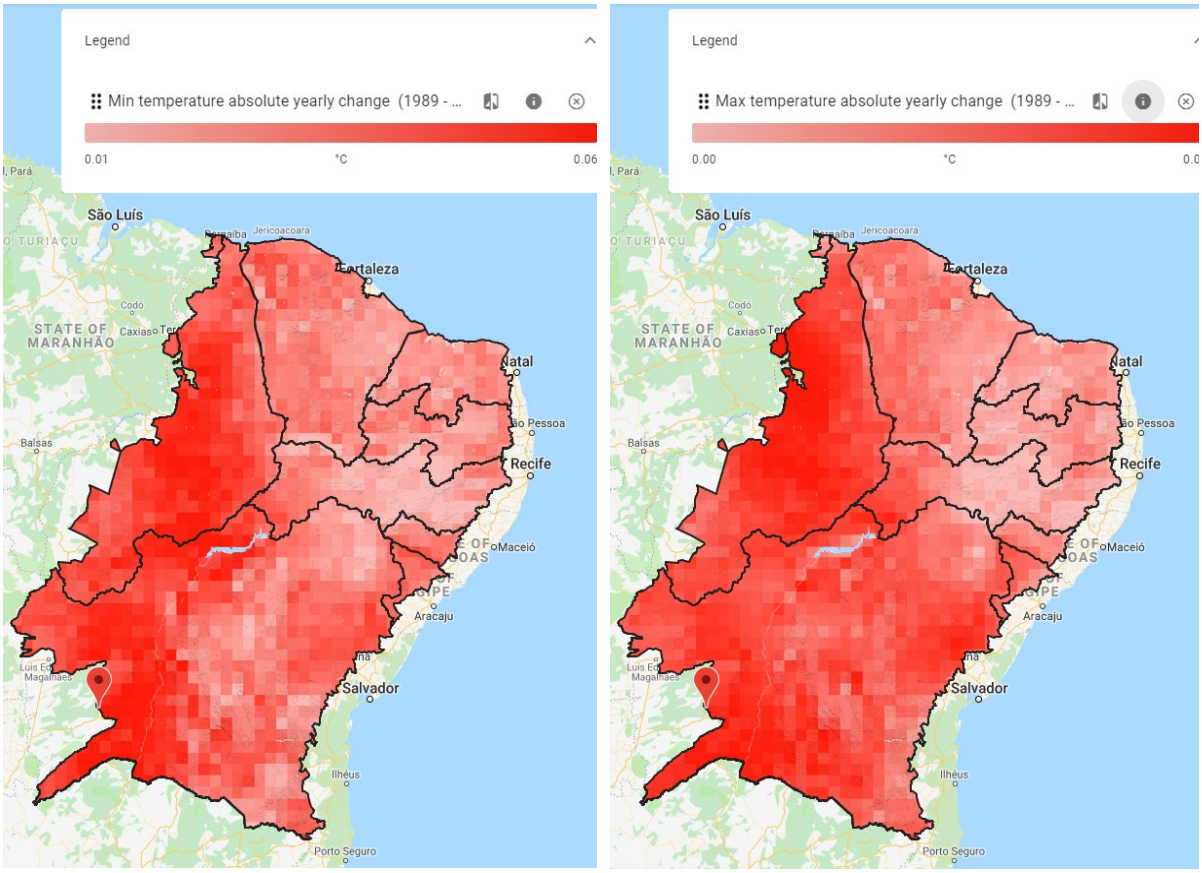


Figure 3 Min (A) and Max (B) temperature absolute yearly change 1989 – 2016[47]

Average annual rainfall for the entire project area is about 645 mm, the Semiarid NEB presents great variability in rainfall distribution with average rainfall variations ranging from 390 mm in districts like Retirolandia, Valente, and Gaviao to 1,550 mm in districts like Barras, Batalha, Mucambo and Graca (Figure 4 (A)). Generally, the driest period is from June to September, with August and September presenting the lowest average rainfall. Average Annual precipitation has reduced by approximately 74 mm between 1981 and 2018. During that period the Semiarid portion of Bahia's average anual rainfall decreased by 91.70 mm to 548.47 mm; of Piaui by 66.30 mm to 760.22 mm C; of Ceará by 85.90 mm to 735.41 mm; of Rio Grande do Norte by 46.14 mm to 671.25 mm; of Paraiba by 4.69 mm to 693.02 mm; of Pernambuco by 57.55 mm to 570.30 mm; of Alagoas by 60.98 mm to 673.36 mm; and of Sergipe by 120.01 mm to 734.49 mm.

47 European Centre For Medium-Range Weather Forecasts (ECMWF), 2016.

(A) (B)

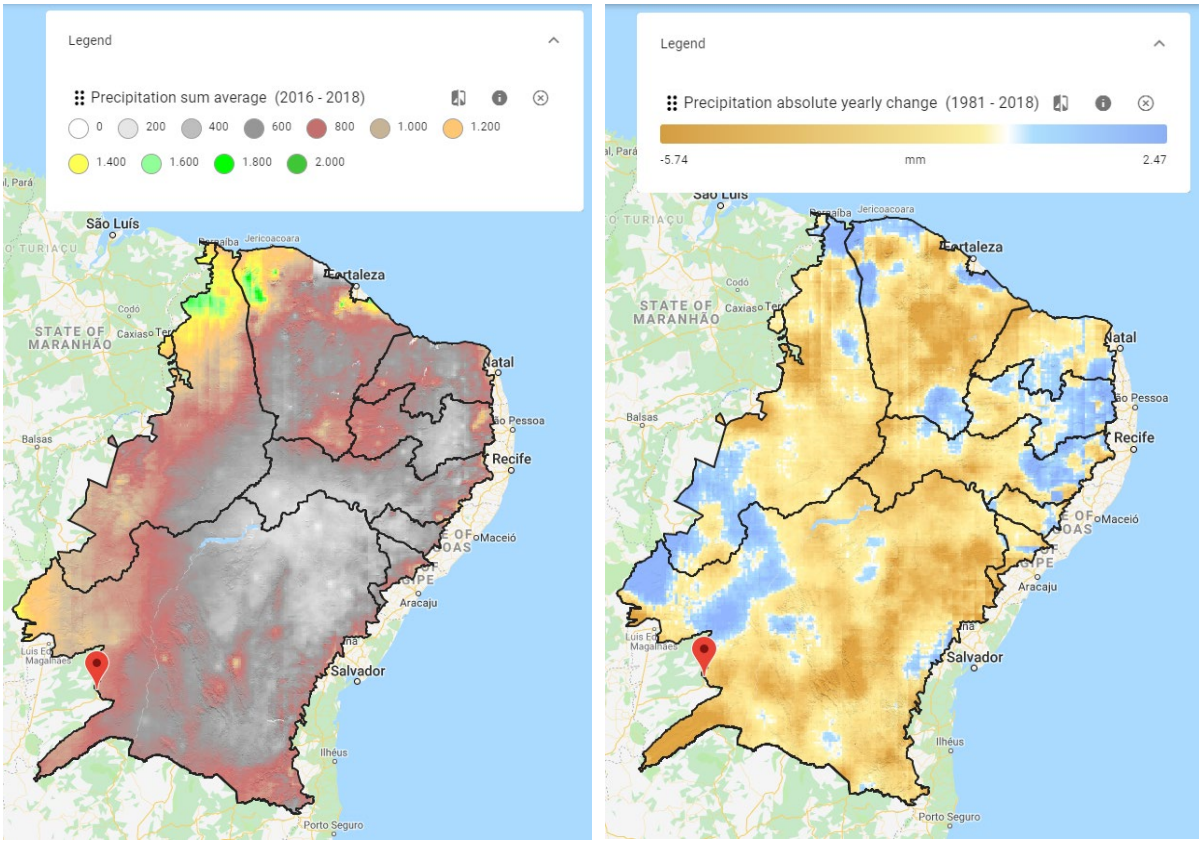


Figure 4 (A) Precipitation sum average 2016 - 2018[48]; (B) Precipitation absolute yearly change (1981-2018)[49]

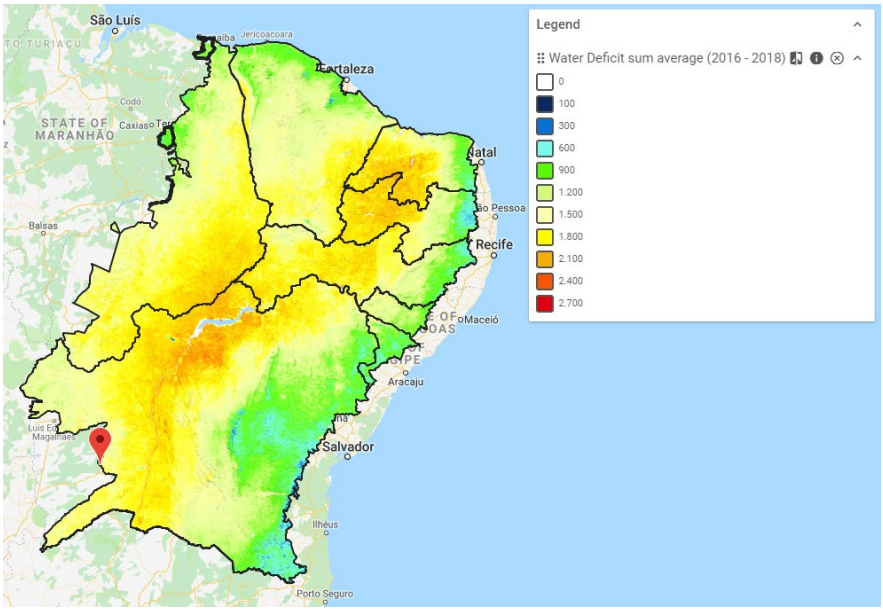


Figure 5 Climatic water deficit sum average 2016 – 2018[50]

48 CHIRPS: Climate Hazards Group InfraRed Precipitation with Station data (version 2.0 final)
49 Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS v2)
50 LP DAAC derived from processing MOD16A2 MODIS/Terra Net Evapotranspiration 8-Day L4 Global (500m), version 6

The region is highly affected by climatic water deficit (figure 5) deriving from high annual evaporation. Average Climatic water deficit has grown from 2001 to date by 65.62 kg/m^2 with important peaks in 2012 and 2015 reaching a deficit of up to 1 709.33 kg/m^2. The areas most affected are low lying inland terrains highly vulnerable to droughts. Within Semiarid NEB, water bodies represent less than 1% of total land cover; while the highest percentage of territory is shrubs at approximately 36%; another 19% are dry forests, 17% is grassland. Bahia and Piaui, are the states with highest concentration of areas suffering from annual fires, as well the areas with most access forest resources.[51]

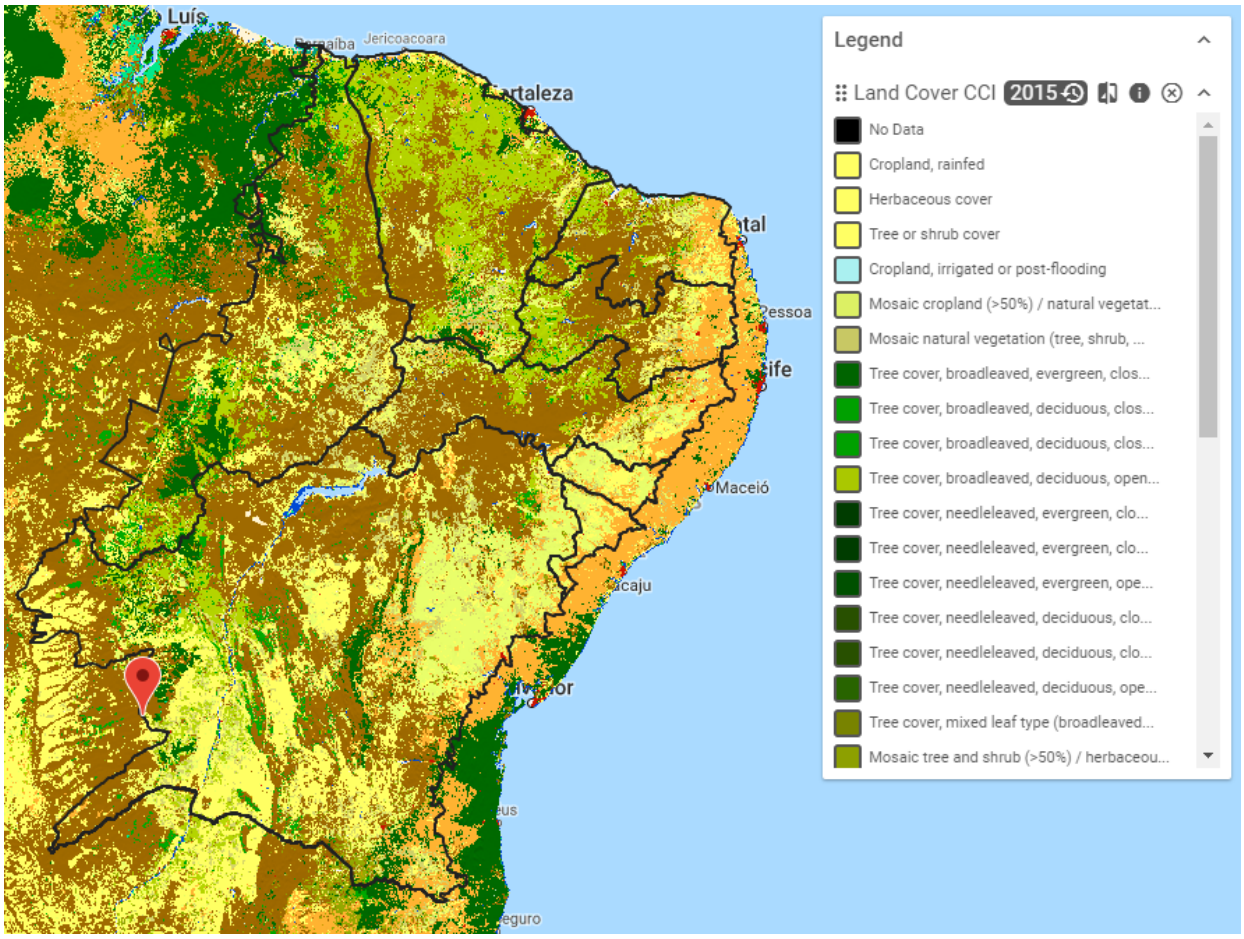


Figure 6 Land Cover [52]

51 MCD64A1.006 MODIS Burned Area Monthly Global 500m
52 ESA Land Cover CCI (300 m spatial resolution)

(A) (B)

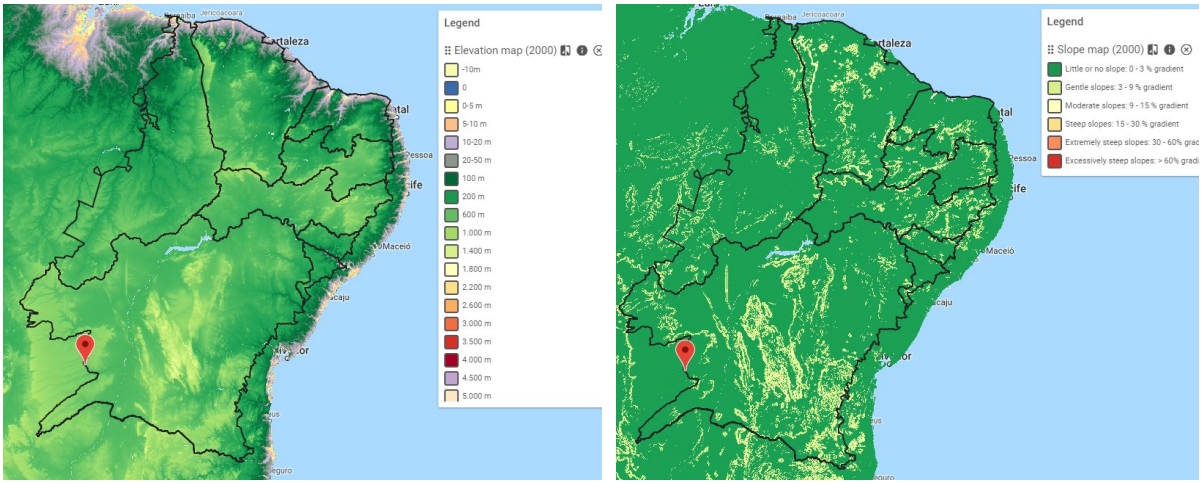


Figure 7 (A) Elevation Map of NEB[53], and (B) Slope

Figure 8 presents anomalies regarding minimum and maximum temperatures, and precipitation. These are calculated by comparing average records between the period 2013 – 2017 against the period 1989 – 2017, and presented in deviation by pixel for each select data set. Important variations in temperature and precipitation where perceived and coincide with statistics on the 2011-2016 drought having areas of Semiarid NEB with monthly max temperature deviations of up to 2.47°C and monthly precipitation deviations ranging from approximately -90.28 mm to 117.00 mm.

(A) (B) (C)

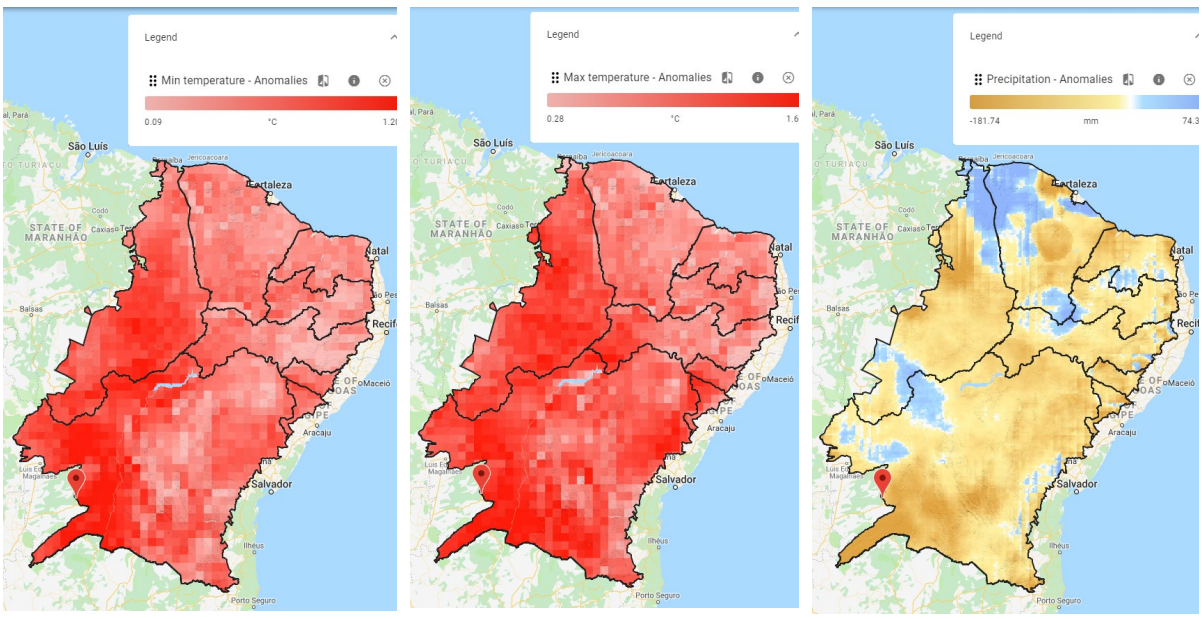
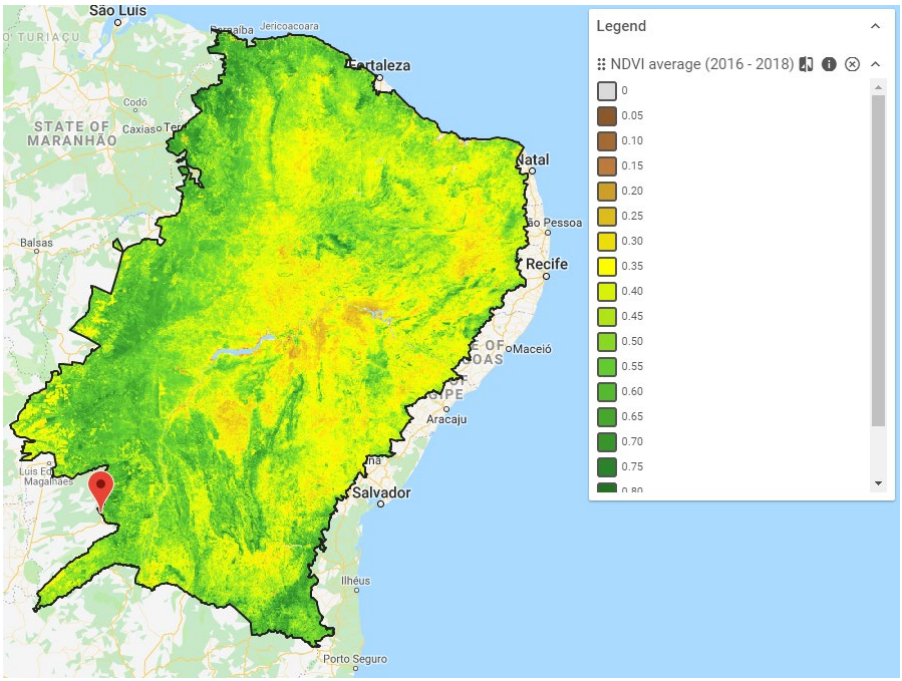


Figure 8 (A) Min and (B) Max[54] temperature anomalies; (C) Precipitation anomalies[55]

53 SRTM Digital Elevation Data Version 4
54 ECMWF Dekadal Minimum and Maximum Temperature
55 CHIRPS pentad: Climate Hazards Group InfraRed Precipitation with Station data (version 2.0 final)

Normalized Difference Vegetation Index (NDVI) provides an alternative measure of vegetation amount and condition. Figure 7 presents the average NDVI for the period 2016-2018 (A) and the absolute yearly change between the period 2001-2018 (B). As can be seen, most portions of the Semiarid NEB have suffered consistent reductions in NDVI for the analyzed period. Notwithstanding the negative trend and high risk of tree loss (figure 10) under a BaU RCP 8.5 scenario; the region also has an important capacity to support restoration of tree cover under adequate management policies and practices.

(A)



(B)

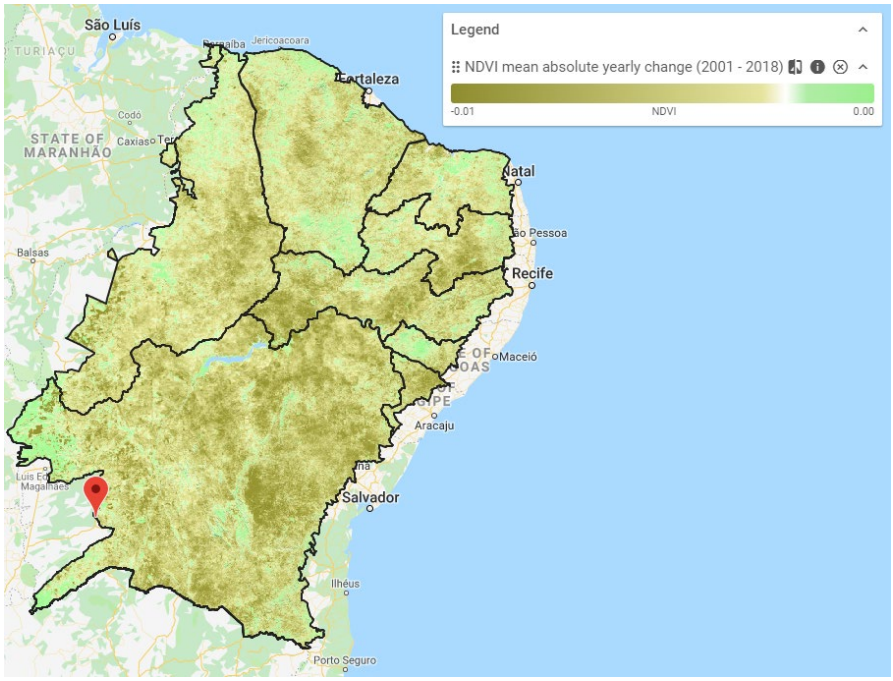


Figure 9 (A) NDVI Average 2016 - 2018; (B) NDVI mean absolute yearly change[56]

(A) (B)

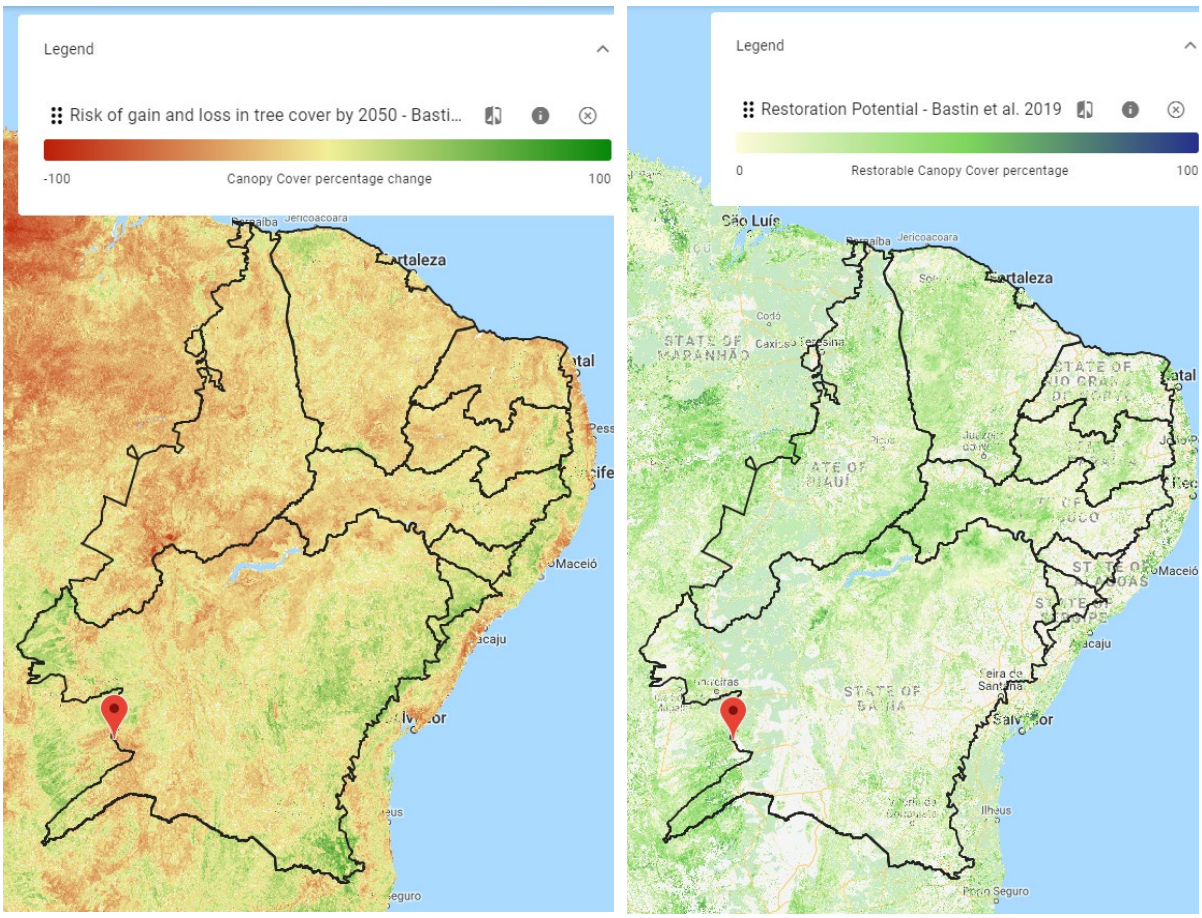


Figure 10 (A) Risk of gain and loss in tree cover under a "BaU" scenario RCP 8.5; and (B) restoration potential[57]

56 LP DAAC derived from processing MOD13A1 Vegetation Indices 16-Day L3 Global
57 The global tree restoration potential (Bastin et al. 2019)

5.2 Climate change scenarios and impacts

The project will take place in the Semiarid region of Northeast Brazil (NEB),[58] a region hosting 27 million people[59] The rural semiarid of the nine northeastern States are where IFAD has been supporting rural development for the past 25 years. The northeast region has experienced secular chronic problems related to water scarcity, with periodic droughts. Nonetheless, the drought that affected this region during 2011-2016 is considered the worst in the past 100 years and has exacerbated many social problems through the indebtedness of farmers, migration, disease, and malnutrition.[60, 61] The estimated economic losses of this drought event are in the order of US$ 6 billion in the agricultural sector alone.[62] "Climate change and variability are among the main threats to socio-ecological sustainability in many semi-arid regions. High levels of social vulnerability in the northeast of Brazil make this region one of the most susceptible to the impacts of climate change in the country."[63] It is possible to identify an increase in temperature from 1901 to 2000 of about 0.8 °C in NEB, and an important acceleration in warming during the last three decades. An analysis on drought events that occurred in the Semiarid from 1981 to 2016[64] reveals that drought intensity for the last 36 years has been increasing, and that recent droughts were more frequent, more severe and affected a larger area with significant impacts for population, as well as economical activities. The northeast region has experienced secular chronic problems related to water scarcity, with periodic droughts. Nonetheless, the drought that affected this region during 2011-2016 is considered the worst in the past 100 years and has exacerbated many social problems through the indebtedness of farmers, migration, disease, and malnutrition.[65, 66] The estimated economic losses of this drought event are in the order of US$ 6 billion in the agricultural sector alone.[67]

The Brazilian National Institute for Space Research (INPE) has been providing the government with regional climate scenarios by downscaling global climate models. Four sets of downscaling simulations based on the Eta Regional Climate Model forced by two global climate models, the HadGEM2-ES and the MIROC5, and two RCP scenarios—8.5 and 4.5, have been carried out[68].

Projections point to the warming of the entire continent. For the Northeast region, accordingly, the simulations (HadGEM2-ES and MIROC5 for two RCP scenarios—8.5 and 4.5) predicted a temperature increase from 0.5 – 2.0ºC in the period 2011- 2040 compared to a baseline period of 1961-1990[69]. It is expected that the interior – which is already becoming drier – would be more affected than the coastal areas.[70] Despite the rise of precipitation in the summer, the projected annual cycle shows a dominating annual **reduction of rainfall in the region**.

58 The Resolution 115 of 23/11/17 from Sudene defines the Semiarid by the following characteristics: i) Average annual rainfall of 800 mm or less; ii) Thornthwaite Aridity Index equal to or less than 0.50; and iii) Daily percentage of water deficit equal to or greater than 60%, considering all days of the year.
59 Ministry of Integration webpage, available at: http://www.integracao.gov.br/semiarido-brasileiro
60 Gutiérrez APA, Engle NL, De Nys E, Molejon C, Martins ES (2014) Drought preparedness in Brazil. Weather Clim Extremes 3:95– 106. doi:10.1016/j.wace.2013.12.001
61 Marengo, Jose A., et al. "Climatic characteristics of the 2010-2016 drought in the semiarid Northeast Brazil region." Anais da Academia Brasileira de Ciências 90.2 (2018): 1973-1985.
62 Marengo, Jose A., Roger Rodrigues Torres, and Lincoln Muniz Alves. "Drought in Northeast Brazil—past, present, and future." Theoretical and Applied Climatology 129.3-4 (2017): 1189-1200.
63 Patricia S. Mesquita & Marcel Bursztyn & Hannah Wittman, 2014. "Climate Variability in Semi-arid Brazil: Food Insecurity, Agricultural Production and Adjustment to Perceived Changes"
64 Brito, SSB; et.al. Frequency, duration and severity of drought in the Semiarid Northeast Brazil region, International Journal of Climatology, 2017.
65 Gutiérrez APA, Engle NL, De Nys E, Molejon C, Martins ES (2014) Drought preparedness in Brazil. Weather Clim Extremes 3:95– 106. doi:10.1016/j.wace.2013.12.001
66 Marengo, Jose A., et al. "Climatic characteristics of the 2010-2016 drought in the semiarid Northeast Brazil region." Anais da Academia Brasileira de Ciências 90.2 (2018): 1973-1985.
67 Marengo, Jose A., Roger Rodrigues Torres, and Lincoln Muniz Alves. "Drought in Northeast Brazil—past, present, and future." Theoretical and Applied Climatology 129.3-4 (2017): 1189-1200.
68 CHOU, S.C.; et.al. Assessment of Climate Change over South America under RCP 4.5 and 8.5 Downscaling Scenarios. **American Journal of Climate Change**, v. 03, p. 512-527, 2014.
69 Chou, SC; et.al. Assessment of Climate Change over South America under RCP 4.5 and 8.5 Downscaling Scenarios. American Journal of Climate Change, v. 03, p. 512-527, 2014.
70 International Policy Centre for Inclusive Growth (IPC-IG) Working Paper No.141; UNDP, 2016. " Climate change and impacts on family farming in the North and Northeast of Brazil"

Furthermore, an **increase in the length of consecutive dry days** and wide climate variability are common features in these and other simulations for the NEB[71]. Dry summer months are expected to perceive a moderate increase between 2 and 6 ºC in NEB[72]. Impacts are expected to grow exponentially within a range temperature increase of approximately 4.5 ºC for the period 2041 and 2070, in line with IPCC projections.

A more specific study in the Northeast confirmed the findings of the South American downscaling scenarios discussed above. Both station data analysis and numerical simulations (for the periods of 1960-2000 and 2010-2050) revealed **trends of increasing maximum temperature** and **diminishing precipitation**. The water-balance calculations showed reduced soil moisture availability and total rainfall. The atmospheric model simulations were consistent with the station data regarding the present warming; the climate change scenarios for 2010-2050 indicated a faster increase of daily maximum temperature over the Northeast compared to that simulated for the recent past.[73]

An analysis on drought events that occurred in the Semiarid region of Northeast Brazil from 1981 to 2016[74] reveals that drought intensity for the last 36 years has been increasing and that **recent droughts were more frequent, more severe and affected a more substantial area** with significant impacts for population, as well as economic activities. Drought intensity was measured by three indicators: duration, which equals the number of months of the event; frequency, the number of events per period; and severity, which measures the absolute negative value of the hydro-meteorological and agricultural indexes used.

When modelling surface and groundwater supplies per water basin, the results for the Northeast region are alarming, **estimating a sudden reduction in flows by 2100** in the river basins that supply the region: *São Francisco, Atlântico Norte e Nordeste* and *Atlântico Leste*. Such a scenario is of particular concern, given that the Northeast's interior is already becoming drier and experiencing a seven-year continuous cycle of prolonged severe droughts from 2011-2017[75]. It is also the area where family farming is concentrated and currently faces the country's most significant challenge regarding poverty eradication.[76] Projections estimate possible losses of up to 79.6% in agro-productive areas and subsequent increase in food insecurity and health issues due to climate change and maladaptive practices. (CEDEPLAR-FIOCRUZ, 2008). There is a significant correlation between average precipitation and agricultural production, but the effect is statistically significantly higher for crops produced by family farmers than average agricultural production. The average crop area lost due to droughts in the 1990-2016 period was 221,973 hectares per year.[77]

Due to climate change, staple food crops, such as beans, corn and cassava, can suffer productivity losses up to 5% by 2030 in the Northeast, and some scenarios project that manioc can even disappear from the region[78]. Projections indicate that while most crops including coffee, sugarcane, oranges and cotton will be affected maize and wheat will be the most severely impacted. (USAID, 2018) Main issues affecting agricultural productivity will arrive from increasing temperatures, changes in amount and distribution of rainfall, and increased droughts intensity and occurrence, maladaptation practices derived from agricultural intensification (e.g. with sub sequent deforestation

71 LACERDA, F. F.; et.al. Long-term Temperature and Rainfall Trends over Northeast Brazil and Cape Verde. **Journal of Earth Science & Climatic Change**, v. 6, n. 8, p. 296, 2015.
72 INPE. 2015. "Cenários de Mudanças Climáticas: Regionalização." Unpublished. São José dos Campos: Instituto Nacional de Pesquisas Espaciais.
73 RIBEIRO NETO, A; ROLIM DA PAZ, A; RAIMUNDO DA SILVA, E. Impactos e vulnerabilidade do setor de recursos hídricos no Brasil às mudanças climáticas. In: BRASIL. MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E INOVAÇÃO (Eds) **Modelagem Climática e Vulnerabilidades Setoriais à Mudança do Clima no Brasil**. Brasília, Ministério da Ciência, Tecnologia e Inovação, (p. 189 – 240), 2016.
74 BRITO, S. S. B.; et.al. Frequency, duration and severity of drought in the Semiarid Northeast Brazil region, International Journal of Climatology, n. 2017, 2017.
75 RIBEIRO NETO, A; ROLIM DA PAZ, A; RAIMUNDO DA SILVA, E. Impactos e vulnerabilidade do setor de recursos hídricos no Brasil às mudanças climáticas. , In: BRASIL. MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E INOVAÇÃO (Eds) **Modelagem Climática e Vulnerabilidades Setoriais à Mudança do Clima no Brasil**. Brasília, Ministério da Ciência, Tecnologia e Inovação, 2016. p. 189 – 240.
76 IFAD - IPC-IG. Climate change and impacts on family farming in the North and Northeast of Brazil, Working Paper No.141, Brasília, IPC-IG, UNDP, IPEA, IFAD, 2016. (This study was commissioned and paid for by IFAD).
77 Young, Carlos Eduardo, 2019.
78 MACHADO FILHO, H. et al. **Climate change and impacts on family farming in the North and Northeast of Brazil. Working Paper 141**. Brasília: IPC-IG/UNDP; IFAD - Semear; IPEA, 61 p., 2016. (This study was commissioned and paid for by IFAD).

and soil erosion) will further affect NEB and its agricultural sector. This negative consequence is particularly relevant considering that the current productivity in the semiarid is already low; hence any further losses would mean a more significant threat to food security in the region, with consequent repercussions on both local and national food security.

From 2017 to 2030 a 10% precipitation reduction scenario could cause an average annual loss of R$ 96.7 million in family farmer's agriculture production value. If the rainfall reduction is 20%, these losses increase to annual loss of R$ 193.3 million in family farmer's agriculture production value.[Error! Bookmark not defined.] Besides, the **expected climate changes may exacerbate** other environmental problems that already affect family farming in the semiarid, like animal breeding, wild plant gathering, soil degradation, pests, dissemination of diseases and weeds and desertification.

5.3 **Adaptation**

Low income family farmers, the target group of this project, face very harsh and difficult conditions for developing productive and sustainable livelihoods. NEB is considered the most vulnerable region to climate change in the country,[79] Family farms account for almost all (generally over 90%)[80] of agricultural properties in the drylands of Brazil. These farms are usually smallholdings, with a significant proportion of them covering less than twenty hectares[81]. Despite some variants,[82] they generally blend annual dryland agriculture harvesting food crops – mainly maize, beans and cassava – for home consumption and sale, in addition to raising livestock-. Families often have backyard gardens, a few fruit trees and poultry. Few also have small irrigated areas. There are 2 million family farms employing over 6.5 million people in the Northeast, covering a total of 28 million ha, which represent 52% of the value of production and 87% of the total labor in the sector.[83]

In the Semiarid, brackish or salty groundwater is common. Around 25% of wells have freshwater (< 500 mg/l TDS[84]), 33% are brackish (501 to 1,500 mg/l TDS), and 42% salty (> 1,500 mg/l TDS).[85] Thus an estimated 75% of the wells in the Semiarid are unfit for human consumption.

The climate change vulnerabilities are a result of the following sensitivity and adaptive capacity factors that exacerbate the impacts of climate change: 1) high poverty incidence and low absorption capacities of climate and economic shocks, 2) water scarcity and poor quality, 3) inadequate productive practices which further degrade the soil, and 4) deforestation of the Caatinga Biome depleting the ecosystem services. Superimposing the temperature rise, increase in droughts and rainfall variability upon pre-existing social-economic vulnerabilities place intense pressure on freshwater availability and quality in the region translating into losses of arable land, desertification, increased food insecurity and reduced local economic activities that lower farmers' income and result in rural exodus.

79 WWF and MMA. Índice de Vulnerabilidade aos Desastres Naturais Relacionados às Secas no Contexto da Mudança do Clima. 2017.
80 A study of the São Francisco do Sertão Territory in Bahia State shows that 90.7% of the properties consist of family farms (Articulação-Nacional-de-Agroecologia, 2018). In the Chapada do Vale do Itaim Territory of the Sertão in Piauí State, this reaches 92.7 % (SIDERSKY, 2017).
81 Using data from the 2006 Census of Agriculture 2006 conducted by the Brazilian Institute for Geography and Statistics (IBGE), a study of the São Francisco do Sertão Territory in Bahia State showed that 62% of the farms and ranches in this Territory cover between 0 and 20 hectares.
82 Particularly in Piauí, Ceará and Rio Grande do Norte States, there are areas where cashew tree groves are often found on family farms, in addition to shifting food crop plots and livestock. There is a territory in Bahia State where almost all family farms have areas set aside for perennial sisal plantations.
83 Agricultura familiar no Nordeste: uma análise comparativa entre dois censos agropecuários / Carlos Enrique Guanziroli, Alberto Di Sabbato, Maria de Fátima Vidal. – Fortaleza: Banco do Nordeste do Brasil, 2011. 172p.
84 TDS – Total Dissolved Solids.
85 MME-CPRM-SERVIÇO-GEOLÓGICO-DO-BRASIL. Projeto Cadastro da Infra-Estrutura Hídrica do Nordeste. Relatório Preliminar - 1ª Etapa - 225.000 km2 - Versão Beta. Brasília: MME-CPRM-Serviço-Geológico-do-Brasil. Available at: https://www.cprm.gov.br/publique/media/hidrologia/m apas_publicacoes/cadastramento_fontes_semiarido_brasileiro.pdf. 2003.

5.4 Mitigation

Brazil has the world's sixth largest greenhouse gas (GHG) emissions, releasing in 2016 2.3 billion tons of carbon dioxide equivalent (CO_{2e}), compared with 2.1 billion in 2015. In 2016 emissions were 8.9% higher than 2005, distancing the country from its Paris goal of reducing 37% of its carbon emission by 2025 compared to 2005 levels.[86] GHG emissions in Brazil are largely due to forest and grassland conversion, followed by the agricultural and fossil fuel combustion. Land-use change and agriculture accounted for 73% of all the carbon that was emitted in 2016.[87]

Total emissions in the nine states of the Northeast accounted for a quarter of Brazil's total emissions (591.4 $MtCO_2e$) in 2016. Land use, land-use change and forestry (LULUCF) with 381.8 $MtCO_2e$ (65%) was the major cause of emissions, followed by agriculture with 106.9 MtCO2e (18%) and energy with 102.7 MtCO2e (17%). Land-use change, specifically the deforestation of the Caatinga biome, represented almost 5% of the carbon emissions (28.2 $MtCO_2e$). With 93.7 $MtCO_2e$ emitted, enteric fermentation represented 88% of the agricultural emissions and 16% of the emissions in the Northeast.

Finally, with 102.7 $MtCO_2e$ emitted, the energy sector emissions in the Northeast are largely caused by fuel production, energy generation, road transport and the industrial sub-sector. Renewable biomass from waste material such as coconut husk, cashew nut shells as well as wood from sustainably managed forest plantations and agroforestry systems could be vital to helping the Northeastern states move towards more renewable sources of energy and halt deforestation of the Caatinga.

The project will contribute to the shift to low-emission sustainable development pathways by obtaining reduced emissions from land use, deforestation, forest degradation, and through sustainable forest management, and conservation and enhancement of forest carbon stocks. CRPS principles and practices will eliminate the slash and burn as a method of land clearing and will increase production of biomass and carbon sequestration. To implement the CRPS proposed, a reduction of free-roaming livestock, fodder storage as well as pasture rotation will be promoted. Stratified systems with trees can provide benefits to ruminant farms, since trees can be source of shade and shelter improving productivity by reducing heat stress in tropical climates. In addition, some tree species produce leaves and pods which are highly palatable to animals and are available during the dry season when pastures are of low nutritional quality. Native trees of the Caatinga improve weight gain and milk production.[88] Well managed pastures can improve the ecosystem services provided by the Caatinga, such as micro-climate regulation, carbon sequestration and fixation, pest and disease control, provisioning of water, the decomposition of wastes, natural pollination of crops and other plants and provisioning of raw materials (such as timber, oil seeds and fruits).

5.5 Climate risk category

The project is classified as "high risk" in accordance with IFAD guidelines and standards. This categorization responds to the review of current and projected climate impacts and vulnerability of NEB. It is affected by increased interannual variability of rain cycles, aggravated droughts, and is also affected by significant watershed and land degradation. The target population, rural smallholder and subsistence farmers are particularly affected due to their lack of access to resources to adapt to or recover from extreme climate event impacts. Climate change will potentially exacerbate the current low development in the region, for which the project must ensure adequate integration of adaptation and mitigation measures with a shift from "do no harm" towards "do more good". Financing from the GCF is crucial to overcome a vicious circle of poverty, underdevelopment and exposure to climate variability.

86 CarbonBrief, 2018
87 The Greenhouse Gas Emissions and Removals Estimates (SEEG), 2018. Available at: http://seeg.eco.br
88 Araújo Filho, J. A. Manejo pastoril sustentável da caatinga. Recife, PE: Projeto Dom Helder Camara, 2013. 200 p.

6. RELEVANT POLICIES AND REGULATORY FRAMEWORK

6.1 Relevant Policies

The policies and programs that interact with the PCRP are described in the following paragraphs.

6.1.1 Poverty Reduction and Family Farming

The most prominent poverty reduction program is *Bolsa Família*, a conditional cash transfer program created Federal Government in 2004. It consists of financial assistance to poor families with pregnant women, children and teens between 0 and 17 years old with extremely poor per capita income.[89] The Program has three main axes: (a) income transfer to promote immediate poverty alleviation; (b) conditions that reinforce access to basic social rights in education, health, and social assistance; (c) and complementary programs to strengthen families, so the beneficiaries can overcome their social vulnerabilities.

Other federal Program is the National Program for Strengthening Family Farming (PRONAF), that was plaunched in 1996. In 2003 it was transformed to finance investments and current spending loans for individual and/or groups of family farmers in seventeen different modalities, including specific credit lines for women and youth. The program is operated through public banks, with the Bank of the Northeast (*Banco do Nordeste – BNB*) being the main financial agent in the North-eastern region. The program budget in 2017 was R$ 27 billion to finance investments and short-term loans for family farmers.

In addition to *Bolsa Familia* and PRONAF, other important programs which target family farmers include:

a) the Agrarian Reform Program (*Programa Nacional da Reforma Agrária - PNRA*), under the responsibility of the National Institute for Colonization (INCRA), settles and registers families claiming land in the Unified Registration (*Cadastro Ún*ico);

b) the Agrarian Credit Program (Programa do Crédito Fundiário – PCF), a credit program that allows rural farmers to acquire their land to combating rural poverty and strengthen family farming;

c) the Harvest Guarantee (*Garantia Safra*) Program, which allows families to receive a compensation in case of loss of harvest due to persistent drought or excess of rains;

d) the Family Agriculture Price Guarantee Program (*Programa de Garantia de Preço da Agricultura Familiar - PGPAF*), which sets minimum prices for the main products of family agriculture;

e) Proagro Plus Insurance (*Seguro Proagro Mais*) which protects credit takers of PRONAF in case of harvest loss. It is a multi-risk insurance, covering losses due to climatic adversities and diseases or pests while recognizing traditional production methods of family farmers, such as intercropping, traditional, local or creole cultivars.

f) Food Purchase Program (*Programa de Aquisição de Alimentos – PAA*) creates an institutional market for products produced by family farmers and their organizations through a bidding system. The acquired products are donated to social institutions (hospitals, care institutions, schools) and people in situations of food and nutritional insecurity (who receive food baskets), or are destined to the formation of public stocks.

89 Extremely poor households are defined by a monthly per capita revenue between R$89 up to R$178.

g) National School Meal Program (*Programa Nacional de Alimentação Escolar – PNAE*), requires that at least 30% dos of resources spent on school meals be acquired by Family farmers and cooperatives, and works with simplified procurement processes.

Other credit programs not necessarily oriented for family farmers, but that may also are be available to them are: i) ABC Program for investments to reduce CO_2 emissions in agriculture; ii) Agriculture Modernization and Natural Resource Conservation Program[90]; iii) Promotion of Technological innovation in agricultural production Program[91]; iv) Program for Building and Expansion of Storage Infrastructure[92]; v) Agricultural Machinery Modernization Program[93]; vi) Incentives for Irrigation and Greenhouse Production Program[94]; and vii) Other credit lines for Cooperatives. The Bank of Brazil and BNDES are the main financial agents in public sector and usually provide funds for some of the Programs and credit lines already mentioned. As mentioned above, the Banco do Nordeste is also an active financial agent in the north-eastern region.

To stimulate the production and consumption of native products the federal government launched the National Plan to promote Socio-Biodiversity Supply Chains[95] and the Policy to Guarantee Minimum prices for Socio-biodiversity Products.[96] These programs identified 17 species used by gatherers (the so-called 'extractivists') communities from several biomes and guarantees a minimum value when the market price is lower than the minimum price established by the National Supply Company (*Companhia Nacional de Abastecimento – CONAB*).

6.1.2 Food and Nutrition Security

The Project is consistently aligned with the main policies and priorities for food and nutrition security at the national level.

The National Plan for Food and Nutrition Security (*Plano Nacional de Segurança Alimentar e Nutricional – PLANSAN*) is the main instrument of the Brazilian National Policy on Food and Nutrition Security.[97] The Plan summarizes the proposed actions to be taken by the federal government to respect, protect, promote and guarantee the right to adequate food to all Brazilians. The PLANSAN is guided by the National Policy on Food and Nutrition Security (PNSAN) and is built in an inter-sectorial manner by the Inter-ministerial Chamber of Food Security and Nutrition (CAISAN), that includes 21 ministries, on the basis of the priorities established by the National Council for Food and Nutrition Security (*Conselho Nacional de Segurança Alimentar e Nutricional – CONSEA*). Building on the achievements of the first Plan, and especially on its multisectoral approach, the PLANSAN II enhances its focus on key issues, such as: strengthening of agroecological food systems; supporting indigenous peoples and traditional communities' access to public policies, especially those related to family farming; increasing the public purchase of food products from family farming – by strengthening PNAE and PAA; recognizing the significant contribution of women in agriculture and family farming, especially in the conservation of natural resources, and enhancing their access to public policies and; strong concern for availability of safe and clean water, including the revitalization of watersheds and springs.

6.1.3 Indigenous Peoples and traditional communities

The Brazilian Constitution assures the rights of the indigenous peoples. Their lands and rights to the lands are defined in the concept of original rights that are prior to the creation of the State itself. This is a result of the historical recognition that the indigenous peoples were the first occupants of Brazil. The constitution furthermore

90 Programa de Modernização da Agricultura e Conservação de Recursos Naturais – Moderagro.
91 Programa de Incentivo à Inovação Tecnológica na Produção Agropecuária – Inovagro.
92 Programa para Construção e Ampliação de Armazéns –PCA.
93 Programa de Modernização da Frota de Tratores Agrícolas e Implementos Associados e Colheitadeiras – Moderfrota.
94 Programa de Incentivo à Irrigação e à Produção em Ambiente Protegido – Moderinfra.
95 Plano Nacional para a Promoção das Cadeias de Produtos da Sociobiodiversidade.
96 Política de Garantia de Preços Mínimos para os Produtos da Sociobiodiversidade.
97 Established by Decree no.7.272 / 2010. PLANSAN I (2012-2015) was launched in 2015, followed by PLANSAN II (2016-2019).

sets out that the protection of indigenous peoples rights fall under federal governments' protection. [98] On an international level, Brazil has ratified the Convention 169 and voted in favor of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

Established in 2007, the National Policy for the Sustainable Development of Traditional Peoples and Communities (*Política Nacional de Desenvolvimento Sustentável dos Povos e Comunidades Tradicionais – PNPCT*) seeks to promote the sustainable development of traditional peoples and their communities, including indigenous peoples. One of the main implementation tools of the PNPCT is the Sustainable Development Plan, which aim to inform and guide the implementation of the Policy. In 2012, the Brazilian government launched the National Policy for Environmental and Territorial Management of Indigenous Lands (*Política Nacional de Gestão Territorial e Ambiental de Terras Indígenas – PNGATI*). The Policy calls for the environmental protection and full participation of indigenous peoples in all processes that affect their lands, assuring them the right of being informed and consulted, in a proper way, before taking any actions in indigenous territories. The policy also provides for the participation of representatives of indigenous peoples in institutions in charge of regional and national environmental policies that affect their territories.

6.1.4 Water Access

As explained above, the semi-arid north-eastern region has age-old water scarcity problems which have been addressed, to greater or lesser extent, by a number of government programs and policies. A major infrastructure project, which is still being implemented, is the transposition of the São Francisco River, which started in 2007 and parts of which were inaugurated in 2017. This project diverted water from the San Francisco River to benefit 12 million people in four north-eastern states.

Both the One Million Cisterns Program by MDS and the Freshwater Program by MMA are billed to be key partners in this Project. The Cisterns Program, financed by the Ministry of Social Development (MDS) - actual Ministry of Citizenship (MC) since 2003, targets low-income rural families, affected by drought or lack of water, and residing mainly in the semiarid region. The program currently supports the deployment of more than 15 different types of 'social technologies'[99]. Since its creation, more than 1 million water 'social technologies' have been implemented with Program support, including 877 thousand plate cisterns for household consumption, 145 thousand cisterns for food production and 5 thousand school cisterns. The Freshwater Program by the Environment Ministry, implements a permanent public policy aimed at accessing good quality water for human consumption in low-income populations of the semiarid, through the implementation, recovery and management of desalination systems since 2004. State Plans have the goal of serving 25% (2.5 million people) of the rural population of the semiarid by 2019. In the 2nd phase of the Freshwater Program (2019-2024), the goal is to have installed 1,727 desalination systems and to implement 103 'biosaline' productive units, benefiting approximately 1.19 million people.

Other water access program worth noting are the Sustentar Program and Salta-Z supported by FUNASA/Ministry of Health. These programs seek the sustainability of sanitation actions in rural areas, through the training of managers and operators in diverse alternatives of management, operation, maintenance and water quality control

98 Constitution from 1988, chapter VIII. Source: https://pib.socioambiental.org/en/Constitution

99 The concept of social technology (ST) ('Tecnologias Sociais' in Portuguese) was developed in Brazil during the decade of 2000. Although there is no official definition for this concept, it can be defined as a way to design, develop, implement and manage technology oriented to solve social and environmental problems. In more practical terms, STs are understood as products, techniques or methods that have a low cost and can be replicated, developed and/or applied in interaction with a community, which represent social transformation solutions through the sustainable use of local resources. Examples of STs are: small rainwater harvesting cisterns for domestic use and larger ones for backyard garden irrigation, ecological cooking stoves (*ecofogões*), farm water reservoirs (*barreiros trincheira*), household greywater treatment systems (*sistema bio-água de reuso*), underground water barriers (*barragens subterrâneas*).
(FERNÁNDEZ, L. et al. Synergies and trade-offs between climate change mitigation and adaptation strategies: lessons from social technologies in the semiarid region of Bahia, Brazil, Latin America. **Latin American J. Management for Sustainable Development,** v. 3, n. 1, p. 1-18, 2016; and REDE-DE-TECNOLOGIA-SOCIAL, Ed. **Tecnologia Social e Desenvolvimento Sustentável: contribuições da RTS para a formulação de uma política de Estado de Ciência, Tecnologia e Inovação**. Brasília, DF: Secretaria Executiva da Rede de Tecnologia Social (RTS)ed. 2010.

of the water supply systems. In addition, the Sustentar Program involves the community served, with education in health and environmental sanitation. The National Water Agency (*Agência Nacional de Águas – ANA*) indirectly stimulates the Payment of Environmental Services policy, and directly supports the construction of infiltration terraces and basins, the re-adaptation of vicinal roads, the recovery and protection of springs, the reforestation of permanent reforestation of permanent protection areas and legal reserves, environmental sanitation, rural sanitation projects and collection and recycling of waste as a way of preserving water resources.

The National Policy to Combat Desertification and Mitigation of Drought Effects and its instruments, as well as the National Commission to Combat Desertification (CNCD), were sanctioned in July 2015. This law instructs how to map and diagnose desertification processes, including land degradation in arid, semiarid and dry sub-humid areas resulting from various factors and vectors, including climatic variations and human activities.

6.1.5 Climate Change

In 2015, Brazil submitted its Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC). Brazil is committed to reducing greenhouse gas (GHG) emissions by 37% below 2005 levels by 2025 and, as a subsequent indicative contribution, to reducing GHGs by 43% below 2005 levels by 2030. The Government of Brazil (GoB) is committed to the implementation of its NDC, including full respect for human rights and the rights of vulnerable communities, indigenous peoples, traditional communities and workers in sectors affected by corresponding policies and plans, and is promoting gender-transformational measures. The Federal Government is equally committed to achieving its NDC targets as it works to eliminate extreme poverty and reduce inequality. A large part of the NDC target is based on reducing emissions from deforestation and degradation (REDD).

The NDC goals reaffirm some prior Brazilian commitments and update others. Indeed, most of the Brazilian targets are already embedded in existing laws and national plans. Including them in the NDC is important to inform the international community about Brazil's ambitions to strengthen and consolidate these policies in domestic debates and to attract investment to meet the goals.

The NDC's goal of restoring and reforesting 12 million ha (7 million ha of tree plantation plus 5 million ha of restoration) will be accomplished by complying with its Native Vegetation Protection Law ("Forest Code"), and the subsequent National Plan for Restoration of Native Vegetation (PLANAVEG). According to the Forest Code, some set-aside areas - e.g. Legal Reserves (*Reservas legais - RLs*) and Permanent Preservation Areas[100] (*Áreas de Preservação Permanente - APPs*) – for conservation can be sustainably harvested and include the partial use of exotic species, such as pines and eucalyptus, interplanted with native species, which could mitigate the cost of restoration and even provide profits. The implementation of PLANAVEG should contribute to the achievement of this commitment, regarding the recovery of the native vegetation of APPs and RL and areas of low agricultural productivity.

PLANAVEG applies the same logic used to define the national recovery goal of 12 million ha to regionalize this amount among the six Brazilian biogeographic regions. The values indicate that most of the defined recovery goal is concentrated in the Amazon and Atlantic Rainforest (76%), while the *Cerrado* represents 17%, the *Caatinga*, 4% (500,000 ha), and the remaining 3% divided among the *Pantanal* and *Pampa*. PLANAVEG recognizes that in the family agriculture context, "the implementation of agroforestry systems for the composition of Legal Reserves can also contribute to food security, nutrition, income, health, shelter, social cohesion, energy resources, and environmental sustainability." Other relevant instruments of the Forest Code are the Environmental Rural Registry (*Cadastrro Ambiental Rural - CAR*) and the Environmental Compliance Program (*Programa de Regularização Ambiental – PRA*).

100 APPs are mandatory on hilltops, steep slopes, coastal shrublands, mangroves, wetlands, around springs, and along watercourses and reservoirs.

The social dimension is at the core of Brazil's adaptation strategy, bearing in mind the need to protect vulnerable populations from the negative effects of climate change and enhance resilience. In this context, Brazil is working on the design of new public policies, through its National Adaptation Plan (*Plano Nacional de Adaptação à Mudança do Clima – PNA*), in its final elaboration phase. The strong involvement of stakeholders, at all levels, will contribute to the formulation and implementation of Brazil's National Adaptation Plan.

In this context, the country National Adaptation Plan puts forward cross-sector adaptation strategies to address the wide range of risks that climate change is creating and is the means to implement the adaptation aspect of the National Determined Contribution. The National Adaptation Plan also will establish guidelines to implement adaptive measures to increase climate resilience in 11 sectors and themes.

The NDC presents the strengthening of the Low Carbon Emission Agriculture Program (*Plano ABC – Agricultura de Baixa Emissão de Carbono*) as the main strategy for sustainable agriculture development and commits to restoring 15 million ha of degraded pasturelands, enhancing 5 million ha of integrated cropland-livestock-forestry systems and restoring and reforest 12 million ha of forests by 2030. The ABC Plan is one of the sectorial plans devised under the National Policy on Climate Change. Its overall objectives are: reducing greenhouse gas emissions in agriculture; improving the efficiency in the use of natural resources; increasing the resilience of production systems and rural communities; and promoting adaptation to climate change in the sector. One of the main instruments of the policy is the National Plan of Agroecology and Organic Production (*Plano Nacional de Agroecologia e Agricultura Orgânica – PLANAPO*), known under the name of 'Agroecological Brazil', that was conceived with the participation of various sectors of civil society.

6.2 Regulatory Framework

6.2.1 Environment

The Brazilian legal system had its first environmental milestone with the edition of Law nº 6.938/81, which instituted the National Environmental Policy (PNMA). PNMA has instituted the environment as a specific object of protection, as well as the National Environment System - Sisnama, a set of bodies able to plan an integrated action for the sector. In addition, it established the obligation of the polluter to repair the damage caused and the user to contribute by the use of environmental resources for economic purposes (art. 4th, VII), without prejudice to administrative sanctions (art. 14, §1º).

Subsequently, the Federal Constitution of 1988 dedicated a chapter to the environment, imposing a duty on the public authorities and the community to defend the environment and preserve it for present and future generations (art. 225). Article 225 also imposes on the public authorities several obligations in order to ensure the effectiveness of the right to the ecologically balanced environment, among them the preservation and restoration of essential ecological processes and the promotion of ecological management of species and ecosystems (§1st). It also obliges individuals or legal entities that practice conduct and activities considered harmful to the environment to repair environmental damage caused, without prejudice to criminal and administrative sanctions (§3rd).

Other legal acts, such as laws, decrees, resolutions and ordinances, also address environmental issues and form the set of environmental standards in Brazil. Such rules may be either federal, state or municipal, since the Union and the States have concurrent competence to legislate on forests, nature conservation, soil and natural resource protection, pollution control and others (art. 24, VI , CF), and municipalities have the power to legislate on matters of local interest (art. 30, II, CF).

And yet, the executive competence to protect the environment is common among Union, States, Federal District and Municipalities (CF, art. 23, VI). Thus, these entities can and should enforce environmental standards, and also promote liability actions against those who do not comply with current environmental legislation.

6.2.1.1 Flora

The protection of the flora is guaranteed by the CF to the extent that it is up to the Government to ensure the right of all to the environmentally balanced environment. Thus, the CF prohibits practices that endanger their ecological function or cause the extinction of species (art. 225, §1, VII).

Prior to CF, forests and other vegetation were already protected by provisions of the Forest Code, Law nº 4.771/65. Law nº 12.651/2012[101] has recently dealt with the issue, providing for the protection of native vegetation and repealing numerous norms through sensitive modifications to the forest protection regime.

The new Forest Code then maintained the determination of forest replacement, already regulated by Decree nº 5.975/2006, which provides that it is the compensation of the volume of raw material extracted from natural vegetation by the volume of raw material resulting from forest planting for generation of forest cover or recovery, being mandatory for the natural or legal person that uses forest raw material from natural vegetation suppression or that holds the authorization of natural vegetation suppression (art. 13 and 14).

One of the forms of flora protection is the obligation of environmental authorization for vegetation suppression and its consequent forest replacement. In this sense, the law stipulates that the suppression of native vegetation for alternative land use, whether public or private domain, will depend on the registration of the property in the CAR (Rural Environmental Registry)[102] and prior authorization of the competent state agency of Sisnama (art. 26).

6.2.1.2 Specially Protected Territorial Areas

a) Permanent Preservation Areas

Article 225 of the CF determined as the responsibility of the Government, the definition, in all units of the Federation, of territorial spaces and their components to be specially protected (§1, III).

Within this concept, the new Forest Code (Law nº 12.651/2012) defined the Permanent Preservation Area (APP) as the protected area, covered or not by native vegetation, with the environmental function of preserving water resources, the landscape, geological stability and biodiversity, facilitating the gene flow of fauna and flora, protecting the soil and ensuring the well-being of human populations (art. 3º, II). These spaces, among which we can highlight the marginal strips of watercourses; the surroundings of artificial springs and reservoirs; the restingas; the tops of hills; and slopes greater than 45º are subject to specific regulation.

t is important to respect the non-suppression of PPAs given that the Environmental Crimes Law typifies the action of destroying or damaging forests considered permanent preservation, even if in formation, or using it in violation of protection norms, with penalty of detention and fine (art. 38 of Law nº 9.605/98).

b) Legal Reserve

Another especially protected territorial space is the so-called Legal Reserve. The Legal Reserve is the area located inside a rural property or possession, with variable length according to criteria established in the code itself. The Legal Reserve's function is to ensure the sustainable economic use of the rural property's natural resources, to

101 Provides for the protection of native vegetation; amends Laws nº 6.938/81, 9.393/96 and 11.428/2006; repeals Laws nº 4.771/65 and 7.754/89, and Provisional Measure nº 2.166-67/ 2001.

102 Created by Law nº 12.651/2012 and recently regulated by Decree nº 8.235/2014 and Normative Instruction MMA nº 02/2014, the CAR is an instrument of the National Rural Environmental Registry System (SICAR), mandatory electronic registration for all rural properties, which Its purpose is to integrate environmental information regarding the status of the PPAs, Legal Reserve areas, forests and remnants of native vegetation, Restricted Use Areas and consolidated areas of rural properties and holdings in the country.

assist in the conservation and rehabilitation of ecological processes and to promote the conservation of biodiversity, as well as the shelter and protection of wildlife and native flora (art. 3rd, III, of Law nº 12.651/ 2012).

c) Conservation Units

In addition to APPs and Legal Reserves, Conservation Units are also classified as specially protected territorial spaces.

Conservation Units were created by Law nº 9.985/2000, which established the National System of Conservation Units (SNUC), and are defined as territorial spaces and their environmental resources, including jurisdictional waters, with relevant natural characteristics, legally established by the Government, with conservation objectives and defined limits, under special management regime, to which adequate guarantees of protection apply (art. 2nd, I).

The SNUC Law has divided Conservation Units into two groups with specific characteristics: (i) integral protection units, including the Ecological Station, the Biological Reserve, the National Park, the Natural Monument and the Wildlife Refuge; and (ii) sustainable use units that include the Environmental Protection Area, the Area of Material Ecological Interest, the National Forest, the Extractive Reserve, the Fauna Reserve, the Sustainable Development Reserve and the Private Natural Heritage Reserve.

The same provision also defined the obligation for almost all species of Conservation Units to have a management plan, buffer zones and ecological corridors.

Regarding the so-called buffer zones, the SNUC Law defines them as being around a conservation unit, where human activities are subject to specific rules and restrictions, with the purpose of minimizing the negative impacts on the unit (art. 2nd, XVIII), and its limits may be defined in the act of creation of the unit or later (art. 25, paragraph 2nd).

- Brazil has also specific legal instruments for biodiversity conservation, such as National Biodiversity Policy – Decree nº 4.339/2002,
- National Program for Biological Diversity
- National Biodiversity Commission - Decree 4703/2003),
- Decree 2519, which enacts the Convention on Biological Diversity (CBD).

6.2.1.3 Water Resources

The Federal Constitution determined that it is competence of the Union to establish a national water resources management system and to define criteria for granting rights to its use (art. 21, XIX).

In this sense, Law nº 9.433/97 was enacted, which established the National Water Resources Policy (PNRH) and created the National Water Resources Management System (SNGRH). The Law also established principles, objectives, guidelines and instruments for the management of water resources. It should be noted the observance of two fundamentals of PNRH: the multiple use of water and the recognition of water as a good of economic value, that is, its use through financial consideration (art. 1st, IV and V).

The first presupposes that water resources management provides for multiple water use, i.e. the water supply by the Union and the States must be in line with this principle. The management of water resources based on multiple use also presupposes that the use of water resources is granted, as these uses can often be concurrent, generating conflicts between user sectors or even environmental impacts.

The granting of rights to use water resources was regulated by CNRH Resolution nº 16/2001, which defined it as the administrative act by which the granting authority grants the grantee the right to use water resources, for a specified period (art. 1st).

The link between quality management and water quantity management occurs through the framing of water bodies in predominant use classes, because by fitting a body of water into a particular use class, therefore, if the maximum allowable concentrations of each pollutant in the same.

In this regard, the following standards must be observed: Decree nº 79.367/77, which provides for standards and the standard of water potability; Conama Resolution nº 274/2000, which provides for the classification of freshwater, brackish and saline waters throughout the National Territory, as well as determines the release standards; Conama Resolution nº 357/2005, which provides for the classification of water bodies and environmental guidelines for their framing, as well as establishes the conditions and standards of discharge of effluents; and Resolution CNRH nº 91/2008, which provides for the general procedures for the framing of surface and underground water bodies.

6.2.1.4 Environmental Licensing

Environmental licensing was instituted by Law nº 6.938/81 as one of the necessary instruments for the protection and improvement of the environment (art. 9th, IV), as it verifies the possibility of negative environmental impacts caused by the construction, installation, expansion and operation of establishments and activities that use environmental resources, as well as establishes the necessary measures for their prevention, repair and mitigation.

Environmental licensing is the procedure whereby the competent environmental agency licenses a potentially polluting activity after technical analysis, which imposes on the entrepreneur a series of measures aimed at maintaining the ecologically balanced environment. Thus, the scope of environmental licensing is to reconcile economic development with environmental preservation.

To discipline the environmental licensing aspects established in PNMA, Conama Resolution nº 237/97 was issued, which deals specifically with environmental licensing.

Failure to comply with any conditions, restrictions, requirements and environmental control measures defined by the environmental agency as conditioning factors may lead to the suspension or cancellation of the licenses related thereto, without prejudice to civil, administrative and, in certain cases, criminal liability.

a) Environmental licenses or permits

The Conama Resolution nº 237/1997 establishes all the steps that must be followed in the licensing process (art. 10) and defines the environmental licenses to be issued by the competent environmental agency, namely the Preliminary Licenses - LP, Installation - LI and Operation - LO (art. 8th).

The LP is granted in the preliminary phase of the project planning, where the environmental agency approves, through mandatory prior inspection, the location and design of the project, certifies the environmental viability from the analysis of possible environmental impacts and establishes the basic requirements and conditions. to be met in the next phases (art. 8th, I).

After analyzing the specifications contained in the plans, programs and projects presented, including the environmental control measures and compliance with the conditions established in the LP, the environmental agency will issue the LI, authorizing the installation of the project (art.8th, II).

Finally, the LO will be granted after the verification of the effective compliance with the conditions of the previous licenses, authorizing the operation of the project (art. 8, III), after verification of the effective compliance with what the previous licenses determine, such as the control measures. conditions and conditions determined for the operation.

It is emphasized that it is essential to observe the conditions, restrictions, requirements and environmental control measures required by the environmental agency as conditions in the licenses, given that their failure to comply may result in the cancellation of the license, civil and administrative liability and, in certain cases, criminal liability.

In addition to the licenses provided for in Conama Resolutionnº 237/97, the licensing process also requires the issuance of authorization for the capture, collection and transportation of fauna; land use certificate; authorization for vegetation suppression; authorization for archaeological prospecting and salvage and reserve of water availability / granting the right to use water resources, among others.

Specifically about this Project, an emergency measure has been taken by every state of the semiarid stating that all infrastructure works and activities aimed at mitigating the effects of droughts are either exempt of the environmental licensing process or have a simplified licensing mechanism in place. For avoidance of doubt, national legislation and the legislation applicable to the States must be observed; at time of design and implementation. The following activities considered in the project are usually exempted from environmental licensing and its necessity will be checked by BNDES and the states whenever approval is needed:

- Construction and installation of cisterns, dams and other equipment for the abstraction and retention of water of any kind, shape or model.
- Implementation of irrigated production systems using micro sprinkler or drip technology in areas of up to 1 ha (one hectare),
- Installation and recovery of wells up to 50 m deep, as well as artificial reservoirs, dams or barriers, with up to 2 ha of water surface;
- Purchase of animals with health certificates issued by the responsible bodies
- Works and services of soil correction;
- Construction of fences, corrals and machine sheds;
- Agricultural and livestock activities carried out in dry regions that are not subject to irrigation, will be exempt from environmental licensing according to the State Laws in the semiarid.

The activities contemplated in the project must comply with the following regulations at the federal and state levels:

Bahia

According to Law 10,431/2006, undertakings and activities necessary to mitigate the environmental, social and economic effects of an emergency or public calamity resulting from drought shall follow a specific procedure for simplified environmental licensing. The application for the simplified environmental licensing should be addressed to the Institute of Environment and Water Resources – INEMA.

Ceará

The State Council for the Environment- COEMA, through resolution No. 01 of February 2018 establishes a review of the procedures for Simplified Environmental Licensing for emergency works required to cope with drought in the State of Ceará. The State Superintendence of the Environment – SEMACE will proceed to the analysis of the framework of the application of the Resolution COEMA Nº 10 of June 11, 2015.

Paraiba

According to the administrative standard Nº 125 of 2015 issued by SUDEMA (Paraíba's environmental authority), cisterns, small dams and public works considered goods of common use - such as desalination facilities, are exempt from environmental licensing process provided they do not involve further deforestation or environmental degradation.

Pernambuco

Decree No. 38146 of 2012 establishes procedures for the Simplified Environmental Licensing of emergency works necessary to confront drought in the State of Pernambuco. The State Agency for the Environment - CPRH will analyze the framework of the application.

Piauí

The Secretariat of Environment and Water Resources - SEMAR will analyze the framework of the application of Decree No. 14921 from 2012 which regulates the Simplified Environmental Licensing for the same activities mentioned above.

Rio Grande do Norte

Institute of Sustainable Development and Environment of Rio Grande do Norte -IDEMA, through Ordinance No. 55 of 2013, resolves the activities and circumstances under which a Simplified Environmental Licensing applies.

Sergipe

The Council of Environment of the State of Sergipe- CEMA / SE will analyze the framework of the application of Administrative Standard. 01/2009.

6.2.2 Contribution to the regulatory framework and policies

The Project will help Brazil achieve its NDC and the targets of the Low-carbon Agriculture Program (ABC). CRPS principles are a viable option for smallholders to fulfil their legal obligations under the Brazilian Forest Code (FC). The Project will support beneficiaries to overcome the challenges they face (e.g., lack of technical support and incomplete fiduciary documentation) to fully comply with the national regulatory framework.

The project will strengthen regulatory frameworks by implementing the instruments established in Brazilian Forest Code (Law 12651/2012). The Forest Code governs the use and protection of private lands in Brazil. It is one of the most important pieces of legislation with the potential to drive efficient land use in Brazil and, in doing so, become an effective tool against climate change.

Under this Code, rural properties play an important role in biodiversity and natural resource conservation, as owners must maintain 20% native vegetation of their total land area in the *Caatinga* Biome. These "Legal Reserves" (LR) are intended to preserve forested areas and their ecosystems, thus contributing towards an enhanced ecological balance and avoiding deforestation emissions. In addition, rural properties have to map and leave Permanent Preservation Areas (APP in Portuguese) intact, being areas that have been designated for protection because they have been identified as critical to the preservation of essential ecosystem functions, such as the preservation of water resources, landscapes, geological stability, biodiversity, genetic flows for fauna and flora, soil protection and safeguarding the wellbeing of human populations. Examples of APPs are riparian zones, springs, hilltops, steep slopes and mangroves. Each rural landholding is thus required to have an environmental rural registry (CAR – the Portuguese acronym), which is an electronic register of georeferenced information about a rural property. The CAR integrates environmental information regarding the property (such as the LRs and APPs) to assist in monitoring and combating deforestation and degradation of native vegetation in private rural properties. The CAR is essential to access rural credit from financial institutions.

However, many properties have yet to meet these requirements: they either don't have a CAR yet or there is a deficit regarding the LR, or a degraded APP that cease to provide environmental services. Embrapa researchers found that family farmers face some particular barriers when it comes to the implementation of the forest code

such as low education level of the farmers, lack of technical support, and incomplete fiduciary documentation[103]. The small size of these farms is also an issue, as preserved areas are not fully available for cropping and grazing. In this general context, the extension agents providing support to the farmers in this Project will work with all beneficiaries to ensure they become (are) fully compliant with the forest code. Smallholding family farmers are entitled to a slightly more flexible rule, that enables them to include certain types of production within their LR. According to research, the CRPS principles proposed by the Project are a viable option for smallholders to both fulfil their legal obligations to conserve and/or restore land within the Forest Code and maximize livelihoods and other benefits[104]. The CRPS proposed here are completely aligned with the Low-Carbon Agriculture (ABC) program.

The Forest Code also established another instrument that has only been implemented by one state in Brazil (Mato Grosso do Sul), the *Cotas de Reserva Ambiental* (CRA, Environmental Reserve Quotas)[105]. The CRAs[106] are a market mechanism of offsetting that can be an effective conservation tool rewarding farmers that sequester carbon or avoid deforestation emissions[107]. This CRA market could potentially reduce the country's overall LR 'debt' by 56% [108]. Given the high costs of forest restoration, exchange of CRAs could become a cost-effective way to facilitate compliance, meanwhile protecting forest surpluses that might otherwise be legally deforested. A balanced use of CRAs should focus on improving functional and ecological attributes of forested landscapes, e.g., habitat integrity (and thus biodiversity), carbon stocks, and water balance regulation.

The Project will fund activities designed to facilitate the development of a roadmap to implement the CRA market. Depending on these roadmaps, additional studies may also be funded by the Project to define priority areas, flexible compensation rates, definition of ecological value among others. In addition, all families participating will obtain the CAR, an instrument that is crucial for the implementation of the Forest Code.

The Low-carbon Agriculture (ABC) program and the Forest Code are the two most important instruments for achieving the NDC. Once state regulators and extension agents understand the possibilities and benefits of the CRPS principles implemented by the Project, they will be better equipped to oversee and support the implementation of the new Forest Code (to other non-beneficiaries of the project) and the ABC program and therefore generate consistent services and policy.

6.3 Adherence to GCF principles

6.3.1 Consistency of the assessment with IFC Performance Standards (PS1-PS8)

For the sake of a better comparability and evaluation the ESMF will work with the GCF adopted performance standards, a comparability and equivalence table is presented in the following section.

The PCRP interventions analysis evaluated the convenience to trigger the following performance standards as a precautionary measure:

---

103 LOPES, S. R. M.; BRIENZA JR., S. A Regularização Ambiental e o Agricultor Familiar na Amazônia Legal a Partir da Lei Nº 12.651 de 2012. Belém, PA: Embrapa Amazônia Oriental, 2017.

104 MICCOLIS, A. et al. Restoration through Agroforestry: Options for Reconciling Livelihoods with Conservation in the Cerrado and Caatinga Biomes in Brazil Experimental Agriculture, n. 2017 - Online. Available at: https://doi:10.1017/S0014479717000138, p. 1 - 18, 2017.

105 GASPARINETTI, P.; VILELA, T. Implementando Mercados de Cotas de Reserva Ambiental (CRA): Desafios e oportunidades para as Regulamentações Estaduais. Documento de Discussão. Available on-line at: http://www.observatorioflorestal.org.br/content/uploads/2018/05/PORT_documento_de_discussao_CRA_CSF_Fev2018.pdf: Conservation Strategy 2018

106 Each Forest Reserve Credit represents one hectare (1 ha) of forest Legal Reserve, that is surplus to the amount required by law to be maintained in any given rural property.

107 The CRA market can potentially reduce the country's overall Legal Reserve 'debt' by 56%.

108 SOARES FILHO, B. et al. Cracking Brazil's Forest Code. **Science,** v. 344, p. 363 - 364, 2014.

6.3.2 **Performance Standard 1: Assessment and Management of Environmental and Social Performance**

Performance Standard 1 highlights the importance of managing environmental and social performance throughout the life of a project. The ESMF identifies the key risks at the design stage e.g. a list of potential negative impacts, that is subject to continuous enhancement during the course of project implementation. As a result the Environmental and Social Management System (ESMS) to be implemented should involve the engagement between the government, workers involve in the implementation and/or local communities potentially affected by the project.

The central project management unit CPMU, through PMEL, in coordination with other responsible government agencies and (potential) third parties will conduct a process of environmental and social assessment, and establish and maintain the ESMS i.e. SECAP, appropriate to the nature and scale of the PCRP and its potential changes in the course of implementation, and commensurate with the level of its environmental and social category. In line with PS 1 and IFAD SECAP the concept of continuous improvement will be an ongoing process throughout the life of the project, correcting and improving following a Plan-Do-Check-Act cycle (PDCA). Besides, the Environment and Social Management Plan (ESMP) and relevant studies will be disclosed along with the stakeholder engagement plan and the appropriate grievance mechanism.

In addition to meeting the requirements under the PS1, the PCRP will comply with applicable national and international laws as discussed in the previous section.

6.3.3 **Performance Standard 2: Labour and Working Conditions**

Performance standard 2 has been triggered in anticipation of the activities that will be funded in activities 1.1.2. Implement CRPS in family farms and backyard gardens, 1.1.3. Implement Collective Resilient Investments, 2.1.1. Build boardwalk cisterns for backyard gardens, 2.1.2. Implement social technologies to increase water in the field during periods of drought, and 2.1.3. Implement treatment and reuse systems for household wastewater.

All potential contractors or communities participating will be required to follow national occupational health and safety regulations and/or the WB EHS. PS2 will be reassessed at the implementation stage to determine if the work planned will require adjustments to avoid the use of child or forced labour, and identify risks in their primary supply chain that are under the scope and responsibility of the PCRP

6.3.4 **Performance Standard 3: Resource Efficiency and Pollution Prevention**

The project considers the implementation of Climate Resilient Productive System (CRPS) and also supports the construction of water harvesting storage and treatment facilities for waste water. CRPS promotes sustainable agriculture and will support good practice in fertilizers usage in the areas of influence of the project. The project will not support the use of pesticides. Also the water related infrastructure planned is very local and small in scale given the local needs.

However, the project will revert to the possibility to trigger this PS during the implementation phase to avoid any potential misuse of the resource and prevent pollution.

6.3.5 **Performance Standard 4: Community Health, Safety, and Security**

The PCRP promotes the practice of a climate resilient agriculture, nevertheless as part of the project execution, fertilizers may be used for increased crop productivity, or indirectly, by increasing the availability of short-term credit for farm inputs or water for irrigation, which may increase the use of fertilizers. However careful selection of the type of agrochemicals and management of their use (timing, dosage, mode of application, etc.) will be promoted.

The PCRP will not support any usage of pesticides and will place special emphasis to discourage the use of any one included in the United Nations' list of persistent organic pollutants (POPs) targeted for elimination from the global market. PCRP will also facilitate the International Code of Conduct on the Distribution and Use of Pesticides to be adopted by the project if need be

The small infrastructure proposed in the project does not represent any risk for local communities. However, the construction of the proposed facilities will be preceded by capacity building that will include safeguards compliance.

6.3.6 **Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**

Given the fundamental importance of the Caatinga and in line with IFAD corporate mandate the PCRP activities will not take place inside strictly protected areas. The projects financed will evaluate the selection sites taking into account not only the presence of protected areas under SNUC and IUCN categorization but also the buffer zones and biodiversity sensitivity areas.

When in the nearby of a buffer zone the project will review the planned activities against the national protected area classification and the IUCN category before proceeding, to promote the contribution to areas adjacent to buffer zones.

6.3.7 **Performance Standard 7: Indigenous Peoples**

The Northeast region, where the PCRP will take place, is home of a total of 233,079 indigenous individuals (26% of the total indigenous population), representing 80 indigenous peoples' groups[109]. At the present stage of the Project design process it is still not possible to identify which indigenous peoples' groups and communities will be targeted. This will depend on the geographic coverage of Project's interventions that, at the same time, will depend upon states' participation.

Nevertheless, anticipating the potential inclusion of indigenous groups in the project areas an Indigenous People Planning Framework (IPPF) has been developed. The IPPF aims to provide guidance to the preparation the Indigenous Peoples' Plans that will be designed, together with indigenous peoples' communities, once the Project area and the indigenous peoples' groups are identified. The IPPF for the current proposal, therefore, shall be considered a working document that is expected to be iterated and shaped through inputs by the indigenous peoples, their communities and their organizations who will be directly involved in the Project.

The IPPF is attached to the ESMF.

6.4 Adherence to IFADs principles

The PCRP ESMF sets out actions to implement mitigation measures and monitoring and reporting measures on performance, institutional and organizational arrangements. It aims to address measures for information disclosure, grievance redress mechanism, and the process for continued consultation and participation of affected people during project implementation. Thus, the potential risks and impacts identified may be subject to change based on empirical information obtained on the ground and feedback received during project implementation. Periodic evaluations will be made with stakeholders (especially those who are most vulnerable) so that social and environmental risks can be more clearly avoided and strategies can be developed to overcome possible obstacles (as detailed in the Stakeholder Plan). The project's Advisory Committee and Consultative Council will play an

109 IBGE, Brazilian National Census, 2010

important role in receiving and channeling concerns and demands of specific groups (ex: indigenous/ quilombola communities/ women).

Table 2 Equivalence of triggered IFAD and GCF safeguards.

IFC Performance Standard	IFAD corresponding policy/Instrument	Project applicability
Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts	Environmental and Social Management Plan	The project developed an ESMP matrix (Section 7)
Performance Standard 2: Labour and Working Conditions	Environmental and Social Management Plan	The project will promote compliance with national employment and labour laws. It will also promote safe and healthy working conditions, will aim to distribute well work responsibilities avoiding overburdening certain members of families (ex: women) in Territorial Resilience Investment Plans (TRIPS) and Climate Resilient Production Systems (CRPS).
Performance Standard 3: Resource Efficiency and Pollution Prevention	Guidance Statement 2 – Agrochemicals	A fertilizer and waste management Plan is pending the final decision of intervention areas.
Performance Standard 4: Community Health, Safety, and Security	Guidance statement 7 – Water (agricultural and domestic use) Guidance statement 14 – Community health	Guidance on mitigation measure for reducing the possible negative environmental impacts of projects which mobilize surface water or groundwater for irrigation will be prepared up on ground truthing. However, Rainwater harvesting or improved rainfed farming systems investments are typically in less need for mitigation. Preventive and control measures consistent with good international industry practice will be evaluated prior the project implementation to avoid potential impacts during the construction phase of cisterns and the deeply excavated reservoirs and also in the implementation and operation of grey and black water
Performance Standard 7: Indigenous Peoples	Indigenous Peoples Plan	IPPF has been prepared and will be shaped through inputs of IPs populations once project areas are defined

7. ASSESSMENT OF POTENTIAL IMPACTS

7.1 PCRP's Environmental and social category

IFAD has three categories (A, B, C) defined according to the likely significance of potential impacts from environmental and social risks. Guiding questions for environmental and social risk classification are found in the SECAP. Based on the guiding questions (please see Appendix 2 of this document) and a thorough analysis of the components potential impacts the PCRP was categorized as B. That is, the project may have some adverse environmental and/or social impacts on human populations or environmentally significant areas, but the impacts:

- are minor to moderate;
- are site specific and none are irreversible in nature; and
- can be readily remedied by appropriate preventive actions and/or mitigation measures.

This SECAP/ESMF will ensure that all infrastructure investment is fully compliant with GCF's, BNDES's, IFAD's and national social and environmental standards. In particular, all water harvesting and storage investment in Component 2 will be designed not to interfere with ecological water flows or natural drainage of water bodies. No wells will be drilled by the project. All water harvesting and storage technologies implemented by the project have been applied in the semiarid and shown to have minimal negative environmental impact while providing significant positive gains in human wellbeing. For instance, the environmental impact found in an Embrapa study of the underground storage was an increase in energy use due to improvement in productive conditions.[110]

The climate resilient productive systems (CRPS described in Appendix A) will promote improved soil and water management, reduction of agrochemical uses and ecosystem restoration. What is more, no expansion of agricultural land use is expected. Once project areas are defined, an indigenous peoples plan (IPP) will be unfolded prior to any intervention.

7.2 Potential E&S Impacts

The CRPS and water harvesting and storage technologies selected for this project aim to make productive activities compatible with environmental protection. However, there may be potential environmental and social consequences during the implementation that needs to be avoided or mitigated.

The main impacts that can be caused by this project activities are listed below:

1. Pressure on land ownership: the expectations and uncertainties generated in the society by the success of the implementation of the project can lead to increase in property values, provoking land speculation in the real estate market and even land conflicts. This may hinder the project's beneficiaries if their land tenure is not secure.

2. Irregular occupation of indigenous lands, quilombolas or settlement: The area of implementation of the project may be occupied by different traditional communities, such as quilombola communities and indigenous populations, whose ways of life and the history of mobilization related to the process of guaranteeing their territories and their rights. The project will prioritize working with these vulnerable communities. Some of these communities don't have their land rights settled, which can generate conflicts

110 RELATÓRIO DE AVALIAÇÃO DOS IMPACTOS DAS TECNOLOGIAS GERADAS PELA EMBRAPA. Barragem Subterrânea: uma opção de sustentabilidade para o semiárido do Nordeste. Unidade: Embrapa Solos. Equipe de Avaliação: Igor Rosa Dias de Jesus, Ana Paula Dias Turetta, Veramilles Aparecida Faé e Maria Sonia Lopes da Silva. Rio de Janeiro, março de 2016. Available at: https://bs.sede.embrapa.br/2015/relatorios/solos_2015_barragem-subterranea.pdf

if their land is to be coveted by farmers in the region. Thus, if the project does not consider the specific support to such communities, as well as their inputs to the project implementation, there may be an impact on the community.

3. Erosion processes induction and soil impoverishment: Some regions in the semiarid are naturally prone to erosive processes and mass movements. Currently, most farmers make use of poor soil management practices and suppression of vegetation that can cause loss of fertile soil. The use of inadequate vegetation suppression techniques, such as land clearing using slash and burn, can contribute to worsening soil conditions. The objective of implementing the CRPS is to change these practices, however, this can take more time than expected by the project. In addition, during implementation of component 2 investments, erosion and soil compaction can happen around the sites where water storage systems will be constructed, with loss of soil structural and biotic properties. Thus, the construction activities and implementation of CRPS can aggravate the erosive process by leaving soils devoid of vegetation cover, being subject action of rains and to the superficial drainage of the rainwater and, with this, the transport of superficial material.

4. Contamination of water resources and soil: The inappropriate use of fertilizer, irrigation, construction materials and soil transportation can contaminate neighbouring water resources and soil.

5. Interferences with vegetation: During the initial phase of implementation of the CRPS, there may be suppression of remnants of vegetation of the caatinga, although that will be strongly discouraged by the TA team of the project. Reducing vegetation fragments can lead to habitat fragmentation, which can lead to loss of habitat and species, contributing to the impact on biodiversity and climate. Once the CRPS are in place there should be more vegetation, and consequently an increase in biodiversity.

6. Interference with protected areas: Some Indigenous and many family farmers and traditional communities don't have land tenure. Especially Quilombolas and Fundo de Pasto communities don't have properly demarcated land rights, and some may reside in protected areas. Some family farmers and traditional communities are not aware of the environmental legislation and may suppress vegetation in areas protected by law, such as Permanent Protected Areas (APPs) and legal reserves. Because of the drought conditions in the Northeast, most of the plantations are located close to water bodies, which are Permanent Protected Areas (APPs). It should be noted that, the areas chosen for project implementation may be located in buffer zones of environmental preservation, since the sustainable agricultural activities proposed will contribute to preservation of environmentally sensitive areas and natural habitats.

7. Increased scarcity of water resources: In general, family farming in the northeast does not use irrigation (sequeiro). This project will introduce irrigation techniques to many families to reduce their vulnerability to climate change. The project's irrigation will be coupled with rainwater capture and storage systems. However, neighbours and other farmers (non-beneficiaries) may want to simulate the success of the beneficiary farmers and use less sustainable sources of water for irrigation. This could further hinder water security in a region with already scarce resources.

8. Increase in salt content of the soil: A subcomponent of the project will promote productive activities with effluents from 24 existing desalinisation units (there are over 500 in the region), such as fish breeding, quenching animal thirst and irrigation of salt resistant plant varieties for animal feed. Currently, these effluents are contained in open pits with no utilization. Under certain conditions (with wells with sufficient flow, with salt content below the highest levels), it is possible to develop a productive and intensive use of the concentrate. The effluents salt concentration depends on that of the original well, and can be from 20-40% higher. The project will implement biossaline productive units to test their effectiveness, environmental impact and income generation potential. Salt can accumulate in these small lots (1 hectare) and contaminate neighbouring units in the rainy season through runoff.

9. Gender discrimination: Exclusion of female agricultural workers from technical, production-oriented activities can occur by TA services that are devoid of gender-transformational approaches.

10. Impact on the health and safety of farmers: Poor labour conditions and workers safety not complying with international standards for construction of eco-effcient stoves, biodigestors, water capture and treatment systems, and can cause health related complications, and the increase the risk of injuries.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

It is at the core of the project's theory of change to address vulnerabilities of family farming systems and build resilience capacities of smallholder vulnerable farming families in the NEB. As such all the PCRP investments are directly focused at 'doing-good' and the achievement of resilience capacities will be monitored through the family resilience scorecard and index presented in Appendix 1 to Annex 11 Monitoring and Evaluation Plan. Nevertheless, while doing so some of the activities might create some adverse environmental and social risks, as identified in the previous section, which need to be mitigated to avoid doing any nonintentional harm. The below table is the preliminary ESMP and identifies: risk types and related potential negative impacts which might occur because of project interventions; the related project mitigation measures; the responsible entity for their implementation; and the related budget.

The ESMP will be revisited and finalized at project start-up as part of the Project's Implementation Manual (PIM).

Table 3 Preliminary Environmental and Social Managment Plan

Risk Type	Potential negative impacts	Project Mitigation Measures	Monitoring	Responsible institution	Costs[111] (USD)
Social risks and mitigation measures					
Land tenure security	Many family farmers and indigenous, quilombolas and Fundo Pasto communities and other family farmers do not have tenure security to their lands, which makes them vulnerable to encroachment from other actors and reduce their incentives to invest in CRPS and conservation measures. The project's investment in land improvements may increase pressure from encroachment	The participatory mapping and planning exercise, as part of the development of the TRIPs, will include conflict mediation and resolution over the use of resources (activity 1.1.1) The project will provide legal and notary support to project's beneficiary communities for the registration of their land (activity 1.1.4). Interested communities or individual beneficiaries will be supported in obtaining a CAR. (activity 1.1.4)	M&E tracking of TRIPs. Including, legal and notary support, conflict mediation, CAR support. Quarterly Project Management Accountability System (PMEL) reports.	SIUs and PMEL delivery organization.	5,000 / TRIP % of activity 1.1.1-1.1. 4; estimated per investment, not on yearly basis. Tracking of support included in M&E budget.

111 All figures consider estimates based on total project cost and projected beneficiaries; must be adjusted for state level sub-projects. Costs are presented per year unless otherwise stipulated.

Indigenous and traditional communities' right to self-determination	Even though indigenous and traditional communities are extremely vulnerable to poverty and climate change and are among the targeted beneficiaries, they might reject project activities and support due to poor information and consultation processes	Once the project area is selected, an Indigenous Peoples Planning Framework (IPPF) will be implemented and approval will be sought from FUNAI to ensure agreement on the FPIC process. The communication activities proposed in Component 3 will provide all communities with qualified information about the objectives, scope, criteria and policy of the project. A consultation process with each community will be implemented where the communities will decide on how they want the project activities to proceed in their lands based on their documented consent. This will be followed by the participatory development and consent on the TRIPs which will be the basis for project investments and technical support in component 1 and 2.	TRIPS FPIC tracking through PMEL system. Quarterly (PMEL) reports.	SIUs and PMEL delivery organization.	Activity 3.1 (%): 17,000 / sub-project Tracking of FPIC included in M&E budget.
Gender based discrimination	Women are not participating in project activities and do not access the benefits.	The project has a Gender Assessment and Action Plan that is mainstreamed in project activities and is an important complement to the ESMP. Some key actions are: All project personnel will have training in gender-transformational approaches and avoidance of gender biases and discrimination Direct targeting strategies will be applied and their effectiveness monitored for the inclusion of women 40% of technical assistance team will be women. Specific training for women on CRPS technologies and practices and	Quarterly collecting gender disaggregated monitoring and evaluation data to track the extent to which women have been able to participate and benefit from project activities and take leading roles and positions. Tracking of procurement processes for gender activities.	SIUs and PMEL delivery organization.	% of SIU: 12,000 / sub-project 27 training events: USD 123,238. % of activity 3.1. Gender disaggregated tracking included in M&E budget.

		encouragement and support to women in becoming farmers-trainers Implementation of productive activities with women focused on the cultivation of nutritionally-rich foods in backyard gardens and other productive spaces, including native, rustic edible plants that are more resilient in semiarid conditions Promotion of seed banks" operated by women as a mechanism for validating the native knowledge of heirloom seeds, involving women directly in such efforts.			
Exclusion of youth	Young people are not participating in project activities and do not access the benefits, making them more prone to unqualified migration.	Specific strategies will be implemented to encourage youth participation in the development and implementation of the TRIPs such as the use of youth focus group discussions to capture their ideas and aspirations to be included in the TRIPs Youth rural educational institutions will be supported in developing and implementing curricula for teaching and experimenting with CRPS. Youth will be involved in young communicators networks being trained in and responsible for facilitating production of audiovisual and printed materials to support CRPS and development of a participatory audiovisual monitoring model all in close collaboration with TA teams an community-based partner organizations Youth will also be involved in short-term professional courses in CRPS and will subsequently be incorporated in TA teams and serve as liaisons with families	Quarterly collecting youth disaggregated monitoring and evaluation data to track the extent to which youth have been able to participate and benefit from project activities and take leading roles and positions.	SIUs and PMEL delivery organization.	% of SIU: 12,000 / sub-project Youth disaggregated tracking included in M&E budget.

		Finally, youth will also be an important part of the target group for the small grant support for micro enterprises and entrepreneurship in businesses that support the upscaling of CRPS			
Labour's rights and working conditions	Most works will be done through farmer's and community groups, However in the case contractors will be used for water works, there can be a risk of non-compliance with labour rights and conditions.	In case any contractors will be used a specific clause on labour rights and conditions and compliance with national and state labour laws will be included in the contract and compliance will be periodically monitored.	Tracking and verification of procurement process.	SIU procurement specialist.	% of SIU: 2,000
Nutrition security	The increase and diversification of agricultural production will not translate into improved diets of family farmers.	The project will integrate nutrition education modules in the technical assistance trainings delivered by service providers. Nutrition education will be also included in schools where CRPS will be implemented.	M&E tracking of CRPS.	SIUs and delivery organizations.	% of SIU: 2,000
Farmers' and family members health	Farmer's health may be affected from inadequate use of pesticides following increase in crop cultivation facilitated by increased access to water. Family health may be impacted from the reuse of household waste water for vegetable production if the water is not adequately treated	The project will only promote no-pesticide farming practices including a range of integrated tools for plant protection taking into account climate change effects on pest and diseases. As part of trainings and discussions with farmers and communities' awareness raising and information will be provided on health and environmental risks linked to the use of pesticides and safe-use practices. The technologies to be used for the reuse of treated household waste water for vegetable gardening (grey water) and fruit trees and non-eatable plants (black water) has already been implemented and proven to be safe. The grey water is filtered through physical and biological mechanism and the black	Annually monitoring of compliance with environmental and social safeguards including all mitigation measures included in the business plans and financing agreements	SIU safeguard specialists.	% of SIU: 8,500 / sub - project Tracking of ESMP included in M&E budget.

		water is cleaned through an evapotranspiration tank (green septic tank). The latter technology not only facilitates recycling of water and nutrients but also address the significant gap in access to proper sanitation for rural households. As such they contribute significantly to sanitary improvement of environmental and living conditions of beneficiary families. The quality of the water after the cleaning will be systematically monitored.			
Environmental risks and mitigation measures					
Contamination of water resources and soil	Water and soil may suffer contamination from inadequate use of agrochemicals following increase in crop cultivation facilitated by increased access to water.	All beneficiaries will have support from TA teams throughout the project implementation including for CRPS (component 1) and construction and management of water infrastructure and technologies (Component 2). In addition to the activities to avoid the use of pesticides and raise the awareness on their associated health and environmental risks, the project will promote practices to minimize or eliminate the use of fertilizers. As such CRP will promote nutrient recycling techniques from vegetation, compost and manure and the use of green and organic fertilizers. Before designing a CRPS for the individual farmers, famers will be supported in analyzing the specific history of the soils, the climate, the pests found in the region, and the crop of a certain field. No pesticides will be purchased with project's resources.	Annual monitoring of compliance with environmental and social safeguards including all mitigation measures included in the business plans and financing agreements. Tracking of TRIPS and procurement of TA.	SIUs and PMEL delivery organization.	% of TA: 15,000 / TRIP. Estimated per investment, not on yearly basis. % of SIU: 8,500 / sub - project Tracking of ESMP included in M&E budget.

Increase in soil salinity	The project will promote productive activities with effluents from 24 existing desalinization units. Salt can accumulate in these small lots and contaminate neighboring units in the rainy season through runoff.	The soil in the neighboring units to the 24 pilot areas (each of 1 hectare) will be monitored by Embrapa and the Fresh Water Program to ensure salt concentrations are at acceptable levels.	Regular monitoring of interventions.	Embrapa, SIU	% of Activity 1.1.3: 40,000

As presented in annex 11 of the Funding Proposal, a Planning, Monitoring Evaluation and Learning System (PMEL) will be developed as part of component 3 to allow the results-based project management. The data and information collected through the use of specific tools for the implementation of Climate Resilience Productive Systems (CRPS), will contribute not only to learning, feedback and improvement of project interventions but will also build the foundations for the material relevant to the knowledge management. The PMEL will be a fundamental source of information to the Central Project Management Unit (CPMU/BNDES) decision making and will be in particular useful to provide feedback to the State level implementing unit(SIUs) at the state level.. Each State will carry out the physical and financial monitoring of the implemented activities using the DATA-FIDA system and will report to the CPMU to monitor the implementation of the project as a whole. The system has been developed by *Programa Semear Internacional* and all projects in Brazil use it to organize information so that it reflects the implemented activities contribution both to the logical framework. IFAD will be responsible for supervising project implementation, verifying results and recommending adjustive measures if targets are not being met.

9. STAKEHOLDER CONSULTATIONS

In the second half of 2018, a team of nine consultants from various areas of expertise were hired by IFAD and joined the BNDES team to prepare the proposal presented. This process of elaboration was guided by subsidies derived from the empirical reality, captured from field visits to communities in the semiarid region of the Northeast States and through meetings and public consultations with potential stakeholders, both governmental and non-governmental organizations.

During field visits to the semiarid states of Bahia and Pernambuco in October 2018, the team testified demonstrative experiences developed by family farmers, many of which focused on environmental sustainability, such as agroforestry systems (SAFs). Most of these projects were developed with the support and advice of non-governmental organization, such as Centro Sabiá and Caatinga (in the case of the state of Pernambuco), which have the purpose of promoting a series of actions anchored in integrated processes of water management, agroecology, food security and ecosystem conservation. The novelty of the dialogues with these possible partner organizations was the introduction of issues inherent to the environmental field so they could be brought to reflect on the contributions of their actions to processes of adaptation and mitigation of climate change at the local and regional levels. Also, it was an essential step for the team of experts, an opportunity to perceive the gaps in the experiences presented and point out possible fragilities and risks. During these field missions, there were meetings not only with the beneficiaries of socio-environmental actions (construction of technologies for water collection and storage, and agroecological practices) but also with potential stakeholders that already implement strategies for preserving ecosystems and natural resources. These engagements were crucial for outlining the Project and establishing a network of contacts with stakeholders that can be potential Project partners.

At the end of October 2018, this team held a series of meetings with Federal Government institutions in Brasília, such as the Secretariat of Family Agriculture and Agrarian Development (SEAD), the Ministry of Social Development (MDS) - actual Ministry of Citizenship (MC), the Ministry of the Environment (MMA), the Secretariat of International Affairs (SAIN), the Ministry of Science, Technology, Innovation and Communications (MCTIC), and the General Coordination of Policies for Women, Youth, Peoples and Traditional Communities (CEGAT). These meetings were fundamental to understand the contributions of these actors for each component of the Project and its institutional arrangements, being a basis for the construction of a Stakeholder Plan that considers the complementarities between governmental and non-governmental organizations in implementation strategies.

Two public consultations were also carried out during this preparatory phase. They were essential steps both to re-dimension some aspects of the Project (e.g., intervention strategies, guiding concepts and the relationship between the components) and to mobilize potential stakeholders around the proposed project. The description and results of both consultations:

(i) The first public consultation was held in Recife on October 18, 2018, with more than 100 participants, representing around 32 entities. The event focused on the discussion of themes that underpin the main axes of the Project and its main strategies, so that people could contribute to Project designing and express their main concerns and considerations. Thus, the organizations present were divided into the following groups: (i) Adaptation Measures; (ii) Mitigation Measures; (iii) Agroforestry: SAF principles in the Semi-Arid; (iv) Youth, traditional communities and gender; (v) Technical assistance; (vi) Biosaline Agriculture. Each group produced a series of propositions from its thematic axis and presented the issues in the Plenary, generating debates. Some points that crossed all groups were reported in the final synthesis, such as the importance of experimentation and of exchange among actors involved to promote the agroecological principles. The themes of political incidence and "scaling up" successful experiences were also emphasized.

(ii) The second public consultation was with a specific segment that assumes a central role within the Project's targeting strategy: indigenous peoples. It was held on May 9, 2019, in Salvador, with a total of 110 people, representing the following ethnicities of the states of Bahia: Pataxó, Tubanambá, Pataxó hãhãhãe, Atikum, Kiriri, Kaimbé, Tapuia, Tumbalá, Kantaruré. The following organizations and institutions that support

indigenous rights were also present at the consultation: APIB Articulation of the Indigenous Peoples of Brazil (APIB); Articulation of Indigenous Peoples and Organizations of NE, MG and ES (Apoinme); Indigenous Movement of Bahia (Miba); Indigenous Missionary Council (Cimi); Bahia Indigenous Education Forum (Forumeiba); Association of indigenous teachers of the North and West of Bahia (Apinoba).

This consultation had two objectives: (i) to take into account the specific contributions of indigenous peoples in this Project, respecting their specificities; (ii) identify possible risks in the implementation cycle, related to particular needs of indigenous peoples. The consultation was guided by the concept of FPIC (Free, Prior and Informed Consent), which constitutes an effort to "guarantee to an affected or traditional community (local communities within the area of influence of the Project) the right to give or not their consent to projects that may affect their lands, understood as those they habitually occupy or use". This Project, focused on socio-environmental sustainability measures for facing climate change, understands that indigenous peoples of Brazil contribute significantly and play a crucial role in the reduction of deforestation, ecosystem preservation and efficient management of natural resources in the national territory. At the same time, there are risks in the implementation of any project since indigenous villages are governed by other patterns of behavior, interpersonal and power relationships.

Some of the points raised in the plenary by the participants deserve prominence and have been taken into account in the design process:

(i) The importance of valuing differentiated modes of production of indigenous peoples: Participants from different tribes raised their tendency to produce collectively within a given area. According to a leader of the Atikum ethnic group, "they prioritize working collectively because they produce more." This issue needs to be taken into account in the Technical Assistance services.
(ii) The productive processes have been directed towards self-consumption, but there is interest in investing more in income generation initiatives. The representatives of this Consultation emphasized that the notion of environmental preservation is not a hostile force, which comes as a shock to income generation. These are strengths that can be added in work aimed at improving agricultural activities.
(iii) Indigenous peoples emphasized the importance of "producing without pesticides" and expressed interest in deepening knowledge about ways to "generate income without pesticides".
(iv) In the case of some peoples, such as Kiriri, there is a concern with the plantation of monocultures, such as Eucalyptus, which has aggravated the process of deforestation in the area around the villages.
(v) Regarding the possible risks, some representatives warned of the need to consult the cacique about the process of implementation of the Project, since he assumes a position of authority in the indigenous villages. There should be respect for the organizational forms of indigenous peoples, which entails careful consultation with the cacique and village management bodies, such as the "Council" composed of older people.
(vi) Regarding the procedures indicated, the representatives pointed out the importance of conducting a "pre-diagnosis" in the areas to be affected in each community. They emphasized the ways of "reaching the territory", clarifying that "it has to reach the Territory with a differentiated look."

Bahia, state that was chosen for the conduction of the consultation, became a "sample" of the issues that affect multiple indigenous peoples in their various territories. The proposals raised were incorporated into the design of the Project and should guide other inquiries. The plan is to carry out further consultations with indigenous peoples within the states that will be chosen to integrate the Project during its implementation cycle. These consultations will be guided by the objective of creating an agreement with such communities, based on the notion of free, prior and informed consent. It demonstrates a commitment on the part of the executing agencies to engage in the construction of a space that provides direct interaction with the various segments that make up the target audience. It is important that the demands of these distinct social groups be considered at the beginning of the Project's implementation so that adjustments can be made promptly.

Annex 7 presents the detailed and comprehensive "Stakeholder Engagement Plan" of this funding proposal, including continuous engagement plan.

10. GRIEVANCE AND REDRESS MECHANISM

IFADs Grievance Redress Mechanism can be accessed when necessary to manage project-related grievances that cannot be resolved by the project's Executing Entity. This tittle will develop IFADs Complaints Procedure for alleged non-compliance with its social and environmental policies and mandatory aspects of its Social, Environmental and Climate Assessment Procedures (SECAP).

IFAD-funded projects and programmes are designed in a participatory manner, taking into account the concerns of all stakeholders. IFAD requires that projects are carried out in compliance with its policies, standards and safeguards. Moreover, IFAD's Strategic Framework calls for ensuring that projects and programmes promote the sustainable use of natural resources, build resilience to climate change and are based upon ownership by rural women and men themselves in order to achieve sustainability.

The objective of the IFAD Complaints Procedure is to ensure that appropriate mechanisms are in place to allow individuals and communities to contact IFAD directly and file a complaint if they believe they are or might be adversely affected by an IFAD-funded project/programme not complying with IFAD's Social and Environmental Policies and mandatory aspects of SECAP.

Complaints must concern environmental, social and climate issues only and should not be accusations of fraudulent or corrupt activities in relation to project implementation – these are dealt with by IFAD's Office of Audit and Oversight.

10.1.1 Principles of engagement

The channels of engagement adhere to the process of communication with the different stakeholders, which rely on:

- Quality of service: handling the requests and complaints from respondents with proper quality of service.
- Free and Impartial service: respect for the diversity of different publics, with the commitment to exercise activities impartially, without favour of any order, free of prejudice and any fraud, corruption or practice of actions harmful to national and international public administrations.
- Right to Information: guaranteed right to access information, in transparent, clear and accessible language, in accordance with the law.
- Channel of dialogue: maintain an open channel of dialogue with the news media, social networks, and various other social sectors.
- Good faith and willingness to resolve the conflict, grievance, complaint or dispute should be considered as an essential pre-requisite to the process;
- A mediator may be mutually agreed to assist with resolving the conflict and/or grievance;
- The decision/resolution arrived through mutual agreement should be considered as final;
- Such decision would be signed by both parties and witnessed and communicated as the final and binding decision – at whichever level a decision or resolution of conflict or grievance is agreed.

10.1.2 Eligibility criteria

To file a complaint for alleged non-compliance with IFAD's social and environmental policies and mandatory aspects of its SECAP, IFAD will consider only complaints meeting the following criteria:

- The complainants claim that IFAD has failed to apply its social and environmental policies and/or the mandatory provisions set out in SECAP.
- The complainants claim that they have been or will be adversely affected by IFAD's failure to apply these policies.
- Complaints must be put forward by at least two people who are both nationals of the country concerned and/or living in the project area. Complaints from foreign locations or anonymous complaints will not be taken into account.
- Complaints must concern projects/programmes currently under design or implementation. Complaints concerning closed projects, or those that are more than 95 per cent disbursed, will not be considered.

10.1.3 The process

The complainants should first bring the matter to the attention of the government or non-governmental organisation responsible for planning or executing the project or programme (the Executing Entity), or to any governmental body with the responsibility for overseeing the Executing Entity. If the Executing Entity does not adequately respond, then the matter may be brought to the attention of IFAD. The issue may be brought straight to IFAD if the complainants feel they might be subject to retaliation if they went to the Executing Entity directly.

The Regional Division will examine the complaint and, if necessary, will contact the Executing Entity, or the governmental body with the responsibility for overseeing the Executing Entity, to decide if the complaints are justified. If the complainants request that their identities be protected, IFAD will not disclose this information to the Executing Entity or anyone else in government.

If the complaint is not justified, the Regional Division will inform the complainants in writing.

If the Regional Division finds the complaint is justified and there is proof of actual or likely harm through IFAD's failure to follow its policies and procedures, IFAD will take action. This may consist of making changes to the project/programme, or requiring that the EE observes its obligations under the Financing Agreement. IFAD's response will focus bringing the project/programme into compliance and no monetary damages will be available or paid in response to such complaints. The complainants will be informed of the outcome of the issue by the Regional Division.

In all cases, if the complainants disagree with IFAD's response, they may submit a request to SECAPcomplaints@ifad.org and request that an impartial review be carried out by the Office of the Vice-President.

The Office of the Vice-President will decide on the steps to be taken to examine such complaints, including, if necessary, contracting external experts to review the matter. The complainants will be informed of the results of the review.

IFAD will include in its Annual Report a list of received complaints and a summary of actions taken to address them.

10.1.4 How to submit a complaint

A complaint relating to non-compliance with IFAD’s Social and Environmental Policies and mandatory aspects of its SECAP can be submitted in any of the following ways:

- Download the complaints form (Word) available here and as appendix 3 of this document.
- Send an email to SECAPcomplaints@ifad.org or mail to:

  IFAD

  SECAP Complaints (PMD)

Via Paolo di Dono 44

00142 Rome, Italy

Complaints must include the following information:

- Name, address, telephone number and other contact information
- Whether the complainants wish to keep their identity confidential, and if so, why
- Name, location, and nature of the IFAD project/programme (if known)
- How the Complainants believe they have been, or are likely to be, adversely affected by the IFAD-supported project or programme

10.1.5 The project-level Grievance Redress Mechanism

The project will establish one or more grievance mechanisms at field level to file complaints. Contact information and information on the process to file a complaint will be disclosed in all meetings, workshops and other related events throughout the life of the project. The project will include in the capacity building program information on the GRM and will organize consultations to determine the most suitable way for beneficiaries and stakeholders to communicate their concerns and ideas.

The Grievance Redress Mechanism and guidelines will be developed for the project taking into account IFADs corporate Complaints Procedure to receive and facilitate resolution of concerns and complaints with respect to alleged non-compliance of its environmental and social policies and the mandatory aspects of its Social, Environmental and Climate Assessment Procedures.

The project will also be responsible for documenting and reporting as part of the safeguards performance monitoring on any grievances received and how they were addressed.

10.1.6 How to submit a complaint at project level

Complaints can be raised either orally or in writing, directly to the State level implementing unit (SIU); the SIU will be responsible for creating and notifying of a digital and physical address to which complaints can be addressed.

Complaints must include the following information:

- Name, address, telephone number and other contact information
- Whether the complainants wish to keep their identity confidential, and if so, why
    - All necessary provisions will be taken to keep complainants' identities confidential in the complaints procedure when so requested.
- Name, location, and nature of the IFAD project/programme (if known)
- How the Complainants believe they have been, or are likely to be, adversely affected by the IFAD-supported project or programme

10.1.7 The process at local level

Submitted complaints will be sent to the Project Manager and M&E officer to assess whether the complaint is eligible. Project Manager will inform and incorporate the relevant Senior Safeguards specialist, social and/or environmental, as required.

Eligible complaints will be addressed by the SIU. The PM and relevant Senior Safeguards Specialist, with support the from the M&E Officer will be responsible for recording the grievance and how it has been addressed if a resolution was agreed.

If the situation is too complex, or the complainer does not accept the resolution, the complaint must be sent to a higher level, until a solution or acceptance is reached:

- 1st level: At this level, received complaints will be registered, investigated and solved by the SIU.
- 2nd level: If the complaint has not been solved and could not be solved in level 1, the SIU must report it to the CPMU. Received complaints will be registered, addresses and monitored by the CPMU.
- 3rd level: If the complaint has not been solved and could not be solved in level 2, the complaint must be submitted to IFAD following the procedure stipulated above.

Notwithstanding the above, all complaints may be directly submitted to BNDES (2nd level) where applicable stipulations in the Brazilian norms and in the BNDES ombudsman's office will prevail. The GCF independent Redress Mechanism and the Secretariat's indigenous peoples focal point will be available for assistance at any stage, including before a claim has been made.[112]

For every complaint received, a written proof will be sent within ten (10) working days to IFAD and the EE; afterwards, a resolution proposal will be made within thirty (30) working days.

In compliance with the resolution, the person in charge of dealing with the complaint, may interact with the complainant, or may call for interviews and meetings, to better understand the reasons.

All complaint received, its response and resolutions, must be duly registered.

10.1.8 Resolution

Upon acceptance of a solution by the complainer, a document with the agreement should be signed .

10.1.9 Other considerations

Certain measures will most definitely favor the efficiency of the Grievance Redress Process within the context of PCRP. The first of these measures is the creation of mechanisms and procedures that promote Stakeholder groups' engagement in the Project's strategic actions, such as the implementation of management bodies that incorporate multiple stakeholders at both the CPMU and State-level Implementing Units (SIUs) levels. At the SIU level, consultative councils will be created to ensure that PCRP's objectives and strategies are met, with a deep commitment to principles of transparency and equity, through the full participation of the beneficiaries, state secretaries and representatives from civil society partner organizations. In order to guarantee that the most vulnerable stakeholder groups will be well represented in these representative spaces and bodies, rigorous selection criteria will be strictly followed. Their active participation will also be stimulated through the following measures: (i) Inputs of stakeholders will be considered in the construction of Baseline studies during the first year of the Project's implementation cycle; (ii) A crosscutting approach to gender, race and ethnic aspects will be incorporated in Territorial Resilience Investment Plans, as well as in other strategies and methodological instruments, with the guidance and orientation of Youth, Gender and Traditional Communities Specialists; (iii) Consultations with traditional communities will take place so as to guarantee free, prior, and informed consent; and (iii) periodic evaluations will be prioritized, based on a review of potential social and environmental risks and strategy-planning for overcoming such obstacles.

All Professionals that act on local and regional levels within the scope of PCRP must be aware of the principles contained in the SECAP and IPPF – Indigenous Peoples Planning Framework and how they influence their intervention strategies. For instance, all technical assistance professionals that act directly in the field should be

[112] Information available at: https://irm.greenclimate.fund/home

aware of project ESMP and specifically that a consultation process should be undertaken to solicit and obtain indigenous peoples' free, prior and informed consent (FPIC) before any action is taken in indigenous peoples' communities and /or if there exists the possibility that proposed interventions might directly affect indigenous peoples' communities and their rights. The principles of this IPPF, which is line with the Green Climate Fund's Indigenous People Policy and the IFAD Policy of Engagement with Indigenous People, should be clearly laid out in Training sessions in the first 6 months of PCRP's implementation cycle. Measures such as these represent forms of assuring good performance standards within the Project, in such a way that complaints and grievances, although they are inherent to any social process, are dealt with in due time and do not necessarily need to be taken forward within formal mechanisms and procedures. In consideration of the power dynamics that tend to place indigenous communities in a situation of disadvantage in relation to other social groups and institutions, as well as the history of violence, which has plagued indigenous and other traditional communities (ex: "Fundos de pasto"; quilombolas), especially in the face of social and environmental conflicts concerning the use of land and natural resources in many of these territories, when a claim is presented by IPs, the complainants' identities should be kept confidential at all costs in these procedures.

In evaluation and monitoring sessions, that will take place every 6 months, focus groups will be formed so as to facilitate the expression of opinions by specific segments (ex: women x men; youth x elders) about different aspects of the Project's implementation process (activities planned, environmental and social risks, etc.) The evaluation and monitoring of Project strategies and actions should take place on an ongoing basis, as risks and impacts arise, and should be free from any sort of interference, coercion or intimidation on the part of Project team members or other third parties. Creating designated spaces for evaluation processes that allows for the voices of disadvantaged groups to be heard is a necessary measure for safeguarding their possible concerns, in such a way that they do not necessarily become formal complaints and grievances. In the case of rural women, for instance, who tend to suffer from situations of violence or other forms of violations in the family units or in community instances, such focus groups are an efficient strategy for creating a safe space in which such issues can be raised and dealt with in a proper manner. Gender specialists, who act on all levels of the Project, will also be important mediators of such complex situations, guaranteeing at all times the upmost confidentiality and protection of possible victims.

It is important to clarify that accessing a grievance mechanism should represent the last resort, given that constant dialogue between these most vulnerable social groups and Professionals trained to consider such demands and mediate conflicts, such as the Youth, Gender and traditional communities Specialists, will be cultivated through the Stakeholder Engagement strategy (see Annex 7 for greater details). This strategy can be seen to be an act of prevention – so that concerns can be channeled and expressed in due time and don't necessarily need to move on to the next level, becoming full-fledged grievances.

Once an identified problem turns into a formal grievance and is taken to the Project-level mechanism, it is important that vulnerable stakeholders understand that their legal rights will be protected under a national judicial process. Also, it should be made clear to them that, if they are not satisfied with the resolution that has been provided by the Project-level local mechanisms, another option involving mediation through conflict resolution exists. This possibility should be widely disseminated in all explanations given about the GRM and its forms and stages of operation during the process of fortifying Stakeholders and their engagement in the Project as a whole, as well as once any complaints are registered. In the case of indigenous people, this option may be considered to be more culturally appropriate, given their different conceptions of adequate processes for mediating conflicts and finding collective solutions within the context of PCRP's interventions. The mediator to be chosen in such cases should be a person who has credibility in the context of indigenous communities and who displays understanding of their cultural specificities. Strict criteria concerning the profile and experience of this professional should be reviewed and validated by Consultative Councils at the SIU level, as well as other governing instances.

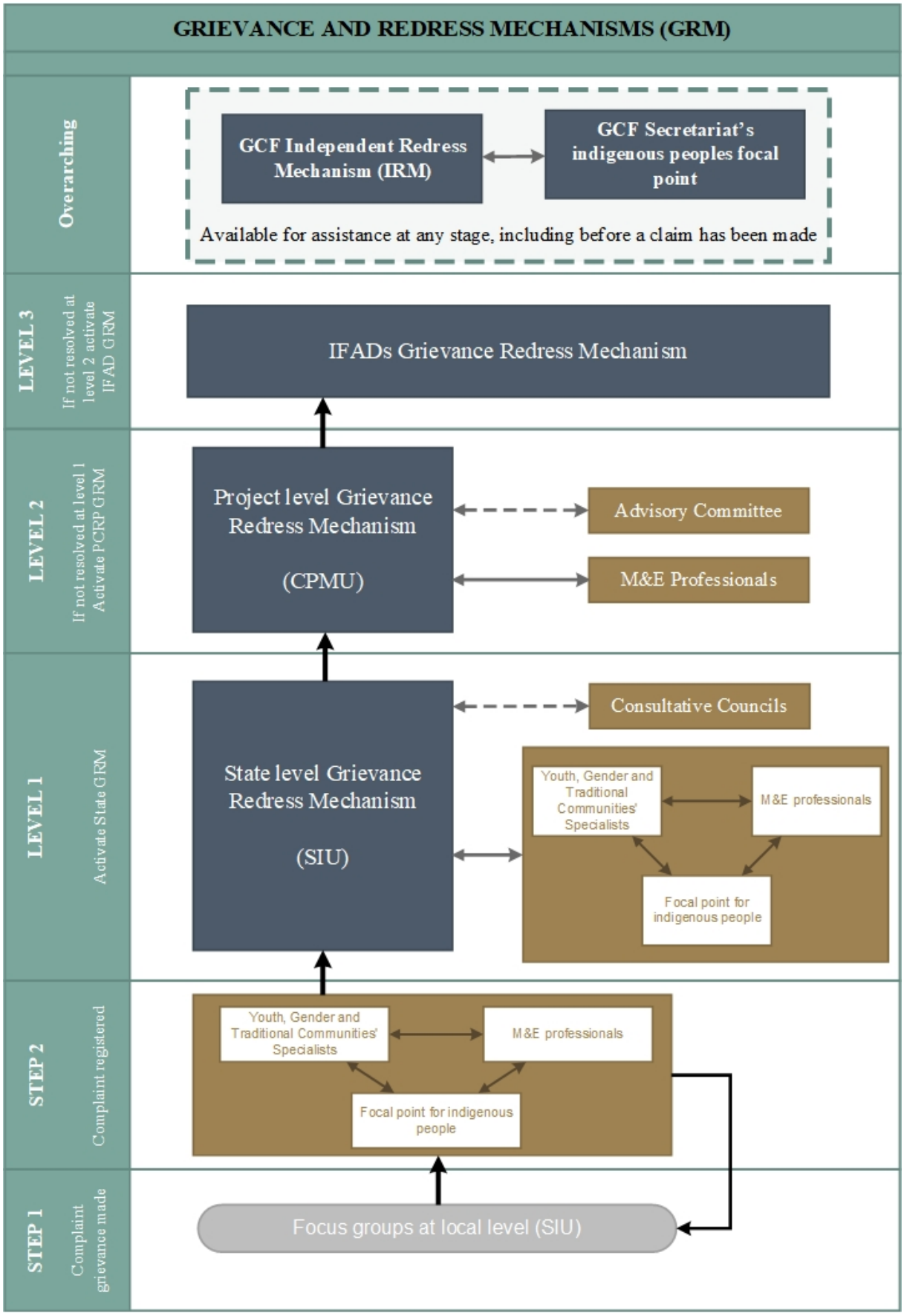


Figure 11 Grievance Mechanisms and process

11. SEXUAL HARASSMENT, SEXUAL EXPLOITATION AND ABUSE

In line with IFAD's policy to preventing and responding to sexual harassment, sexual exploitation and abuse (2018)[113], all contracts with project staff, contractors, suppliers and other third parties to be funded with IFAD funds will include: (i) provisions prohibiting acts of sexual harassment and SEA, (ii) provisions establishing an obligation to immediately report to IFAD or the Government incidents of sexual harassment and/or SEA in IFAD-funded or -managed activities or operations, and (iii) provisions allowing for the immediate termination of contract based on proven acts of sexual harassment and/or SEA in connection with IFAD-funded or -managed activities or operations.

The appropriate reporting channel for sexual harassment and SEA is the Ethics Office (Hotline +39 06 5459 2525 or ethicsoffice@ifad.org). SEA allegations can also be reported to the Office of Audit and Oversight (Hotline +39 06 5459 2888 or anticorruption@ifad.org). IFAD is also putting in place regional SEA focal points.

The existence of the Grievance and Redress mechanism, the complaint process, as well as the mandatory compliance with IFAD policies including SEA, must be communicated to the organizations and beneficiaries of the project by the executing unit.

12. DISCLOSURE

The project will disclose the relevant documentation developed through GCF design process (including the SECAP and the Gender Assessment and Action Plan) in a timely manner. Category B projects will be disclosed as minimum 30 days before expected date of GCF approval pursuant to the requirements of the GCF Information Disclosure Policy. State-level subprojects will disclose all relevant documentation as minimum 30 days before expected date of BNDES approval.

Disclosed documents must be presented in a way that is accessible and culturally appropriate, placing due attention to the specific needs of community groups which may be affected by project implementation (such as literacy, gender, differences in language or accessibility of technical information or connectivity).

IFAD and the project will ensure the widest dissemination and disclosure of project information possible. Taking into account special needs and limited access to web content; in this regard, special attention will be placed on potential project participants: farmers, illiterate or technological illiterate people, people with hearing or visual disabilities, people with limited or no access to internet and other groups with special needs. The dissemination of information among these groups will be carried out by BNDES and the State partners. All accessible and locally available tools for disclosure will be utilized, including social media, local newspapers, flyers, brochures, radio, and television. Special attention will be placed on dissemination of project environmental and social safeguards, including the Grievance Redress Mechanism.

113 Policy available at: https://www.ifad.org/en/document-detail/asset/40738506

13. SAFEGUARDS BUDGET ALLOCATION

The components of the PCRP require a central and also a decentralized organization to cover the whole set of activities that need to be implemented on the ground as well as to have a fluid communication with IFAD and the BNDS as implementing agency. To that end a Central Project Management Unit (CPMU) will be placed within BNDES and will monitor implementation, compile physical and financial information, report to IFAD and will be overall accountable. Also, each state will establish its own state-level State level implementing unit (SIU), which will be responsible for procurement, financial management, evaluation and monitoring of its own activities

Safeguard supervision of works will need to be hosted at the CPMU and the SIU to control compliance in both levels, on the ground and at the project level ensuring a correct course of actions. A social safeguard and an environmental safeguard specialist shall provide technical support and timely assistance on the ground attending happenings on a daily basis from the SIU. Similarly, a senior safeguard specialist and a climate change change specialist will work with the inputs provided from the SIU and liaise with IFAD. Also consultants will be needed to support the cross cutting themes of indigenous peoples and gender. The Table below has a ballpark estimation on the cost of the personal fully or partially dedicated to the safeguards implementation.

Table 4 Cost estimate of SECAPs dedicated staff

Staff	Quantity	Cost per month	Work Share	Total / year (in USD)
State Level				
Senior Environmental Safeguards Specialist	3	1600	100%	57,600
Senior Social Safeguards Specialist	3	1600	100%	57,600
Communication and Knowledge Management Specialist	3	1600	15%	8,640
Senior M&E Specialist	3	1600	25%	14,400
M&E Analyst	3	1200	25%	10,800
Field level				
Environmental Safeguards Specialist	9	1300	100%	140,400
Social Safeguards Specialist	9	1200	100%	129,600
Communication and KM Specialist	9	1200	15%	19,440
M&E Specialist	9	1200	25%	32,400
Total				**470,880**

APPENDIXES

APPENDIX I

Indigenous Peoples Planning Framework

1. Project's context and objectives

1. Overall, the Project aims to reduce the impacts of climate change and increase the resilience of poor rural families living in the Brazilian semiarid, through transitioning to resilient production systems. The Brazilian semiarid is located mostly in the Northeast region, occupying approximately 12% of the Brazilian territory and hosting 27 million people (12% of the total population)[114]. The Project is expected to contribute to increased climate-resilient sustainable development for 1 million poor and food insecure rural households.

2. With the main objective of reducing the impact of climate change and increasing the resilience of the affected population in the semiarid region in Northeast Brazil, the Project will promote the integrated management of water, food and related ecosystem processes. The Project will consists of three components: (1) access to safe water resources; (2) transition to climate resilient production, with investment, capacity building and technical assistance for reforestation through agroforestry systems and (3) management, knowledge sharing and monitoring.

3. The Project will be implemented in the most drought affected semi-arid areas of up to three states of the Northeast Region of Brazil, crossing with the potential for CRPS analysis. The participation of the states will be determined based on specific criteria (as per eligibility criteria). In this framework, the Project will target the poorest regions and among those the municipalities and communities more exposed to social and environmental vulnerability, and prioritize women, youth and traditional communities, including indigenous peoples, as its main beneficiary groups[115].

2. Rationale for the Indigenous Peoples Planning Framework (IPPF)

4. In line with the Green Climate Fund's Indigenous People Policy and with the IFAD Policy of Engagement with Indigenous Peoples, this IPPF aims to ensure that indigenous peoples' rights are respected and that indigenous peoples' communities are able to actively participate and benefit from the development of project's interventions. With this objective, IFAD, BNDES and the States, will define a consultation process to solicit and obtain indigenous peoples' free, prior and informed consent (FPIC) before any action is taken in indigenous peoples' communities and / or if the proposed interventions might directly affect indigenous peoples' communities and their rights. In this framework, the present IPPF has been designed to ensure that, whenever the Project will operate in areas where indigenous peoples live, they will; (i) be fully and effectively engaged in the design, development and implementation of Project's activities; (ii) receive culturally appropriate social and economic benefits; (iii) not be harmed or suffer from adverse impact that may result from the Project.

5. At the present stage of the Project design process it is still not possible to identify which indigenous peoples' groups and communities will be targeted. This will depend on the geographic coverage of Project's interventions that, at the same time, will depend upon states' participation. In this context, the IPPF aims to provide guidance to the preparation of the Indigenous Peoples' Plans (IPPs) that will be designed, together with indigenous peoples' communities, once the Project area and the indigenous peoples' groups will be identified. The IPPF for the current proposal, therefore, shall be considered a working document that is expected to be iterated and shaped through inputs by the indigenous peoples, their communities and their organizations who will be directly involved in the Project. In other words, it is expected to be a living document that will be adapted and elaborated in tandem with the unfolding phases of the Project.

114 Ministry of Integration webpage, available at: http://www.integracao.gov.br/semiarido-brasileiro

115 On the targeting process and specific criteria that will be employed to select the states and identify/prioritize municipalities and communities, refer on the Targeting section of the main text of the Project proposal.

3. Legal and policy framework for indigenous peoples in Brazil

6. Brazil has a multi-level institutional framework for the promotion and protection of the rights of indigenous peoples and individuals. The mainstay of this framework is the **Federal Constitution of 1988**, which recognizes political, economic and social rights to indigenous peoples, in the respect of their cultural distinctiveness. The Federal Constitution guarantees to indigenous peoples collective rights to "their social organization, customs, languages, creeds and traditions", as well as to "the lands they traditionally occupy"(article 231). Naturally, indigenous individuals also enjoy the same rights as all Brazilian citizens, including the rights to health and education.

7. The leading government institution responsible for the promotion and protection of the rights of indigenous peoples is the Ministry of Justice and Citizenship (MJC) and **the National Foundation for Indigenous Peoples (FUNAI)**. FUNAI works under the Ministry of Justice and Citizenship, according to Law 5,371/1967 and Decree 7,778/2012. Amongst its tasks, FUNAI is responsible to support the identification, demarcation and regularization of Indigenous Lands, to register those territories traditionally occupied by indigenous peoples and to take action against the illegal invasion of indigenous peoples´ lands. At the same time, FUNAI promotes policies aimed at indigenous peoples´ self'-driven and sustainable development, such as the conservation and sustainable management of natural resources in the Indigenous Lands.

8. At the national level, progresses have been made in the last decades to translate the rights of indigenous peoples into **public policies and national programs**:

9. **Health**. In 2010, the Special Secretariat for Indigenous Healthcare (SESAI) was established at the Ministry of Health. Since its creation, the number of professionals dedicated to providing healthcare for indigenous individuals has grown by almost 50%; 45% of the SESAI staff is indigenous. SESAI is also responsible for the provision of sanitation services, including water supply[116.]

10. **Education**. The National Constitution guarantees the right to bilingual, culturally appropriate basic education to the Brazilian indigenous citizens. The two main permanent forums for discussing and designing policies in this domain are the National Education Council (CNE), and the National Commission for Indigenous School Education (CNEEI). Since 2009, the implementation of indigenous education is led by the Secretariat for Continued Education, Literacy, Diversity and Inclusion of the Ministry of Education (SECADI/MEC), which operates in close co-ordination with State and Municipal authorities.

11. **Environment**. Established in 2007, the National Policy for the Sustainable Development of Traditional Peoples and Communities (PNPCT) seeks to promote the sustainable development of traditional peoples and their communities, including indigenous peoples. One of the main implementation tools of the PNPCT are the Sustainable Development Plans, which aim to inform and guide the implementation of the Policy.

12. In 2012, the Brazilian government launched the National Policy for Environmental and Territorial Management of Indigenous Lands (PNGATI). The Policy calls for the environmental protection and full participation of indigenous peoples in all processes that affect their lands, stressing the need to solicit and obtain indigenous peoples' free, prior and informed consent (FPIC) before taking any actions in indigenous territories. The policy also provides for the participation of representatives of indigenous peoples in institutions in charge of regional and national environmental policies that affect their territories, such as river-basin committees and the Brazilian Climate Change Forum.

13. **International level**. Brazil is an active participant in all key forums and institutions devoted to the promotion and the protection of the rights of indigenous peoples. It is one of the 22 countries that have ratified in 2002 the International Labor Organization (ILO) Convention 169 and supported the adoption of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the American Declaration on the Rights of Indigenous Peoples (ADRIP). According to these documents, the Brazilian government is required to carry out good-faith consultations with indigenous peoples` representatives in order to solicit and obtain their FPIC, in order to be able to carry out said projects. In 2016 Brazil also ratified the Paris Agreement, which highlights the need to promote and respect the rights of indigenous peoples while addressing climate change-related issues.

116 Source: IFAD, Economic Inclusion Programme for Families and Rural Communities in the Territory of the Plurinational State of Bolivia (ACESSOS).

14. **Current threats**. Despite the achievements reached at the policy level, in the last year violence against indigenous peoples has increased: according to the Missionary Council for Indigenous Peoples, 92 indigenous persons were murdered in 2007; by 2014, that number had increased to 138[117]. Attacks and killings are frequently reprisals after indigenous peoples reoccupy ancestral lands following long delays in demarcation processes.

15. Today, the demarcation process of indigenous lands is, in fact, stagnating[118]: this depends on a number of factors, including the debilitation and understaffing of FUNAI, insufficient political will to conclude demarcation procedures at the ministerial and Presidential level, a constant cycle of administrative delays and a general poor understanding of and appreciation for indigenous peoples' distinct ways of life. Furthermore, the urgency for land demarcation is exacerbated by deforestation, destruction of rivers and depletion of soil quality due to intensive monocropping and mining activities, all of which render land and water inadequate for sustaining indigenous peoples' lives. All these factors are exposing indigenous peoples' livelihoods at risk.

16. According to the last report (2016) by the UN Special Rapporteur on the Rights of Indigenous Peoples in Brazil, indigenous peoples reported dire threats to their rights and existence in the context of large-scale or high-impact development projects, including megaprojects such as the construction of hydroelectric dams and infrastructure (being Belo Monte dam one of the emblematic cases that gained international coverage), mining and the laying of transmission lines, that are launched without meaningful consultation to seek their free, prior and informed consent. Furthermore, even where indigenous peoples have demarcated territories, they often lack effective control over their resources owing to increasing invasions associated with illegal activities. Concrete and prioritized actions should be taken to guarantee environmental protection of indigenous lands and their natural resources and to prevent illegal activities, with due consideration to and respect for indigenous peoples' forms of organization and their special relationship with their lands.

4. Background and context: indigenous peoples in the Brazilian Northeast

17. According to the last Brazilian national population census (2010, Institute of Geography and Statistics - IBGE) 896,917 individuals recognize themselves as indigenous, representing 0.47% of the total Brazilian population (Source: IBGE, Brazilian National Census, 2010).

18. There are today 305 indigenous peoples' groups identified in Brazil, speaking 274 languages and dialects: of them, 64% live in rural areas and 36% in urban areas[119]. The majority of indigenous peoples inhabit the 721 Indigenous Lands located throughout the country (accounting for 13% of the national territory); the highest concentration of Indigenous Lands is found in the Amazon region (*Amazônia Legal*): 422 areas (115,344,393 hectares), accounting for 23% of the Amazon territory and representing 98.25% of the extension of all Indigenous Lands in the country[120].

19. The Northeast region is home of a total of 233,079 indigenous individuals (26% of the total indigenous population), representing 80 indigenous peoples' groups. Of this population, 51% are women and 49% are men. The state of Bahia hosts the majority of indigenous peoples of the Northeast (nearly 57,000 people), being the third state in Brazil in number of indigenous peoples, followed by Pernambuco (approximately 53,000 people) (Source: IBGE, Brazilian National Census, 2010). The table below presents the total indigenous population of the Northeast region:

117 Source: (2016) Report of the UN Special Rapporteur on the rights of indigenous peoples on her mission to Brazil, UN General Assembly, Human Rights Council, Thirty-third session, agenda item 3, A/HRC/33/42/Add.1, NY

118 In 2016, there were approximately 20 land demarcations pending Presidential ratification and ministerial declaration. Source: (2016) Report of the UN Special Rapporteur on the Rights of Indigenous Peoples.

119 Source: Instituto Socioambiental. https://terrasindigenas.org.br/pt-br/brasil

120 Source: Povos Indigenas no Brasil. https://pib.socioambiental.org/pt/P%C3%A1gina_principal

Table 5 Indigenous population in the Northeast region of Brazil

State	Total population	IPs living in indigenous lands	IPs living outside indigenous lands
Maranhão	38 831	29 621	9 210
Piauí	2 944	-	2 944
Ceará	20 697	2 988	17 709
Rio Grande do Norte	2 597	-	2 597
Paraíba	25 043	18 296	6 747
Pernambuco	60 995	31 836	29 159
Sergipe	340	340	-
Alagoas	16 291	6 268	10 023
Northeast region	**233 079**	**106 482**	**126 597**

Source IBGE, Brazilian National Census, 2010

20. As the table shows, the majority (54%) of the indigenous population in the Northeast region lives outside an Indigenous Land – mostly in communities or agglomerates of villages in rural areas. **Annex 1**. provides a list of the Indigenous Lands located in states of the Northeast region[121] that might be potentially targeted by the project.

5. IFAD's engagement with indigenous peoples

21. In the past ten years, IFAD has gone a long way in its engagement with indigenous peoples. In line with the agreements adopted at the international level for the recognition of indigenous peoples' rights, IFAD has established institutional instruments and participatory processes to ensure indigenous peoples' full and effective participation in its programmes and projects. In particular:

- In 2009, the Policy on Engagement with Indigenous Peoples was approved by the IFAD Executive Board: the Policy established the principles and instruments for IFAD to engage with indigenous and tribal peoples, and ethnic minorities.
- In this framework, all of IFAD's investments (loans and grants) engaging with indigenous peoples must adopt the free, prior and informed consent as operational principle. FPIC must be sought before any action is taken in areas that are home to indigenous peoples or that might directly affect indigenous peoples' communities. As result of the consultative process, a FPIC Implementation Plan needs to be prepared if the project/programme directly involves indigenous peoples. The Plan includes documentation of the consultation process leading to FPIC of the indigenous peoples' communities and any agreement resulting from the consultation and consent process for the project activities.
- The FPIC principle is also mentioned in the IFAD Policy on Environment and Natural Resource Management (2011) and in IFAD's Social, Environmental and Climate Assessment Procedures (2014, updated in 2017).

22. It is also worth mentioning that IFAD has been the first international financial institution to adopt FPIC as an operational principle in its policy documents. In line the above-mentioned policies and instruments, to date, IFAD has engaged with indigenous peoples in frame of the following operations (loans and grants) in Brazil:

121 The list, however, is not comprehensive, since it doesn't include those Indigenous Lands currently under identification and/ or recognition.

Project Name	State/s	Ethic group/s	State of the project
Dom Helder Câmara Policy Coordination and Dialogue for Reducing Poverty and Inequalities in Semiarid North-east Brazil	Northeast region (11 states)	Tabajara, Geripankó, Katokim, Karuazu, Aitikun, Xocó	On-going
Sustainable Rural Development Project in the Pernambuco Territories of Zona da Mata and Agreste	Pernambuco	Xucuru	On-going
Maranhão Rural Poverty Alleviation Project	Maranhão	Guajajara, Canela and Krepum - Katayê	Designed. Not yet effective
Kawaip Kayabi Indigenous Association (Grant)	Pará	Kayabi	Closed
Project Pro-Semiárido (PSA)	Bahia	Tumbalá, Kiriri, Tuxá, Kantaruré	On-going
Project "Empowering Indigenous Youth and their communities to defend and promote their food heritage" (partnership with *Slow Food)*	Bahia	Kiriri	On-going
Project Paulo Freire (PPF)	Ceará	Tabajara	On-going

23. FPIC has been solicited and obtained by the indigenous peoples' groups involved in projects' operations and its process was monitored throughout the implementation of projects' activities through regular communication with indigenous peoples' representative organizations. To undertake the process of consultation with indigenous peoples, IFAD has strengthened its partnership with FUNAI, at the federal, regional and local level, in the states where IFAD has on-going operations or where new project proposals have been designed. IFAD also has established an on-going relationship with Indigenous rights organizations, many of which directly represent these different ethnic groups, such as the Network of Indigenous People of Brazil (APIB) and the Network of Indigenous People and Organizations of the Northeast Region, Minas Gerais and Espiríto Santo (Apoinme). These partnerships will most definitely facilitate the process of consultation with indigenous communities during the development of the current project proposal.

24. In this process of elaborating this project proposal, which has actively engaged a team of 9 specialists from distinct professional areas of expertise since the second semester of 2018, a consultation meeting took place with indigenous peoples' groups in Bahia in May/2019. This consultation process involved a total of 110 people, representing the following indigenous tribes within the state of Bahia: Pataxó, Tubanambá, Pataxó hãhãhãe, Atikum, Kiriri, Kaimbé, Tapuia, Tumbalá, Kantaruré, as well as organizations and institutions that give direct support to indigenous people within Bahia and nation-wide: APOINME, APIB, CIMI, FORUMEIBA e APINOBA. This experience was especially important because it provided valuable information on crucial aspects of the Project Proposal that directly affect and influence indigenous peoples, as well as aiding in the construction of approaches and methodologies that can be most effective in consultation processes that will take place with indigenous peoples once the Project geographic area is defined and the activities start being implemented.

24. IFAD can also rely upon the experience built in working with indigenous peoples in other countries in the LAC region: in Bolivia, for example, IFAD is specifically addressing climate change adaptation practices with indigenous peoples' communities by integrating their traditional ecological knowledge into territorial planning and community-based natural resource management [122]. By strengthening the sharing of knowledge and experiences among projects, IFAD can foster the scaling up of good practices thus improving project's outcomes.

122 Source: IFAD, Economic Inclusion Programme for Families and Rural Communities in the Territory of the Plurinational State of Bolivia (ACESSOS).

6. Soliciting and obtaining indigenous peoples' FPIC: process and methodology

25. As previously mentioned, at the present stage of the Project design process it is not possible to identify which indigenous peoples' groups and communities will engage with the Project. As soon as the participation of the states will be determined, and the Project's geographic areas of coverage prioritized on the base of the targeting selection criteria[123], a **consultation strategy leading to FPIC** will be put in place to identify which indigenous peoples' groups located in the Project's area would be interested in engaging with Project's activities.

26. The consultation strategy will directly involve: (i) the Project's Executing Entity (EE) through its Central Project Management Unit (CPMU) and PMEL Unit, and IFAD; (ii) the local State level implementing unit(SIUs); (iii) FUNAI regional and/or local representations; (iv) indigenous peoples' organizations in the areas targeted by the Project, and; (iv) representatives of indigenous peoples' communities that might be potentially affected by Project's interventions.

27. The main objective of the consultation strategy will be to assess the degree of the expected direct and indirect economic, social, cultural and environmental impacts on indigenous peoples who live in the Project area. However, given the diversity of situations and contexts when seeking FPIC, there will be not an unique or universal way to carry it out. The various instruments that are enshrined in FPIC and implementation experiences will provide general guidelines and qualitative requirements that will guide the processes to solicit and obtain FPIC. Therefore, one of the first steps for seeking FPIC will be to agree with the concerned indigenous peoples' communities on the FPIC process itself. As local communities vary greatly in their sociocultural aspects, history, institutions and approaches to development, the processes that they will agree to undertake may also differ. Translation and interpretation into indigenous languages will have to be ensured throughout the whole process leading to FPIC.

28. During Project's implementation, FPIC will be ensured through a continuous and inclusive process of consultation and participation of the indigenous peoples, aimed at building trust with the communities, their organizations and governance institutions.

29. Overall, the **consultation process leading to the FPIC will be articulated as follows**:

a) Identify indigenous areas and conduct preliminary consultations with indigenous communities to solicit their FPIC;
b) Conduct a sociocultural and livelihoods assessment;
c) Confirm indigenous peoples' interest in engaging with the Project, obtain their FPIC and document the agreement.

a. <u>Identify indigenous areas and conduct preliminary consultations with indigenous communities to solicit their FPIC</u>

30. The CPMU through PMEL, and SIUs together with IFAD will pre-identify indigenous areas within the overall Project's geographic coverage that might be affected by its interventions. The overall criteria applied will be:

- Indigenous peoples' lands or communities located in the rural areas of the semi-arid of the Northeast region, located in the geographic areas covered by the Project.

31. This initial screening will also take into account indigenous peoples' communities with whom IFAD has already established partnerships in the frame of its investments.

32. Once the indigenous peoples' communities will be pre-identified, SIUs will work together with FUNAI regional and/or local offices and indigenous peoples' representative organizations at state/ regional level to prioritize indigenous communities that might engage with the specific projects at the state level. In prioritizing indigenous communities:

- Ensure that the general targeting criteria adopted by the Project to focus on the poorest and most vulnerable communities to social and environmental threats are included and prioritized;
- Ensure that geographic / territorial proximity with the other areas targeted by the Project is respected, to

123 On the targeting criteria adopted to identify and select the most vulnerable areas, municipalities and communities, refer to the Targeting section of the main text of the Project proposal.

promote territorial development and foster the exchange of good practices.

33. Furthermore, it is recommended to:

- Involve different indigenous peoples' groups in order to not concentrate activities in one state and with one indigenous group only;
- Assess which kind of activities are being currently developed with indigenous peoples by other actors from the public sector and the civil society in the selected area, in order to complement efforts and do not duplicate investments;
- Be open and receptive to indigenous peoples' willingness to join the Project; the demonstration of interest by the indigenous communities will be key to ensure a smooth implementation of project's activities.

34. Annex 1. provides a list of the Indigenous Lands located in the Northeast region (in the states of Alagoas, Bahia, Ceará, Maranhão, Paraiba, Sergipe) that might be potentially targeted by the Project. To be eligible, Indigenous Lands need to be located in the semi-arid; at the same time, as the majority of the indigenous population in the Northeast region lives outside an Indigenous Land, there might be the need to target communities or conglomerate of indigenous villages, instead of an Indigenous Land.

35. Once the indigenous areas will be identified, the second step will be to contact indigenous peoples' representative organizations/ reference people at the municipal/ local / community levels to kick start preliminary consultations with the indigenous communities. Organizations may also include NGOs or CSOs with proven experience in working with indigenous peoples.

36. Preliminary consultations with indigenous communities will be carried out by SIU and FUNAI together with indigenous peoples' organizations in order to: (i) share the project's objectives and scope and explain the nature of the proposed activities; (ii) clarify on roles and responsibilities of the parties involved; (iii) evaluate potential benefits and risks of the project and: (iv) assess indigenous peoples' interest to engage with the project. On the base of these first consultations, and the interest express, a number of indigenous peoples' groups/ communities will be identified as potential project beneficiaries.

b. Conduct a socio-cultural and livelihoods assessment

37. A socio-cultural and livelihoods assessment in indigenous communities will be carried out, in order to understand the overall context and to start strategizing local interventions together with the indigenous communities[124]. The assessment will be based on secondary data as well as on primary data collected through consultations carried out in the indigenous communities.

38. The assessment will be aimed to:

i. Carry out initial diagnosis of the situation in the Indigenous Lands and/ or villages visited, especially in relation to the situation of the local environment and natural resources, food security, productive activities (agricultural and non-agricultural) and other existing sources of income, focusing on the internal mechanisms of social and productive organization;
ii. Identify the main demands related to productive investments (agricultural and non-agricultural) and capacity building;
iii. Outline a differentiated working strategy tailored to the indigenous group in question, culturally appropriate to the traditional forms of social and productive organization;
iv. Identify specific activities to be developed with indigenous women and youth, and actions aimed at the valorization and promotion of indigenous traditional knowledge and practices in natural resource management.

39. The assessment will focus on the social, economic and environmental context of the indigenous area, with particular attention to the situation of natural resources, food and nutrition security and livelihoods strategies, as well as customary laws, decision-making and organizing strategies. The assessment should also identify priorities for productive investments to be carried out in indigenous communities, giving special attention to the most vulnerable segments of the population (ex. women head of household, adolescent girls, youth).

124 In the case of community' s productive investments aimed at strengthening families' resilience, the socio-cultural and livelihood assessment might be embedded into the initial survey in the frame of the development of Investment Plans in Resilience Innovation. See, Component 1 of the Project's proposal.

40. To facilitate the discussion on the above-mentioned topics with indigenous peoples' representatives, a survey will be applied. A sample of the questionnaire (in Portuguese) to conduct the socio-cultural and livelihoods assessment is provided in Annex 2.

41. An analysis of potential risks and vulnerabilities of the project in indigenous communities and tailored measures to minimize and mitigate negative impacts will be included. At the same time, the analysis will highlight the main opportunities in place and measures to enhance positive impacts. Overall, all project activities in indigenous communities will embrace the "do not harm" principle, identifying potential constraints along project's implementation and put in place measures to mitigate unintended negative impacts.

c. Confirm indigenous peoples' interest in engaging with the project, obtain their FPIC and document the agreement

42. The final step will be to confirm the interest of the indigenous communities in engaging with the project and obtain their FPIC; this will include formalize consent agreements, planning expected results and activities and implementing arrangements, and mechanisms to measure results. All consultation undertaken will be documented. The recording of the consultations will include: how participants were selected and invited; what documentation they received beforehand (and in which language); who participated; what was discussed and agreed.

43. The agreement should clearly articulate:

i. What was discussed and decided (issues, commitments, budget, timeframe, role, responsibilities, etc.);
ii. Who entered into the agreement (clearly identifying the individuals and they roles) and;
iii. What mechanisms have been set up to maintain dialogue and address disagreements, including arrangements during implementation and monitoring of the proposed activities.

44. If requested by the community, the agreement should be translated in the indigenous language. The results of FPIC process will orient the development of project's activities with indigenous peoples' communities. The strategy, approaches and implementing arrangements agreed will guide the work of project's staff and service providers throughout the implementation of the project's cycle, including a time-bound planning and specific M&E indicators on how to measure the results according to indigenous peoples' perspectives on well-being[125].

45. **Methodology**. The methodology employed during the process leading to FPIC will include: surveys, focus groups discussions (with men/ women/ youth) and individual interviews. The methodology will take into account the cultural socio-cultural specificities of each indigenous group, including their different forms of social and economic organization. Particular attention will be given to indigenous traditional knowledge and local management practices, in order to valorize indigenous peoples' collective management of land and natural resources. The methodology to work with indigenous peoples should be updated during project's implementation.

46. In order to promote **gender and generation equity**, the role of women and young people in community management will be assessed. All activities developed with indigenous peoples will ensure inclusion of women and youth in decision-making processes and that, at the same time, the interventions proposed will not increase women's burden of work. Focus groups with women only (and with youth only) is recommended in order to to ensure women and youth's full participation in the process of consultation, as well as into project's activities.

7. **Grievance and redress mechanism (GRM)**.

47. Will be developed as stipulated in title 10 of PCRPs Social, Environmental and Climate Assessment Procedures (SECAP) note. The different stages are further described with special attention given to protecting vulnerable social groups (indigenous people and other traditional communities; women) so that their complaints can be fully documented and reported while also ensuring that safeguards are put into place that guarantee their right to privacy and the confidentiality of shared information.

48. Stakeholder groups should be informed about the grievance mechanism, its functions and the steps to be taken for presenting and redressing complaints and grievances. The mechanism should be disclosed in a culturally appropriate manner for indigenous peoples, with a respect for their native languages, as well as their use of time,

125 Given the geographic extension of the region where the project will operate and the diverse range of implementing arrangements that might be established, according to the specific state and context, individual community consent agreements might be signed at different stages of project's implementation.

given that indigenous people make use of collective, participatory instances that rely on the expertise and knowledge of elders for reviewing disclosed information, and therefore, have a need of timeframes that are more flexible.

49. In consideration of the power dynamics that tend to place indigenous communities in a situation of disadvantage in relation to other social groups and institutions, as well as the history of violence, which has plagued indigenous and other traditional communities (ex: “Fundos de pasto”; quilombolas), especially in the face of social and environmental conflicts concerning the use of land and natural resources in many of these territories, the complainants’ identities should be kept confidential at all costs in these procedures.

50. This provision will be carried out by the Youth, Gender and traditional communities Specialists at the state level SIUs, who are responsible for stakeholder planning and engagement, and the M & E professionals, who play a key role in monitoring compliances and grievances and communicating with the instances designated for each function. Measures such as these will also be reinforced by project management bodies - specifically the advisory committee and Consultative Councils. The Focal Points on Indigenous Peoples’ Issues will also play a key role in ensuring confidentiality within any grievance processes undertaken by Indigenous people in particular, as well as ensuring that cultural considerations are taken into account during the different stages of the GRM process.

51. The procedures involved with making grievances and the various stages to be followed will be publicly disseminated in the first phase of the Project’s implementation cycle with all stakeholder groups and staff members. The GRM and its forms of operation, will be presented to Project teams in training sessions to ensure that they are fully familiar with its procedures. In capacity-building sessions held with focus groups – women, youth, indigenous groups and other traditional communities – information will be provided on the GRM. The procedures should be publicly advertised and disseminated through simple and culturally appropriate materials, that outline the following content: (i) the timeline for submitting grievances; (ii) expectation of waiting time for acknowledgement, response and resolution of grievances; (iii) description of the transparency of the procedures; (iv) explanation of the governing and decision-making structures, as well as the roles of each of the members of the Project team (ex: Youth, Gender and traditional communities Specialists; M & E professionals); (v) Information about other available grievance mechanisms, beyond the Project’s accredited ones within the immediate scope of PCRP, such as the GCF Independent Redress Mechanism.

52. Stages and procedures of the grievance redress process within PCRP:

(i) **FIRST STEP**: Complaints submitted should be sent to Youth, Gender and traditional communities Specialists at the state level (SIUs) and M & E professionals.

These professionals will be responsible for assessing that the complaints are eligible, providing the necessary information and ensuring that the most vulnerable social groups have their rights safeguarded. In the case of Indigenous People, the Focal Points on Indigenous Peoples’ Issues will serve as liaisons and mediators with these other professionals, due to the need to consider cultural aspects that are specific to each tribe.

(ii) **SECOND STEP**: Local grievance mechanisms will be activated at the state level. The process of conciliation, that makes use of community systems and mechanisms, is a priority.

Complaints should be taken outside of the community for resolution only when the complaints cannot be resolved through local channels. The complaints will be organized in a database, which should include information about each one of the complaints and their forms of resolution, including the solution provided and the need for redress, if deemed to be necessary. M & E professionals will have a fundamental role in fueling this data base and ensuring that all necessary information is registered once grievances are put forth by Project beneficiaries.

(iii) **THIRD STEP**: The project level grievance is activated. Claims are registered, investigated and reviewed:

1) 1st level: At this level, received complaints will be registered, investigated and solved by the SIU.

2) 2nd level: If the complaint has not been solved and could not be solved in level 1, the SIU must report it to the CPMU. Received complaints will be registered, addressed and monitored by the CPMU. Notwithstanding the above, all complaints may be directly submitted to BNDES (2nd level) where applicable stipulations in the Brazilian norms and in the BNDES ombudsman's office will prevail.

3) 3rd level: If the complaint has not been solved and could not be solved in level 2, the complaint must be submitted to IFAD following the procedure stipulated above.

53. The **GCF independent Redress Mechanism**[126] and the **Secretariat's indigenous peoples focal point** will be available for assistance at any stage, including before a claim has been made. The IRM is an instance that should be activated in cases that have not been able to be resolved through local means and mechanisms. It also represents another channel through which project affected people can seek redress, particularly when related to non-compliance with GCF policies or procedures. If complaints are filed with the independent Redress Mechanism, the accredited entities and executing entities of PCRP as well as any other relevant parties should fully cooperate with the authorities of the IRM by providing all required information.

8. Implementation and monitoring

54. The project executing entity will be responsible to ensure the implementation of the IPPF, in close collaboration the States and with other relevant project partners identified during the design phase.

55. To this aim, the main steps to follow at the initial stage of project implementation will be:

(i) Include indigenous peoples-related issues in the project's start-up workshop, in order to raise awareness on the FPIC process with project teams, ensuring understanding of FPIC principle and operational mechanisms, review agreements taken, implementing arrangements and timeline of project's activities in indigenous communities;
(ii) Present the GRM and ensure the project teams are familiar with its procedures;
(iii) Identify knowledge gaps in the project teams to address indigenous peoples' issues and plan capacity building and training accordingly;
(iv) Ensure SIUs hire one/ or more Focal Points on Indigenous Peoples' Issues, that will be responsible to follow-up on activities undertaken in indigenous communities, including defining implementing arrangements for their execution;
(v) Include indigenous peoples' indicators into baseline surveys/ studies;
(vi) Where possible community-based monitoring and information systems will be considered and supported;
(vii) Allocate adequate resources to carry out the proposed activities in indigenous communities.

56. Specific implementing agreements will be taken with indigenous communities during the consultation process.

[126] Information available at: https://irm.greenclimate.fund/home

Annex I. Indigenous Lands in the Brazilian Northeast region

State	Ecological Zone	Indigenous Land (*Terra Indigena*- TI) Indigenous Reserve (*Reserva Indígena* –RI)	Indigenous group/s
Alagoas	Mata Atlantica	RI Aconã	Tingui Botó
		TI Kariri-Xokó	Kariri-Xocó
		RI Karapotó	Karapotó
		TI Wassu Cocal	Wassu
	Caatinga/ Sertão	RI Fazenda Canto	Xukuru-Kariri
		TI Xukuru-Kariri	Xukuru-Kariri
		RI Mata da Cafurna	Xukuru-Kariri
		TI Jeripancó	Jiripancó
Bahia	Mata Atlantica	TI Comexatiba (Cahy-Pequi)	Pataxó
		TI Águas Belas	Pataxó
		TI Barra	Kiriri, Atikum
		TI Barra Velha do Monte Pascoal	Pataxó
		TI Barra Velha	Pataxó
		TI Imbiriba	Pataxó
		TI Aldeia Velha	Pataxó
		TI Coroa Vermelha	Pataxó
		TI Mata Medonha	Pataxó
		TI Tupinambá de Belmonte	Tupinambá
		TI Caramuru / Paraguassu	Pataxó Hã-Hã-Hãe
		TI Tupinambá de Olivença	Tupinambá
		TI Fazenda Bahiana (Nova Vida)	Pataxó Hã-Hã-Hãe
	Caatinga/ Sertão	RI Fazenda Jenipapeiro	Atikum
		Fazenda Remanso (Regularization)	Tuxá
		Fazenda Sempreverde (Regularization)	Pankararú
		Fazenda Sitio (Regularization)	Tuxá
		TI Vargem Alegre	Pankaru
		RI Pankaru	Pankaru
		RI Ibotirama	Tuxá
		TI Kiriri	Kiriri
		TI Massacará	Kaimbé
		TI Pankararé	Pankararé
		RI Quixabá	Xukuru-Kariri
		TI Brejo do Burgo	Pankararé
		TI Kantaruré	Kantaruré
		TI Tuxá de rodelas	Tuxá de rodelas
		RI Riacho do Bento	Tuxá
		RI Nova Rodelas (urban area)	Tuxá
		TI Tumbalalá	Tumbalalá
Ceará	Mata Atlantica	TI Lagoa Encantada	Jenipapo-Kanindé
		TI Pitaguary	Pitaguary
		TI Tapeba	Tapeba
		TI Tremembé da Barra do Mundaú	Tremembé
		TI Tremembé de Almofala	Tremembé
		TI Córrego João Pereira	Tremembé
		TI Tremembé de Queimadas	Tremembé
Maranhão	Amazônia Legal	TI Alto Turiaçu	Awá-Guajá; Ka'apor; Timbira
		TI Arariboia	Awá-Guajá; Guajajara
		TI Awá	Awá-Guajá
		TI Bacurizinho	Guajajara

		TI Bacurizinho (reestudo)	Guajajara
		TI Cana Brava	Guajajara
		TI Caru	Awá-Guajá; Guajajara
		TI Geralda Toco Preto	Krepum Katuyê
		TI Governador	Gavião Pukobiê; Guajajara
		TI Kanela	Canela Ramkokamekrá
		TI Kanela/Memortumré	Canela Ramkokamekrá
		TI Krenyê	Krenyê
		TI Krikati	Krikati
		TI Lagoa Comprida	Guajajara
		TI Morro Branco	Guajajara
		TI Porquinhos	Canela Apanyekrá
		TI Rio Pindaré	Guajajara
		TI Rodeador	Guajajara
		TI Urucu- Jurua	Guajajara
		TI Potiguara	Potiguara
Paraíba	Mata Atlântica	TI Potiguara de Monte-Mor	Potiguara
		TI Jacaré de São Domingos	Potiguara
Pernambuco	Serra	TI Xucuru	Xucuru
		TI Xucuru de Cimbres	Xucuru
		TI Kapinawa	Kapinawa
		RI Fulni-ô	Fulni-ô
		RI Tuxá de Inajá/Fazenda Funil	Tuxá
		TI Kambiwa	Kambiwa
		TI Pipipã	Pipipã
		TI Pankararu	Pankararu
		TI Entre Serras	Pankararu
		TI Pankará da Serra do Arapuá	Pankará
		TI Atikum	Atikum
		TI Truká	Truká
Sergipe		TI Caiçara/Ilha de São Pedro	Xoco

Source: Instituto Socioambiental, Terras Indigenas no Brasil: https://terrasindigenas.org.br/

Annex 2. Sample of socio-cultural and livelihoods assessment survey (in Portuguese).

QUESTIONÁRIO: DIAGNÓSTICO DA SITUAÇÃO SOCIO-PRODUTIVA DAS COMUNIDADES INDIGENAS

DATA	
POVO INDIGENA	
ALDEIA/ TERRA INDIGENA/ MUNICIPIO	
LOCAL/ PARTICIPANTES	
CONTATOS	

DATOS SOBRE A ALDEIA	
Numero de habitantes	
Numero de famílias	
Identificação da(s) liderança(s) na aldeia	
Fundação e tempo de existência da aldeia	
A aldeia têm associação?	

INFRAESTRUTURA E ATENDIMENTO BASICO	
Escola Têm escola na aldeia? Se tiver, até que nível? Quantos alunos têm na escola? Quantos professores trabalham na escola? Se não tiver escola, onde os alunos vão estudar?	
Saúde Têm posto de saúde? Se não tiver, onde fica o posto mais perto ou onde é feito o atendimento? Quantos agentes de saúde trabalham na aldeia? Quais são as principais doenças na comunidade?	
Água Quais são as fontes de acesso e abastecimento de água para uso domestico e para as atividades agrícolas? Têm poço(s)?	
Outras infraestruturas Que outras infraestruturas para uso produtivo existem na aldeia? *(ex. Casa de farinha)*	

ATIVIDADES PRODUTIVAS	
Que tipo de atividade é realizada exclusivamente para assegurar a alimentação das famílias?	
Que se planta principalmente na roça?	
Qual entre os plantio é a principal fonte de alimento? Que é o que mais se planta?	
Como se realiza o plantio? *(técnica utilizada)*	

A produção agrícola satisfaze a alimentação das famílias?	
Existe excedente na produção agrícola para comercialização? *(No caso, especificar que tipo de produtos estão à venda e onde ela é realizada)*	
Que é que você gostaria produzir que não têm?	
As sementes, vocês tem ou compram de fora?	
Quais são as principais dificuldades na produção?	
Como se desenvolve o trabalho para a produção agrícola? *(Ex. Por família nuclear ou extensa, por grupos, etc.)*	
Têm criação de animais de pequeno porte? Quais?	
Que é o que você come durante o dia? O que é que é produzido aqui e que compra de fora?	

ATIVIDADES NÃO PRODUTIVAS	
Têm produção de artesanato para uso interno ou para a venda?	
Existem pontos e negócios de comércio na aldeia?	
Tem funcionários públicos na aldeias? Quantos? *(ex. Professores, agentes de saúde, funcionários de FUNAI)*	
Que outras fontes de renda existem? *(Ex. Aposentadoria, Bolsa Família)*	

CONSIDERAÇÕES FINAIS	
Que poderia ser feito para melhorar a qualidade de vida na aldeia? *(Especificar tipo de atividade)*	
De que forma as atividades deveriam ser desenvolvidas? *(Ex. Por família nuclear, por família extensa, por associação, por grupos de famílias/ aldeias..)*	
Considerações Finais para o Projeto	

DIAGNÓSTICO DA SITUAÇÃO AMBIENTAL	
Qual é a situação climática com relação à seca? As queimadas tem sido frequentes nos últimos anos?	
Qual é a situação dos recursos madeireiros?	
Tem invasão ilegal de madeireiros na aldeia?	
Tem fiscalização dos limites da Terra Indígena ou da aldeia? Feita por quem?	
Como é a situação da caça? E do peixe?	

APPENDIX II

Principles and Practices for Design and Implementation of Climate Resilient Productive Systems (CRPS) in Semiarid Northeast Brazil

Introduction

FAO[127] (based on IPCC[128]) classified technologies and practices that improve farmer's climate resiliency in: improved agronomic practices, integrated nutrient management, tillage and residue management, water management, and agroforestry. These practices are often grouped and referred to as Climate Resilient Agriculture, or Climate-Smart Agriculture, and can consist of several methods, arrangements, and technologies. What is climate resilient to one biome or a production system may not be applicable to another. Climate challenges are also varied in any given geography and adaptation solutions depend on the size of the area and resources available to the farmer. Thus, IFAD hired a team of expert consultants including agronomists, environmental scientists, an anthropologist and a farmer; who spent three weeks in the field consulting with several farmers, NGOs, technical assistance teams as well as universities and research institutions; to respond to the following question: what is climate resilient agriculture for family farmers in the Brazilian semiarid?

Six guiding principles for Resilient Systems in Semi-arid North-east Brazil

The Project will encourage family farmers to apply principles and practices of resilient production to set up two integrated and interdependent agricultural subsystems to ensure productivity during twelve months of the year: one specialized dry subsystem and only depending on the rainy season for water and another specialized year-round production, that makes use of specific water sources and storage, particularly during the long dry season. In the semi-arid region, IFAD found that the concept of climate resilient production translates into practices that will increase availability, flow and retention of water in the system. Pragmatically, it means the simultaneous implementation of the following practices and principles, that shall define what Climate Resilient Productive Systems (CRPS):

(i) Soil Preparation: Maintenance of dispersed trees, setting up cradles and natural fertilization;
(ii) Soil Protection: Soil cover and biomass production with resilient plant varieties;
(iii) Water management: capture and storage (both in soil and vegetation), contour lines or curves and terraces;
(iv) Planting practices: seeking to enhance stratification, diversification and densification with herbaceous, shrub and tree species maximizing photosynthetic capacity of the plot;
(v) Management of cultivated vegetation: active pruning and thinning;
(vi) Sustainable animal husbandry: pasture rotation and fences.

While most of the practices to be supported (see Table A below) have the potential to yield sustainable land management benefits and increase production, they require a significant change in farmers' practices and quite substantial investments. GCF support will enable farmers to take a longer-term perspective in anticipation of the

127 BRANCA, G. et al. **Climate-Smart Agriculture: A Synthesis of Empirical Evidence of Food Security and Mitigation Benefits from Improved Cropland Management**. Rome: FAO, 2011. 35 p.
128 IPCC. **Climate Change 2007: Mitigation of Climate Change. Working Group III contribution to the Fourth Assessment Report of the IPCC**. Cambridge, United Kingdom and New York, NY, USA Cambridge University Press, 2007.

significant financial, economic and livelihood benefits achievable through the application of adaptation measures relative to the declines in production and income that are anticipated to result from the effects of climate change.

GCF support responds to the greatly added urgency which climate change projections give to the application of these practices, and recognizes that for them to function effectively as adaptation measures, they must be applied as part of a larger scale program and be directed and adjusted considering the needs, priorities and cultural specificities, both regional and at the level of productive units.

These practices are interlinked and their benefits are synergic, which means they must be implemented together. Assembling an agricultural system with these elements makes it a water producer, not a consumer, which is the correct approach for a region with low water availability. Table 2 below presents the adaptation benefits that each principle provides to the family farmer.

Table 6. Principles and Practices of Climate Resilient Agriculture Production in the Semiarid

Practices / Adaptation Benefits	Retain soil moisture	Recharge soil moistue	Increase organic matter in soil	Increase photosynthesis	Increase soil carbon	Capture water	Capture humidity in air	Improve microclimate	Reduce erosion
(i) Soil Preparation: Maintenance of dispersed trees, micro-valleys and natural fertilization	x		x	x				x	x
(ii) Soil Protection: Soil cover and biomass production with resilient plant varieties	x		x		x	x	x		x
(iii) Water retention: level curves and terraces		x				x			x
(iv) Planting: Stratification, diversification and densification			x	x		x		x	x
(v) Management: Active pruning and thinning;				x				x	
(vi) Grazing: Pasture rotation and fences.			x	x	x				x

(i) Soil Preparation

The first step in soil preparation is to eliminate the slash and burn as a method of land clearing, since studies show it is inappropriate for agricultural production in the semiarid because it continuously degrades soil and biodiversity of the *Caatinga*.[129] Land clearing for pastures and plantations will be performed by selecting, pruning and maintaining dispersed trees. Maintaining or even increasing the number of dispersed trees in the pastures in the dry tropics that endure prolonged dry periods, represents an option to increase the productivity, profitability and sustainability of animal husbandry systems.[130,131] The removed biomass from the land clearing will serve as soil cover as explained in part (ii).

Soil preparation activities must be carried out during the dry period, well before the first rainfall, so the plants and animals can take advantage of all the water for their development, avoiding delays and compromising results. Cradles for planting seedlings or seeds should be opened, reserving the top soil to put back into the cradle at the time of planting. They must be rich in nutrients to allow the plants to have enough food grow. The use of natural fertilization will be encouraged, be it the fertilizer of ruminants or directly from the biomass produced by the system as well as phosphate and, if possible, rock dust. Fertilization is not a simple provision of nutrients to the plant, it has the function of activating the soil biological activity and involves the cycle of water and minerals. If plantation lines are contemplated, they should be concave in their longitudinal axis to accommodate the natural

129 MAMEDE, M.; ARAÚJO, F. Effects of slash and burn practices on a soil seed bank of Caatinga vegetation in Northestern Brazil. **Journal of Arid Environments**, n. 72, p. 458 - 470, 2008.
130 ARAÚJO FILHO, J. A. **Manejo pastoril sustentável da caatinga**. Recife, PE: Projeto Dom Helder Camara, 2013. 200 p.
131 LASCO, R. D.; DELFINO, R. J. P.; ESPALDON, M. L. O. Agroforestry systems: helping smallholders adapt to climate risks while mitigating climate change. **Wiley Interdisciplinary Reviews: Climate Change,** v. 5, n. 6, p. 825 - 833, 2014.

humidity of the environment and favor the development of the plantation, creating a micro-valley where the root of the plant is located.[132]

(ii) Soil Protection

The soil is a living organism and, thus, needs feeding. Biomass or organic matter is the vital food of the soil, especially in the tropical climate, where nutrient cycling is vigorous and the decomposition of organic matter is quick. A malnourished plant under stress of any origin, increases respiration, reduces photosynthesis, and consequently accumulates less carbohydrates, water and produces smaller harvests. A compacted soil with little macrobiotic life prevents roots from obtaining nutrients and water. Therefore, to meet the needs of the plant, the farmer must protect the soil from sun, wind and rain, in addition to nourishing the fauna. Healthier plants result in photosynthetic efficiency that ensures better yields. This is so significant, that if there is availability at low cost, family farmers will be encouraged to bringing biomass from outside sources to cover the soil.

In order to grow biomass, a plantation matrix must be constructed with specialized species that photosynthesize during the long dry season that is natural in the dynamic of the Caatinga. This means combining plants into a system that is capable of producing biomass and accumulating water during all year long, including under the stress of climate induced droughts. This matrix should consist of cacti, euphorbiaceae, spondias and agavaceous.

If this is possible, at the beginning of the implementation, farmers will produce forage for animals and food for human consumption. Always observing, however, that the biomass that is withdrawn from the system should be the smallest part (1/3), leaving most of it (2/3) to feed the system itself. These fractions will reverse as the soil becomes more fertile and the system healthier.

(iii) Water management

Water can be considered the main limiting factor for agriculture and animal husbandry in the *Caatinga* zone. Nevertheless, the water debate should be focused not on its absence but on how to preserve water during the rainy season so that it can be used during the rest of the year.

It is fundamental to understand that the most important water reserve must be the soil itself. This can be accomplished by reconstructing the natural infiltration promoted by the forest systems that have been depleted. To build a Climate Resilient Productive System in degraded and compacted areas, such as the ones often found in the Semi-arid region, it is necessary to plant in terraces and along contour lines, as well as installing artificial systems for capture, storage and infiltration of rain water, such as ditches, reservoirs and microbasins, to eliminate runoff and promote forced recharge, and thus improve soil hydration.[133]

Component 2 details several water harvesting techniques which have are being widely used in the region. It is crucial, nevertheless, that these technologies be implemented as a means to shift the culture of production in the *Caatinga* towards climate resiliency. Implemented with the current agricultural practices, these technologies will only increase the dependency on external water and fertilization resources, as soils will continue to degrade and compact. Yet, with the development of the Climate Resilient Productive Systems proposed here, the infiltration can occur naturally making more springs perennial and promoting a biological water reserve in the roots and leaves of specialized vegetation (species such as forage cactuses, mandacaru, deer papaya, umbu, sisal, piteira, aloe).

132 SOUSA, H.; MATOS ALMEIDA, S. R. **Jardinagem Florestal: Criando e manejando Agroflorestas de alimentos**. Sl: Edição do Autor, 2016.
133 BRANCA, G., et al. **Climate-smart agriculture: a synthesis of empirical evidence of food security and mitigation benefits from improved cropland management**. Rome: FAO, 2011.35 p.

(iv) Planting practices: stratification, diversification and densification

Stratified, diversified and densified cropping patterns increase the photosynthetic capacity of the land, and therefore, the volume of biomass produced per cultivated area, increasing water circulation and promoting an improvement in the microclimate.[134]

The competition between plants takes place in the strata and not for water or nutrients. Plants of different strata harmonize because they have different light requirements. Crops of the lower stratum produce in the shade, those of the middle stratum need a little more luminosity, and so on, up to those of the emergent stratum that require full light. A system with photosynthetic efficiency associates plants belonging to different strata, that do not compete with each other.

According to Sousa[135],the strata and their respective occupancy rates can be:

- Ground stratum, plants can occupy 10 to 20% of the horizontal space
- Low stratum, plants can occupy 80 to 90% of the horizontal space
- Medium stratum, plants can occupy 50 to 60% of the horizontal space
- High stratum, plants can occupy 20 to 40% of the horizontal space
- Emergent stratum, plants can occupy 10 to 25% of the horizontal space

Whereas in a monoculture, the potential photosynthesis can reach up to 100% in any given areas, in stratified plantations, it can vary from 160% to 235%. Considering that the sun is the only source of energy, this energy needs to be harnessed to the highest intensity. Thus, maximum plant cover is necessary. The horizontal density that complements the stratification uses both commercial and non-commercial species, the latter to be used to generate biomass that will be incorporated into the system.[135]

Several studies suggest that stratified systems may be more resilient to extreme climatic conditions than annual crops and tree-crop monocultures, as they have several mechanisms to reduce the impact of droughts, such as buffering of humidity, reduction of air and soil temperature extremes, windbreaks and shelter belts to slow wind speed and reduce water loss from evapotranspiration.[136,137]

The diversification and stratification must increase in time as the system progresses. First, the project will promote tested consortium models can both improve the production conditions as well stimulate discussions on new agricultural practices and combinations between the species the farmer is already familiar with. As the system becomes more productive, the diversity and quantity of products will increase and, in return, the system it will produce water instead of consuming it.

(v) Management of cultivated vegetation: active pruning and thinning

Pruning, thinning and removal of the senile individuals, to open more space to restart the planting process under more evolved conditions is crucial to the success of the system. Short-cycle crops (herbaceous and shrubs) inter-cropped with tree species (timber and fruit) should be planned, so that after a few years of agricultural production, the trees may be cut to form a new clearing, thus restarting a new production cycle. As the productive environment

134 LASCO, R. D.; DELFINO, R. J. P.; ESPALDON, M. L. O. Agroforestry systems: helping smallholders adapt to climate risks while mitigating climate change. **Wiley Interdisciplinary Reviews: Climate Change,** v. 5, n. 6, p. 825 - 833, 2014.
135 SOUSA, H.; MATOS ALMEIDA, S. R. **Jardinagem Florestal: Criando e manejando Agroflorestas de alimentos**. Sl: Edição do Autor, 2016.
136 BRANCA, G., et al. **Climate-smart agriculture: a synthesis of empirical evidence of food security and mitigation benefits from improved cropland management**. Rome: FAO, 2011.35 p.
137 MICCOLIS, A. et al. **Restauração Ecológica com Sistemas Agroflorestais: como conciliar conservação com produção. Opções para Cerrado e Caatinga.** Brasília: Instituto Sociedade, População e Natureza – ISPN/Centro Internacional de Pesquisa Agorflorestal – ICRAF, 2016. 266 p.

improves permanently, increasing production and productivity, there is no need for the farmer to leave the plot and clear new land. [138]

Natural pruning - caused by wind, lightning, insects - is used by Nature to 'organize' natural forest systems. The function of pruning is the input of organic waste and the rejuvenation of the species and the system. In cultivated systems, pruning can serve several general purposes simultaneously: ensure structure in the stratum of the system; production of biomass to protect and feed soil; production of stakes and stems for planting or fences; forage production; or for marketing such as firewood, stakes, etc. Pruning can also be carried out with more specific objectives, as is the case of the pruning of food species to boost production and of timber species to produce a better stem.

Swidden agriculture is an ancestral technique; to a certain extent it is the indigenous agriculture or itinerant cultivation, which, after abandoning the area, relies on Nature for the recovery of soil fertility, through regeneration of the natural vegetation. Planned and practiced on the basis of the principles of forest management, CRP Systems are a model of food production that guarantees recovery, improvement and conservation of the soil, production of clean, sweet and crystalline water, abundance of healthy foods, and food security and sovereignty for the farming family.

It is important to reinforce that with this kind of active management; the whole system sprouts vigorously, generating more biomass production. When this practice is done correctly and at the appropriate time, the system becomes resistant to drought periods and acquires resilience for a good use of the rainy season.

(vi) Sustainable animal husbandry: pasture rotation and fences

Animal husbandry, especially goats and sheep, is the main activity of the family farmer beneficiaries of this Project. Many authors have shown that stratified systems with trees can provide benefits for this activity[139]. Trees can be an important source of shade and shelter to animals improving productivity by reducing heat stress in tropical climates. In addition, some tree species produce leaves and pods which are highly palatable to these animals and are available during the dry season when pastures are of a low nutritional quality. Native trees of the *Caatinga* (such as *faveleira* or *carnaúba*) improve weight gain and milk production.[140] However, grazing and forage management need to be adapted so as to increase resilience to climate change.

Areas with a low grazing pressure show a higher diversity of plant species than areas with a higher grazing intensity. To implement the climate resilient production proposed here, there needs to be a reduction of free-roaming livestock, fodder storage as well as pasture rotation[141].

Forage will be grown with the system described above.[142] Especially in the first few years, nevertheless, animals should not interfere in the system, thus making fences necessary. The installation of live fence that require no maintenance or renovation will be encourage. These live fences/trees can be part of the system and fulfill several other functions such as wind-breaking, biomass production; fruits and fodder production and also serve as shelter for the animals.

---

138 SOUSA, H.; MATOS ALMEIDA, S. R. **Jardinagem Florestal: Criando e manejando Agroflorestas de alimentos**. Sl: Edição do Autor, 2016.

139 ESQUIVEL MIMENZA, H. **Tree resources in traditional silvopastoral systems and their impact on productivity and nutritive value of pastures in the dry tropics of Costa Rica**. 2007. (MSc). CATIE, Turrialba, Costa Rica.

140 ARAÚJO FILHO, J. A. **Manejo pastoril sustentável da caatinga**. Recife, PE: Projeto Dom Helder Camara, 2013. 200 p.

141 SCHULZ, K. et al. Grazing, forest density, and carbon storage: towards a more sustainable land use in Caatinga dry forests of Brazil. **Regional Environmental Change,** v. 18, n. 7, p. 1969 – 1981, 2018.

142 MICCOLIS, A. et al. **Restauração Ecológica com Sistemas Agroflorestais: como conciliar conservação com produção. Opções para Cerrado e Caatinga.** Brasília: Instituto Sociedade, População e Natureza – ISPN/Centro Internacional de Pesquisa Agorflorestal – ICRAF, 2016. 266 p.

Diversity of Climate Resilient Models

In addition to the adaptation benefits laid out above, the practices prosed in this project have the potential to reduce atmospheric carbon by storing it in the aboveground biomass of trees, in soil organic carbon and, indirectly, by reducing pressure for forest clearance.

In the Brazilian semiarid, it should be noted that there are several concrete models that apply the practices and principles of CRPS cited in Table A. For instance, during one of the preparatory field missions, IFAD team had the opportunity to learn about the 'syntrophic'[143] model from a farming family in the municipality of Riachão do Jacuípe. This system is characterized by being extremely diversified, managed with pruning and densification, and for having as its main productive activities: goat rearing (milk and meat), vegetables and fruits. Another case observed during the project's design mission was the agroforestry model of forage production, which is based on the planting of forage cactuses and various other forage tree species.

There are records in the literature of CRPSs developed by Embrapa Goats and Sheep Research Centre, located in Sobral. This model is characterized by the management of *Caatinga* areas with thinning, 'lowering'[144] and enrichment techniques. This kind of system has already been successfully implemented in land reform settlements located in Rio Grande do Norte[145], as a result of the work of the IFAD-funded Projeto Dom Helder Camara. It is also worth mentioning the *recaatingamento* model, which is designed for the recovery of degraded areas and is being used in the region that is known as the Sertão do São Francisco da Bahia Territory.[146]

Mentioning these examples, we want to point out, on the one hand, that there are already some proposals of CRPS being implemented by family farmers with positive results. Although these examples follow the same general principles, the diversity (of size, crops, arrangement) is as a key element to deal with the different situations that characterize the reality of the target region. On the other hand, these examples also indicate that such initiatives are few and far between, not yet reaching a larger scale.

143 Syntropic' Agriculture is a term referring to a na agroforestry farming system (AFS) based on the concept of syntropy (contrary to entropy) characterized by the organization, integration, equilibrium and preservation of energy in the environment (MONTE, A. L. **Sintropia em agroecossistemas: subsídios para uma análise bioeconômica**. 2013. 112 p. (MSc). Mestrado Profissional em Desenvolvimento Sustentável, Universidade de Brasília, Brasília.)

144 This means pruning the higher branches of trees so as to induce sprouting that is easy to reach for the grazing animals.

145 SIDERSKY, P.; JALFIM, F.; RUFINO, E. Combate à pobreza rural e sustentabilidade no semi-árido nordestino: a experiência do Projeto Dom Helder Câmara. **Agriculturas: experiências em agroecologia,** v. 5, n. 4, p. 23 - 28, 2008.

146 Cf. o site: http://www.recaatingamento.org.br/

Appendix III

SECAP Risk Categorization Screening Questionnaire

Guiding questions for environment and social screening	Yes/no	Comments/explanation
Category A – the following may have significant and often irreversible or not readily remedied adverse environmental and/or social implications.		
Project location		
1. Would the project develop any wetlands? (Guidance statement 1)	No	
2. Would the project cause significant adverse impacts to habitats and/or ecosystems and their services (e.g. conversion of more than 50 hectares of natural forest, loss of habitat, erosion/other form of land degradation, fragmentation and hydrological changes)? (Guidance statements 1, 2 and 5)	No	
3. Does the proposed project target area include ecologically sensitive areas, areas of global/national significance for biodiversity conservation, and/or biodiversity-rich areas and habitats depended on by endangered species? (Guidance statement 1)	No	
4. Is the project location subjected to major destruction as a result of geophysical hazards (tsunamis, landslides, earthquakes, volcanic eruptions)?	No	
Natural resources		
5. Would the project lead to unsustainable natural resource management practices (fisheries, forestry, livestock) and/or result in exceeding carrying capacity. For example, is the development happening in areas where little up-to-date information exists on sustainable yield/carrying capacity? (Guidance statements 4, 5 and 6)	No	
6. Would the project develop large-scale aquaculture or mariculture projects, or where their development involves significant alteration of ecologically sensitive areas?	No	
7. Would the project result in significant use of agrochemicals which may lead to life-threatening illness and long-term public health and safety concerns? (Guidance statement 14)	No	
8. Does the project rely on water-based (groundwater and/or surface water) development where there is reason to believe that significant depletion and/or reduced flow has occurred from the effects of climate change or from overutilization? (Guidance statement 7)	No	
9. Does the project pose a risk of introducing potentially invasive species or genetically modified organisms which might alter genetic traits of indigenous species	No	

or have an adverse effect on local biodiversity? (Guidance statement 1)		
10. Does the project make use of wastewater (e.g. industrial, mining, sewage effluent)? (Guidance statement 7)	No	The project does not make use of wastewater, however, it does include small family size units of green septic tanks to treat wastewater. Small family units of greywater treatment and reuse will also be installed.
Infrastructure development		
11. Does the project include the construction/ rehabilitation/upgrade of dam(s) and/or reservoir(s) meeting at least one of the following criteria? - more than 15 metre high wall; - more than 500 metre long crest; - more than 3 million m^3 reservoir capacity; or - incoming flood of more than 2,000 m^3/s (Guidance statement 8)	No	
12. Does the project involve large-scale irrigation schemes rehabilitation and/or development (more than 100 hectares per scheme)? (Guidance statement 7)	No	
13. Does the project include construction/ rehabilitation/upgrade of roads that entail a total area being cleared above 10 km long, or any farmer with more than 10 per cent of his or her private land taken? (Guidance statement 10). Will the works entail temporary and/or permanent resident workers?	No	
14. Does the project include drainage or correction of natural waterbodies (e.g. river training)? (Guidance statement 7)	No	
15. Does the project involve significant extraction/diversion/containment of surface water, leaving the river flow below 20 per cent environmental flow plus downstream user requirements? (Guidance statement 7)	No	
Social		
16. Would the project result in economic displacement or physical resettlement of more than 20 people, or impacting more than 10 per cent of an individual household's assets? (Guidance statement 13)	No	
17. Would the project result in conversion and/or loss of physical cultural resources? (Guidance statement 9)	No	
18. Would the project generate significant social adverse risk/impacts to local communities (including disadvantaged and vulnerable groups, indigenous people, persons vulnerable to GBV and sexual exploitation and abuse and people with disabilities) or	No	

other project-affected parties? (Guidance statement 13)		
Other		
19. Does the project include the manufacture and transportation of hazardous and toxic materials which may affect the environment? (Guidance statement 2)	No	
20. Does the project include the construction of a large or medium-scale industrial plant?	No	
21. Does the project include the development of large-scale production forestry? (Guidance statement 5)	No	
Rural finance		
22. Does the project support any of the above (Question 1 to Question 21) through the provision of a line of credit to financial service providers? (Guidance statement 12)	No	
Category B – the following may have some adverse environmental and/or social implications which can be readily remedied.		
Location		
23. Does the project involve agricultural intensification and/or expansion of cropping area in non-sensitive areas that may have adverse impacts on habitats, ecosystems and/or livelihoods? (Guidance statements 1, 2 and 12)	No	
Natural resource management		
24. Do the project activities include rangeland and livestock development? (Guidance statement 6)	No	
25. Does the project involve fisheries where there is information on stocks, fishing effort and sustainable yield? Is there any risk of overfishing, habitat damage and knowledge of fishing zones and seasons? (Guidance statement 4)	No	
26. Would the project activities include aquaculture and/or agriculture in newly introduced or intensively practiced areas? Do project activities include conversion of wetlands and clearing of coastal vegetation, change in hydrology or introduction of exotic species? (Guidance statement 4)	No	
27. Do the project activities include natural resource-based value chain development? (Guidance statements 1, 6 and 12)	No	
28. Do the project activities include watershed management or rehabilitation?	No	

29. Does the project include large-scale soil and water conservation measures? (Guidance statements 1 and 5)	No	
Infrastructure		
30. Does the project include small-scale irrigation and drainage, and small and medium dam subprojects (capacity < 3 million m^3)? (Guidance statements 7 and 8)	Yes	Small scale irrigation is included
31. Does the project include small and microenterprise development subprojects? (Guidance statements 12 and 13)	Yes	Producer's organizations will be provided with tools and supplies for market access
32. Does the project include the development of agroprocessing facilities? (Guidance statements 2, 6 and 12)	No	
33. Would the construction or operation of the project cause an increase in traffic on rural roads? (Guidance statement 10)	No	
Social		
34. Would any of the project activities have minor adverse impacts on physical cultural resources? (Guidance statement 9)	No	
35. Would the project result in physical resettlement of 20 people or less, or impacting less than 10 per cent of an individual household's assets (Guidance statement 13)?	No	
36. Would the project result in short-term public health and safety concerns? (Guidance statement 14)	No	
37. Would the project require a migrant workforce or seasonal workers (for construction, planting and/or harvesting)? (Guidance statement 13)	No	
Rural finance		
38. Does the project support any of the above (Question 23 to Question 37) through the provision of a line of credit to financial service providers? (Guidance statement 12)	No	

Guidance for categorization

"Yes" response to any questions between 1 and 22	Environmental and social category is A	Environmental and Social Impact Assessment or an Environmental and Social Management Framework (full or specific) is required depending on availability of information. Also, some specific questions would require the below specific actions:

		• Yes to question 16 – A Resettlement Action Plan is required depending on availability of information. • Yes to question 17 – A Physical Cultural Resources Management Plan is required that includes provisions for managing chance finds at implementation. • Yes to question 18 – Free, prior and informed consent should be obtained/Free, Prior and Informed Consent Implementation Plan is required depending on whether the affected communities are identifiable. In instances where indigenous peoples are affected an Indigenous Peoples Plan is required. A Social Impact Assessment is required. • Yes to question 8 and/or question 15 – A water resources management plan for the project is required. • Yes to question 7, question 9 and/or question 19 – A pest management plan is required.
"No" response to all questions between 1 and 22 and "Yes" response to any questions between 23 and 38	Environmental and social category is B	An environmental and social analysis to develop an Environmental and Social Management Plan (ESMP) is required.
"No" response to all questions between 1 and 38	Environmental and social category is C	No further analysis is required.

In case projects fall under both category A and B, the highest category will be taken as reference. The determination of the project category and classification will depend on the magnitude of impacts and would depend on the scale of such activities; a cautious approach to the concern of cumulative impacts is considered essential. In such cases, the necessary environmental and social analysis and associated budget should be incorporated into project design. Such projects may be considered for category B.

Determining the environmental and social category A, including the extent of assessments and studies to be conducted, will also take into account available information, i.e. recent studies and assessments, including other initiatives in the country, to the extent these are relevant to the proposed project.

Declassification (from A to B or from B to C) may also be possible in case negative externalities are being addressed by other projects or activities implemented by third parties.

Guiding questions for climate risk screening	Yes	No	Additional explanation of "yes" response*
1.Is the project area subject to extreme climatic events, such as flooding, drought, tropical storms or heat waves?	X		
2.Do climate scenarios for the project area foresee changes in temperature, rainfall or extreme weather that will adversely affect the project impact, sustainability or cost over its lifetime?	X		

3. Would the project make investments in low-lying coastal areas/zones exposed to tropical storms?		X	
4. Would the project make investments in glacial areas and mountains zones?		X	
5. Would the project promote agricultural activity in marginal and/or highly degraded areas that have increased sensitivity to climatic events (such as on hillsides, deforested slopes or floodplains)?		X	
6. Is the project located in areas where rural development projects have experienced significant weather-related losses and damages in the past?	X		
7. Would the project develop/install infrastructure in areas with a track record of extreme weather events?		X	
8. Is the project target group entirely dependent on natural resources (such as seasonal crops, rainfed agricultural plots, migratory fish stocks) that have been affected by in the last decade by climate trends or specific climatic events?			
9. Would climate variability likely affect agricultural productivity (crops/livestock/fisheries), access to markets and/or the associated incidence of pests and diseases for the project target groups?		X	
10. Would weather-related risks or climatic extremes likely adversely impact upon key stages of identified value chains in the project (from production to markets)?			
11. Is the project investing in climate-sensitive livelihoods that are diversified?			
12. Is the project investing in infrastructure that is exposed to infrequent extreme weather events?			
13. Is the project investing in institutional development and capacity-building for rural institutions (such as farmer groups, cooperatives) in climatically heterogeneous areas?			
14. Does the project have the potential to become more resilient through the adoption of green technologies at a reasonable cost?			
15. Does the project intervention have opportunities to strengthen indigenous climate risk management capabilities?			Maybe, depending on selected states and target area.
16. Does the project have opportunities to integrate climate resilience aspects through policy dialogue to improve agricultural sector strategies and policies?		X	The project was designed to integrate climate resilience measures.
17. Does the project have potential to integrate climate resilience measures without extensive additional costs (e.g. improved building codes, capacity-building, or including climate risk issues in policy processes)?		X	The project was designed to integrate climate resilience measures.
18. Based on the information available would the project benefit from a more thorough accounting of GHG emission ?		X	FAO has done so. Please see Annex 22

Appendix IV

State short profiles

BAHIA

Precipitation

Average annual rainfall is approximately 550 mm / year decreasing by 91.70 mm since 1981. For the period 1981 – 2019, december has been the rainiest month on average with 92.74 mm while Semptember presents the lowest average rainfall at 11.40 mm. Rainfall patterns are erratic with deviations ranging from -74.59 to 179.63mm.

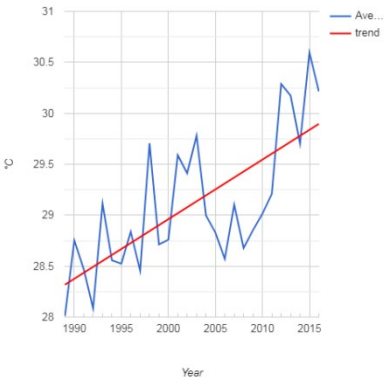
Temperatures

Average annual minimum temperature is 20.15°C, while maximum temperature is 29.90°C. For the period 1981 – 2016 october presents the highest average temperature at 30.59°C, while August was the lowest at 17.48°C ; mininimum and maximum temperature have increased by 0.87°C and 1.58°C respectively.

Land Productivity Dinamics

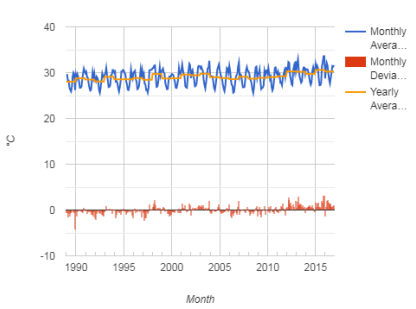
Caatinga portion of Semiard Bahia has 72% of land territory with declining productivity, an adittional 20% present early signs of decline or are stable but stressed. Similar patterns apply throughout B.

Max Temperature 1989 – 2016



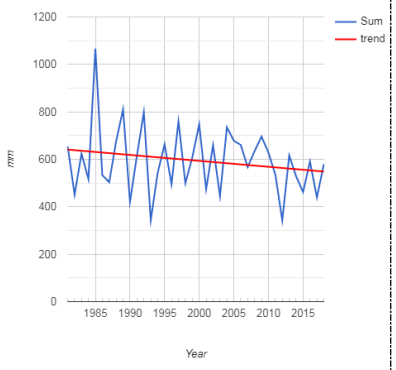
Source: ECMWF; ENSEMBLES

Max temp. Monthly time series 1989-2016



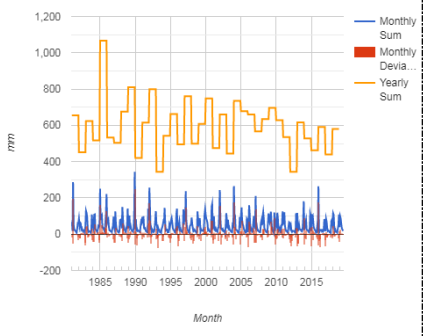
Source: ECMWF; ENSEMBLES

Average Annual Prec. 1981 - 2019



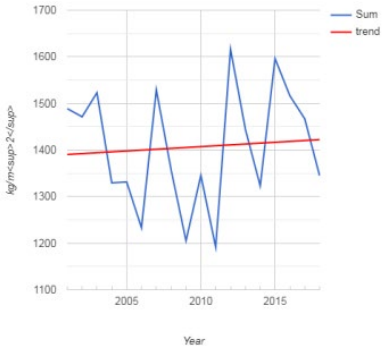
Source: CHIRPS (v2.0)

Prec. monthly time series 1981 – 2019



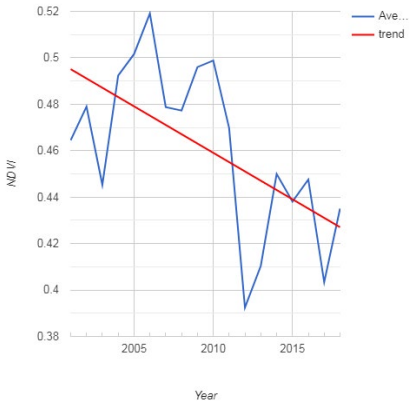
Source: CHIRPS (v2.0)

Climatic Water Deficit 2001 – 2018



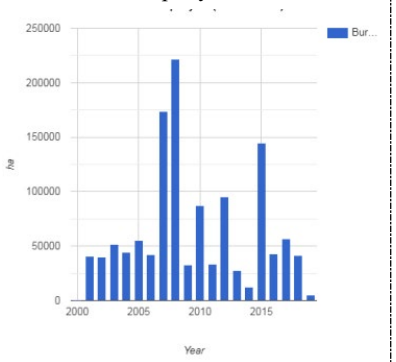
Source: MOD16A2 - MODIS/Terra Net Evapotranspiration 8-Day L4 Global 500 m SIN Grid

NDVI MODIS (250m) 2001-2018



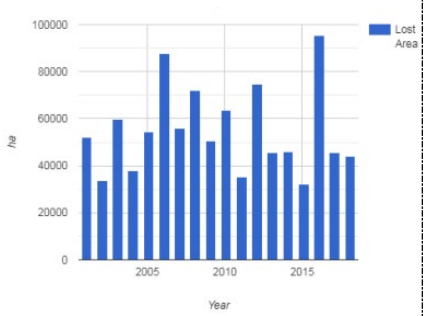
Source: NDVI from NIR-RED bands - MOD13Q1.006 Terra Vegetation Indices 16-Day Global 250m

Burned area per year 2000-2018



Source: MCD64A1: MODIS/Terra and Aqua Burned Area Monthly L3 Global 500 m SIN Grid V006

Forest Change 2000 - 2018



Source: Global Forest Change 2000–2018[147]

Climatic Vulnerabilities and Risks

Modeled projections of future climate identify a likely increase in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall.The project area is highly vulnerable to droughts, river floods, and wildfire; and mildly to highly vulnerable to water scarcity and extreme heat.[148] The annual decrease in rainfall in the region and the increase in temperature could have a negative impact on the agricultural sector if trends continue. The dry period will be even warmer, droughts may be more intense and frequent, and natural vegetation may suffer from water stress. Given interannual seasonality, it is likely that plantations and rain-dependent crops will decrease their productivity in the coming years. In addition, the increase in extreme events could have a significant impact on soils.

147 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53.

148 Global Facility for Disaster Reduction and Recovery (GFDRR), 2019. "Think Hazard tool"

PIAUI

Precipitation

Average annual rainfall is approximately 760 mm / year decreasing by 66.31 mm since 1981. For the period 1981 – 2019, March has been the rainiest month on average with 182.25 mm while August presents the lowest average rainfall at 2.12 mm. Rainfall patterns are erratic with deviations ranging from -105.94 to 263.85 mm.

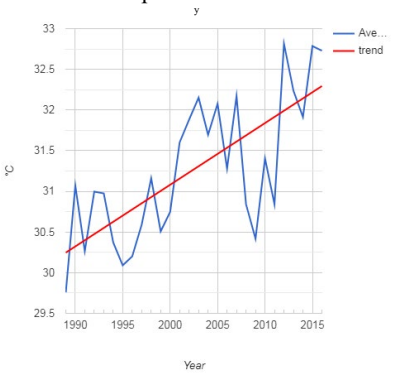
Temperatures

Average annual minimum temperature is 22.81°C, while maximum temperature is 32.29°C. For the period 1981 – 2016 october presents the highest average temperature at 34.17°C, while July was the lowest at 20.85°C ; mininimum and maximum temperature have increased by 1.20°C and 2.05°C respectively.

Land Productivity Dinamics

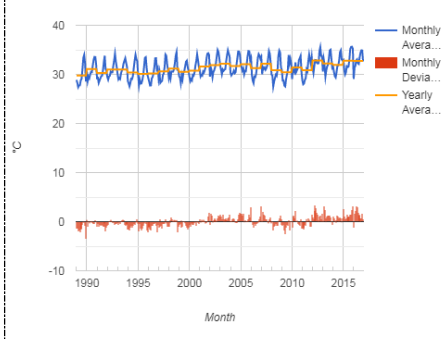
Caatinga portion of Semiard Piaui has 81% of land territory with declining productivity, an adittional 13.5% present early signs of decline or are stable but stressed. Similar patterns apply throughout the entire region.

Max Temperature 1989 – 2016



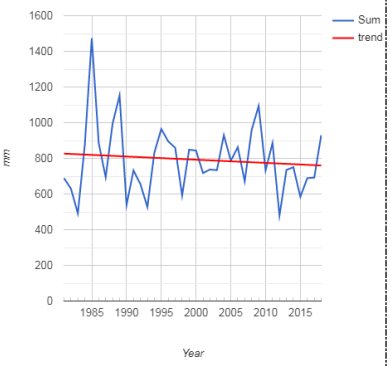
Source: ECMWF; ENSEMBLES

Max temp. Monthly time series 1989-2016



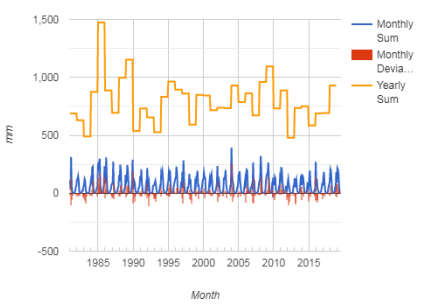
Source: ECMWF; ENSEMBLES

Average Annual Prec. 1981 - 2019



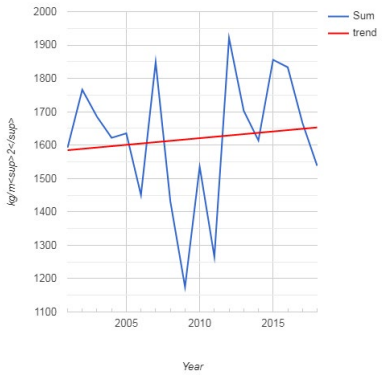
Source: CHIRPS (v2.0)

Prec. monthly time series 1981 – 2019



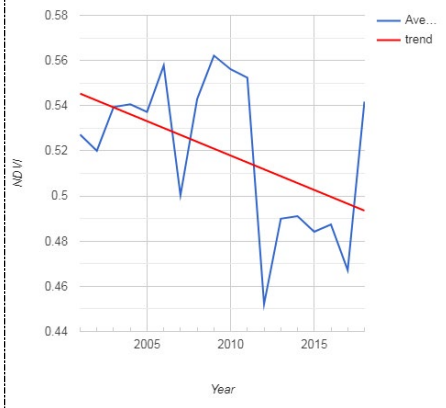
Source: CHIRPS (v2.0)

Climatic Water Deficit 2001 – 2018



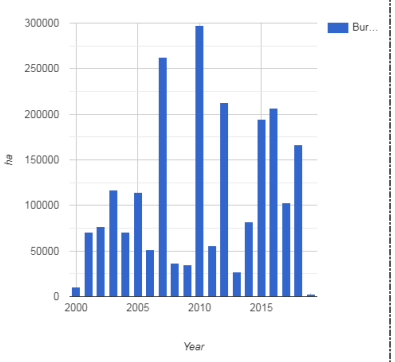
Source: MOD16A2 - MODIS/Terra Net Evapotranspiration 8-Day L4 Global 500 m SIN Grid

NDVI MODIS (250m) 2001-2018



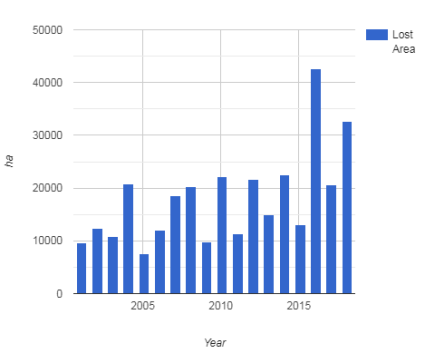
Source: NDVI from NIR-RED bands - MOD13Q1.006 Terra Vegetation Indices 16-Day Global 250m

Burned area per year 2000-2018



Source: MCD64A1: MODIS/Terra and Aqua Burned Area Monthly L3 Global 500 m SIN Grid V006

Forest Change 2000 - 2018



Source: Global Forest Change 2000–2018[149]

Climatic Vulnerabilities and Risks

Modeled projections of future climate identify a likely increase in drought tendency and in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall.The project area is highly vulnerable to droughts, river floods, and loss of tree cover and wildfire (particularly high risk for the Serra das Confusoes national park); and medium to high vulnerability to water scarcity and extreme heat.[150] The annual decrease in rainfall in the region and the increase in temperature could have a negative impact on the agricultural sector if trends continue . The dry period will be even warmer, droughts may be more intense and frequent, and natural vegetation may suffer from water stress. Given interannual seasonality, it is likely that plantations and rain-dependent crops will decrease their productivity in the coming years. In addition, the increase in extreme events could have a significant impact on soils.

149 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53.

150 Global Facility for Disaster Reduction and Recovery (GFDRR), 2019. "Think Hazard tool"

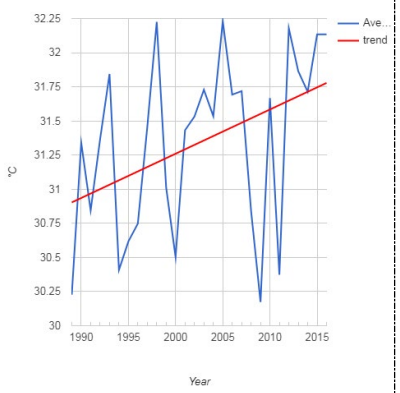
CEARA

Precipitation
Average annual rainfall is approximately 735 mm / year decreasing by 85.90 mm since 1981. For the period 1981 – 2019, March has been the rainiest month on average with 200.92 mm while September presents the lowest average rainfall at 3.47 mm. Rainfall patterns are erratic with deviations ranging from -117.33 to 261.48 mm.

Temperatures
Average annual minimum temperature is 22.37°C, while maximum temperature is 31.78°C. For the period 1981 – 2016 November presents the highest average temperature at 33.72°C, while July was the lowest at 21.20°C ; mininimum and maximum temperature have increased by 0.59°C and 0.88°C respectively.

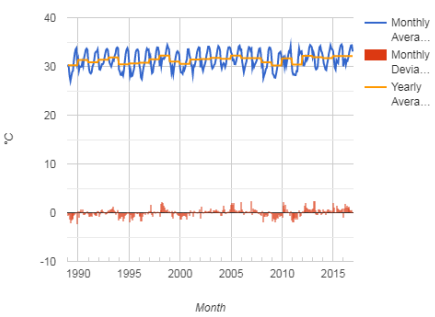
Land Productivity Dinamics
Caatinga portion of Semiard Ceara has 71% of land territory with declining productivity, an adittional 14.5% present early signs of decline or are stable but stressed. Similar patterns apply throughout the entire region.

Max Temperature 1989 – 2016



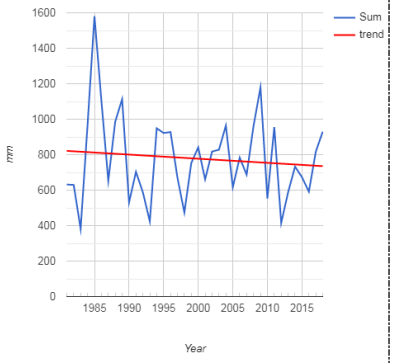
Source: ECMWF; ENSEMBLES

Max temp. Monthly time series 1989-2016



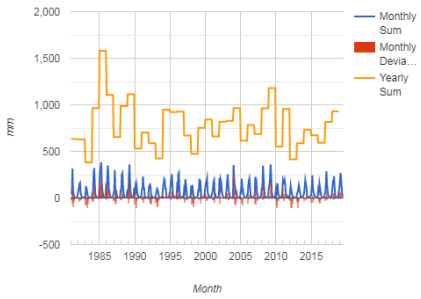
Source: ECMWF; ENSEMBLES

Average Annual Prec. 1981 - 2019



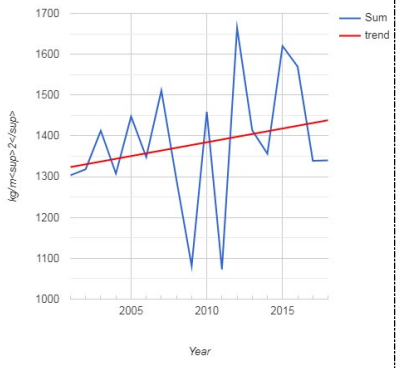
Source: CHIRPS (v2.0)

Prec. monthly time series 1981 – 2019



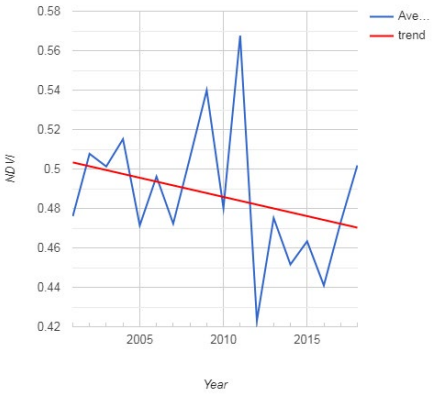
Source: CHIRPS (v2.0)

Climatic Water Deficit 2001 – 2018



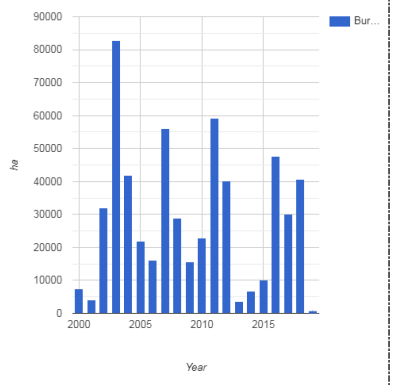
Source: MOD16A2 - MODIS/Terra Net Evapotranspiration 8-Day L4 Global 500 m SIN Grid

NDVI MODIS (250m) 2001-2018



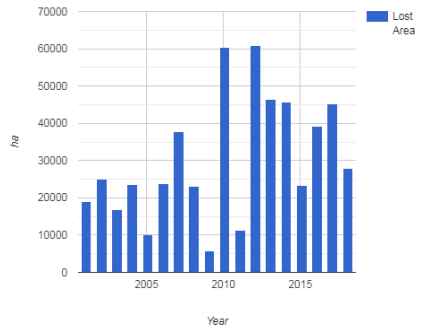
Source: NDVI from NIR-RED bands - MOD13Q1.006 Terra Vegetation Indices 16-Day Global 250m

Burned area per year 2000-2018



Source: MCD64A1: MODIS/Terra and Aqua Burned Area Monthly L3 Global 500 m SIN Grid V006

Forest Change 2000 - 2018



Source: Global Forest Change 2000–2018[151]

Climatic Vulnerabilities and Risks

Modeled projections of future climate identify a likely increase in drought tendency and in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall.The project area is extremely vulnerable to wildfire; highly vulnerable to droughts, river and coastal floods; and medium to high vulnerability to water scarcity, earthquakes, and extreme heat.[152] The annual decrease in rainfall in the region and the increase in temperature could have a negative impact on the agricultural sector if trends continue . The dry period will be even warmer, droughts may be more intense and frequent, and natural vegetation may suffer from water stress. Given interannual seasonality, it is likely that plantations and rain-dependent crops will decrease their productivity in the coming years. In addition, the increase in extreme events and the potential reduction in tree cover could have a significant impact on soils (e.g. increased erosion).

151 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53.
152 Global Facility for Disaster Reduction and Recovery (GFDRR), 2019. "Think Hazard tool"

RIO GRANDE DO NORTE

Precipitation

Average annual rainfall is approximately 671 mm / year decreasing by 46.14 mm since 1981. For the period 1981 – 2019, March has been the rainiest month on average with 162.29 mm while October presents the lowest average rainfall at 4.63 mm. Rainfall patterns are erratic with deviations ranging from -124.69 to 218.62 mm.

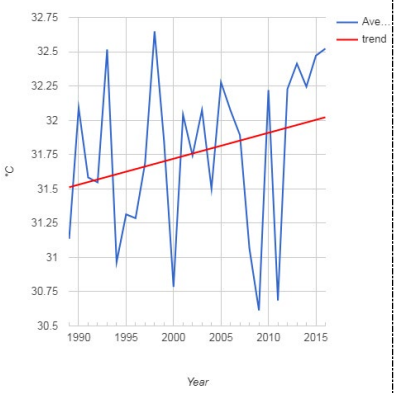
Temperatures

Average annual minimum temperature is 22.48°C, while maximum temperature is 32.02°C. For the period 1981 – 2016 November presents the highest average temperature at 33.52°C, while July was the lowest at 29.99°C ; mininimum and maximum temperature have increased by 0.50°C and 0.51°C respectively.

Land Productivity Dinamics

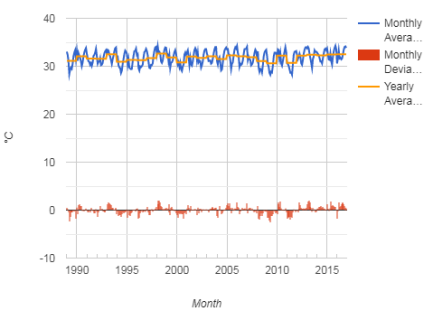
Caatinga portion of Semiard Rio Grande do Norte has 77% of land territory with declining productivity, an adittional 6.82% present early signs of decline or are stable but stressed. Similar patterns apply throughout the entire region.

Max Temperature 1989 – 2016



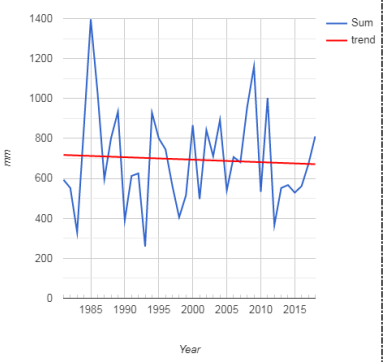
Source: ECMWF; ENSEMBLES

Max temp. Monthly time series 1989-2016



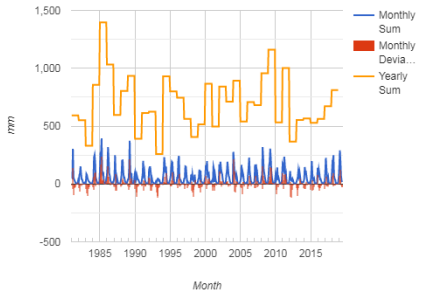
Source: ECMWF; ENSEMBLES

Average Annual Prec. 1981 - 2019



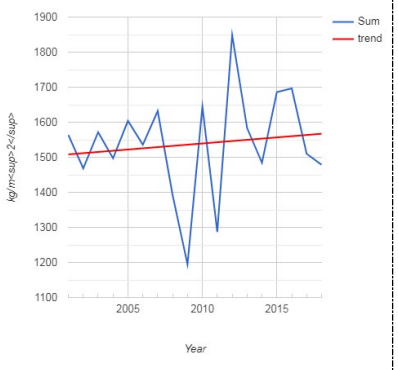
Source: CHIRPS (v2.0)

Prec. monthly time series 1981 – 2019



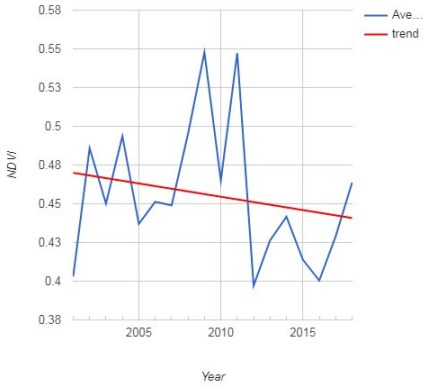
Source: CHIRPS (v2.0)

Climatic Water Deficit 2001 – 2018



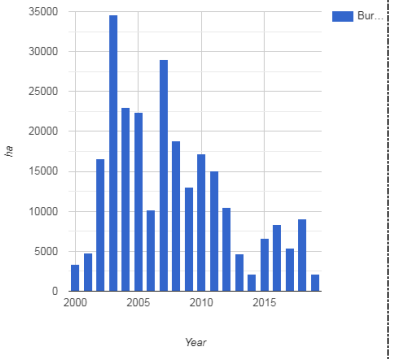
Source: MOD16A2 - MODIS/Terra Net Evapotranspiration 8-Day L4 Global 500 m SIN Grid

NDVI MODIS (250m) 2001-2018



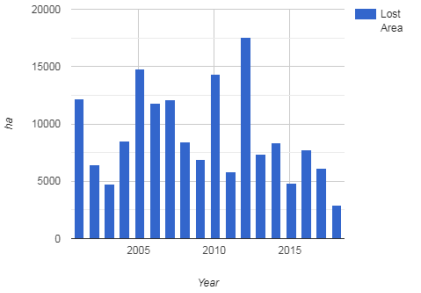
Source: NDVI from NIR-RED bands - MOD13Q1.006 Terra Vegetation Indices 16-Day Global 250m

Burned area per year 2000-2018



Source: MCD64A1: MODIS/Terra and Aqua Burned Area Monthly L3 Global 500 m SIN Grid V006

Forest Change 2000 - 2018



Source: Global Forest Change 2000–2018[153]

Climatic Vulnerabilities and Risks

Modeled projections of future climate identify a likely increase in drought tendency and in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall.The project area is highly vulnerable to droughts, river floods, and wildfire; and medium to high vulnerabilty to water scarcity, earthquake, and extreme heat; and low to very low risk of cyclones and tsunamis.[154] The annual decrease in rainfall in the region and the increase in temperature could have a negative impact on the agricultural sector if trends continue . The dry period will be even warmer, droughts may be more intense and frequent, and natural vegetation may suffer from water stress. Given interannual seasonality, it is likely that plantations and rain-dependent crops will decrease their productivity in the coming years. In addition, the increase in extreme events could have a significant impact on soils.

153 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53.

154 Global Facility for Disaster Reduction and Recovery (GFDRR), 2019. "Think Hazard tool"

PARAIBA

Precipitation

Average annual rainfall is approximately 693 mm / year decreasing by 4.69 mm since 1981. For the period 1981 – 2019, March has been the rainiest month on average with 155.83 mm while October presents the lowest average rainfall at 7.85 mm. Rainfall patterns are with deviations ranging from -99.98 to 249.23 mm.

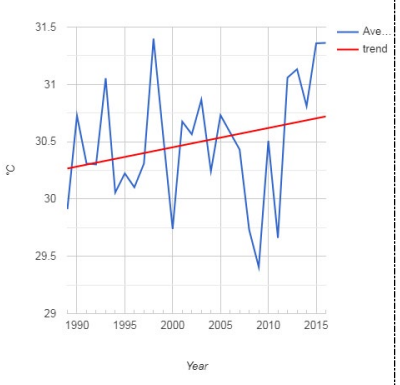
Temperatures

Average annual minimum temperature is 20.77°C, while maximum temperature is 30.72°C. For the period 1981 – 2016 December presents the highest average temperature at 32.175°C, while August was the lowest at 18.87°C ; mininimum and maximum temperature have increased by 0.45°C and 0.45°C respectively.

Land Productivity Dinamics

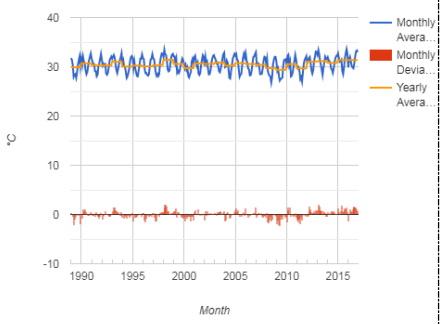
Caatinga portion of Semiard Paraiba has 80% of land territory with declining productivity, an adittional 5.38% present early signs of decline or are stable but stressed. Similar patterns apply throughout the entire region.

Max Temperature 1989 – 2016



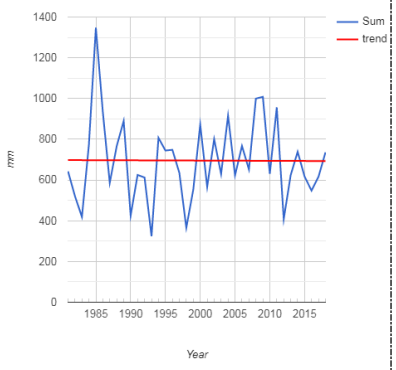
Source: ECMWF; ENSEMBLES

Max temp. Monthly time series 1989-2019



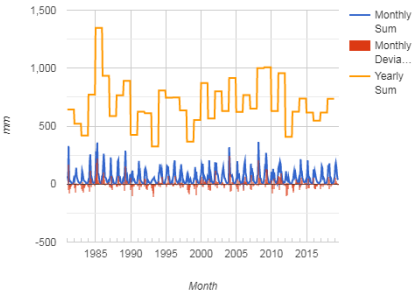
Source: ECMWF; ENSEMBLES

Average Annual Prec. 1981 - 2019



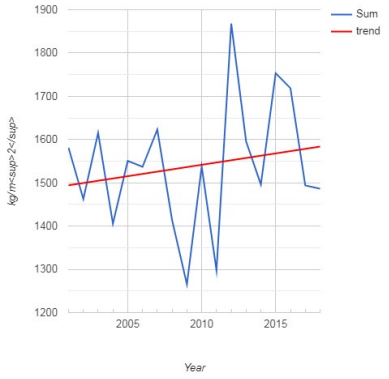
Source: CHIRPS (v2.0)

Prec. monthly time series 1981 – 2019



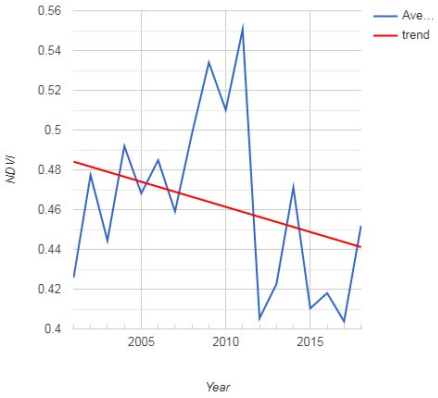
Source: CHIRPS (v2.0)

Climatic Water Deficit 2001 – 2018



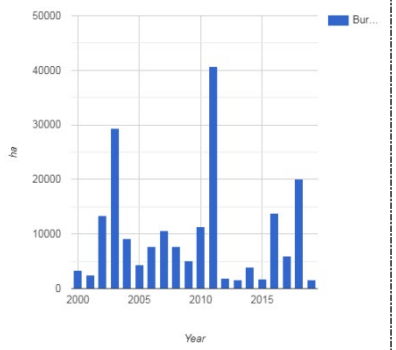
Source: MOD16A2 - MODIS/Terra Net Evapotranspiration 8-Day L4 Global 500 m SIN Grid

NDVI MODIS (250m) 2001-2018



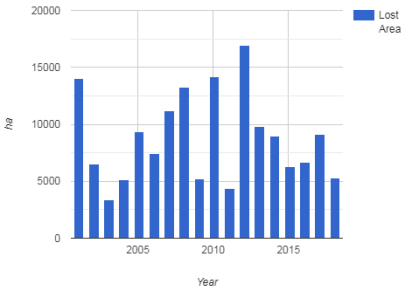
Source: NDVI from NIR-RED bands - MOD13Q1.006 Terra Vegetation Indices 16-Day Global 250m

Burned area per year 2000-2018



Source: MCD64A1: MODIS/Terra and Aqua Burned Area Monthly L3 Global 500 m SIN Grid V006

Forest Change 2000 - 2018



Source: Global Forest Change 2000–2018[155]

Climatic Vulnerabilities and Risks

Modeled projections of future climate identify a likely increase in drought tendency and in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall.The project area is highly vulnerable to droughts, and wildfire; and medium to high vulnerability to river floods, earthquakes, water scarcity and extreme heat.[156] Paraiba presents the smallest variations to date in temperature and precipitation, the region is nonetheless still at risk of decreased precipitation and increased temperature with potential negative impacts on the agricultural sector. The dry period will be even warmer, droughts may be more intense and frequent, and natural vegetation may suffer from water stress. Given interannual seasonality, it is likely that plantations and rain-dependent crops will decrease their productivity in the coming years. In addition, the increase in extreme events could have a significant impact on soils.

155 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53.

156 Global Facility for Disaster Reduction and Recovery (GFDRR), 2019. "Think Hazard tool"

PERNAMBUCO

Precipitation

Average annual rainfall is approximately 570 mm / year decreasing by 57.55 mm since 1981. For the period 1981 – 2019, March has been the rainiest month on average with 127.067 mm while September presents the lowest average rainfall at 9.06 mm. Rainfall patterns are erratic with deviations ranging from --100.67 to 255.82 mm.

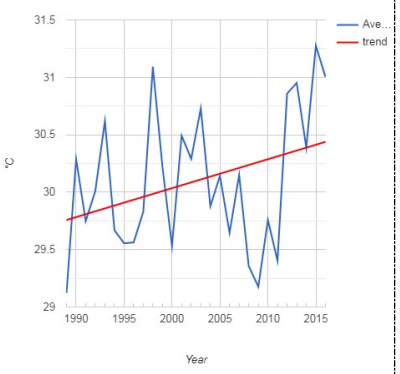
Temperatures

Average annual minimum temperature is 20.42°C, while maximum temperature is 30.44°C. For the period 1981 – 2016 November presents the highest average temperature at 32.38°C, while August was the lowest at 18.08°C ; mininimum and maximum temperature have increased by 0.39°C and 0.68°C respectively.

Land Productivity Dinamics

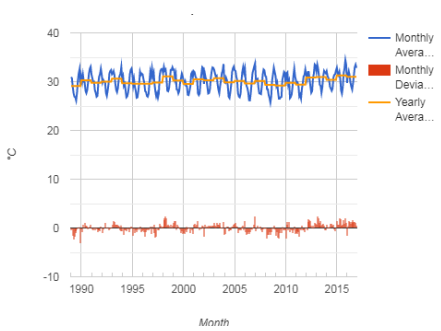
Caatinga portion of Semiard Pernambuco has 82% of land territory with declining productivity, an adittional 8.89% present early signs of decline or are stable but stressed. Similar patterns apply throughout the entire region.

Max Temperature 1989 – 2016



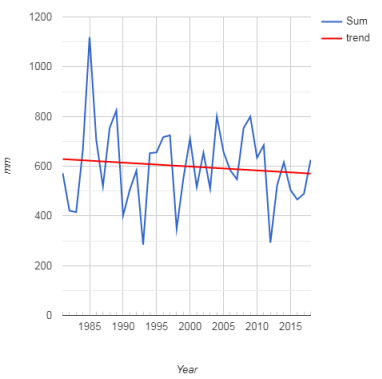
Source: ECMWF; ENSEMBLES

Max temp. Monthly time series 1989-2019



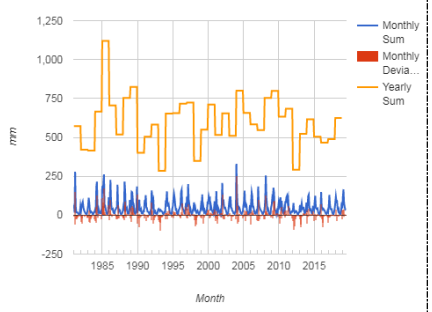
Source: ECMWF; ENSEMBLES

Average Annual Prec. 1981 - 2019



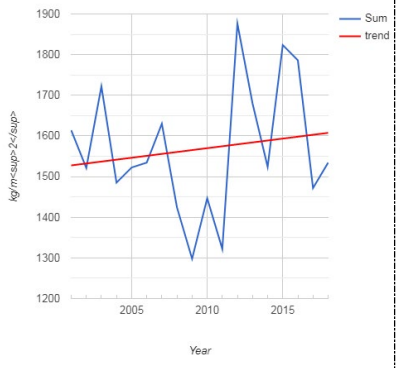
Source: CHIRPS (v2.0)

Prec. monthly time series 1981 – 2019



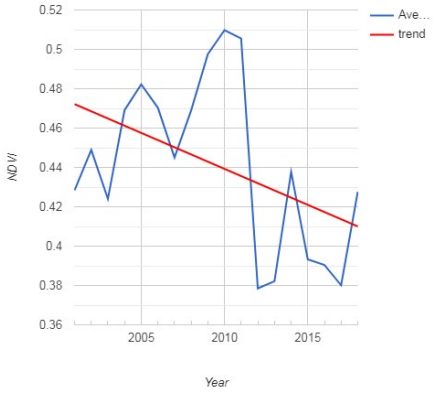
Source: CHIRPS (v2.0)

Climatic Water Deficit 2001 – 2018



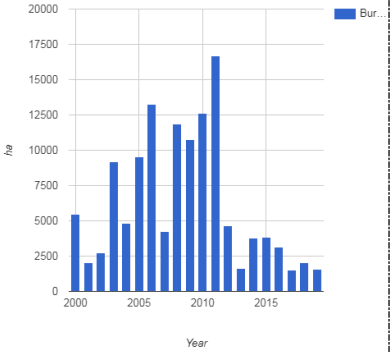
Source: MOD16A2 - MODIS/Terra Net Evapotranspiration 8-Day L4 Global 500 m SIN Grid

NDVI MODIS (250m) 2001-2018



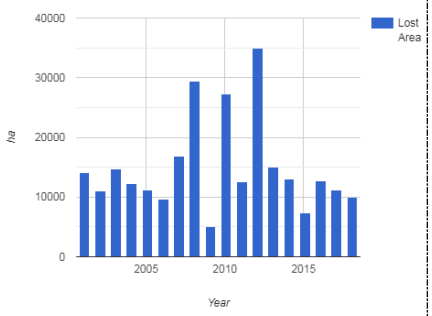
Source: NDVI from NIR-RED bands - MOD13Q1.006 Terra Vegetation Indices 16-Day Global 250m

Burned area per year 2000-2018



Source: MCD64A1: MODIS/Terra and Aqua Burned Area Monthly L3 Global 500 m SIN Grid V006

Forest Change 2000 - 2018



Source: Global Forest Change 2000–2018[157]

Climatic Vulnerabilities and Risks

Modeled projections of future climate identify a likely increase in drought tendency and in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall.The project area is highly vulnerable to droughts, river floods, and wildfire; and medium to high vulnerability to water scarcity and extreme heat.[158] The annual decrease in rainfall in the region and the increase in temperature could have a negative impact on the agricultural sector if trends continue . The dry period will be even warmer, droughts may be more intense and frequent, and natural vegetation may suffer from water stress. Given interannual seasonality, it is likely that plantations and rain-dependent crops will decrease their productivity in the coming years. In addition, the increase in extreme events could have a significant impact on soils.

157 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53.

158 Global Facility for Disaster Reduction and Recovery (GFDRR), 2019. "Think Hazard tool"

ALAGOAS

Precipitation

Average annual rainfall is approximately 673 mm / year decreasing by 60.98 mm since 1981. For the period 1981 – 2019, July has been the rainiest month on average with 116.74 mm while November presents the lowest average rainfall at 17.94 mm. Rainfall patterns are erratic with deviations ranging from -75.51 to 196.14 mm.

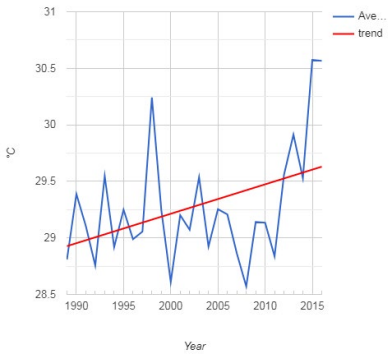
Temperatures

Average annual minimum temperature is 21.37°C, while maximum temperature is 29.63°C. For the period 1981 – 2016 December presents the highest average temperature at 31.82°C, while August was the lowest at 19.06°C ; mininimum and maximum temperature have increased by 0.58°C and 0.70°C respectively.

Land Productivity Dinamics

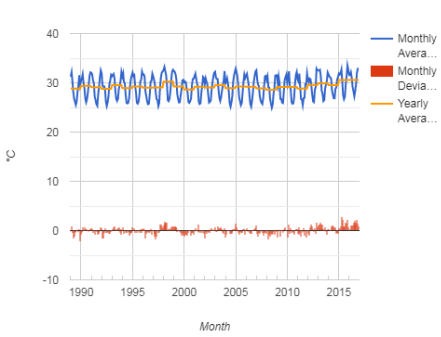
Caatinga portion of Semiard Alagoas has 64% of land territory with declining productivity, an adittional 3.19% present early signs of decline or are stable but stressed. Similar patterns apply throughout the entire region.

Max Temperature 1989 – 2016



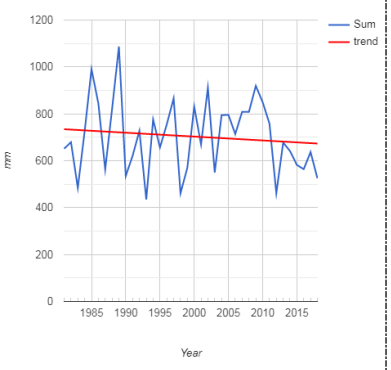
Source: ECMWF; ENSEMBLES

Max temp. Monthly time series 1989-2019



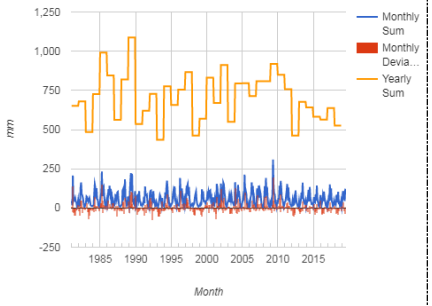
Source: ECMWF; ENSEMBLES

Average Annual Prec. 1981 - 2019



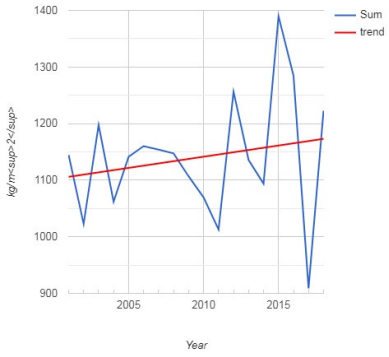
Source: CHIRPS (v2.0)

Prec. monthly time series 1981 – 2019



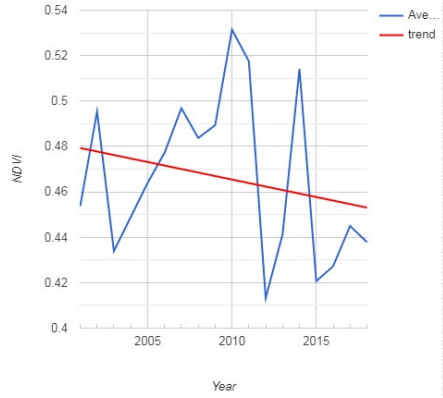
Source: CHIRPS (v2.0)

Climatic Water Deficit 2001 – 2018



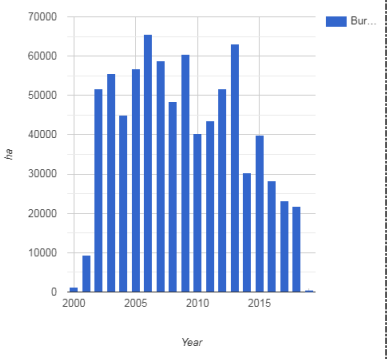
Source: MOD16A2 - MODIS/Terra Net Evapotranspiration 8-Day L4 Global 500 m SIN Grid

NDVI MODIS (250m) 2001-2018



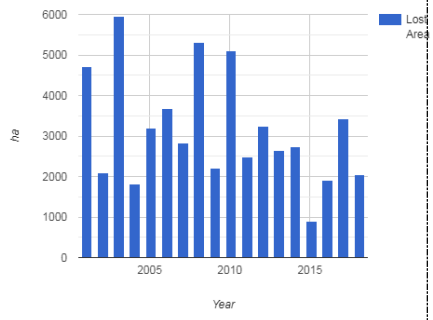
Source: NDVI from NIR-RED bands - MOD13Q1.006 Terra Vegetation Indices 16-Day Global 250m

Burned area per year 2000-2018



Source: MCD64A1: MODIS/Terra and Aqua Burned Area Monthly L3 Global 500 m SIN Grid V006

Forest Change 2000 - 2018



Source: Global Forest Change 2000–2018[159]

Climatic Vulnerabilities and Risks

Modeled projections of future climate identify a likely increase in drought tendency and in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall.The project area is highly vulnerable to droughts, river and coastal floods, and wildfire; and medium to high vulnerability to water scarcity and extreme heat.[160] The annual decrease in rainfall in the region and the increase in temperature could have a negative impact on the agricultural sector if trends continue . The dry period will be even warmer, droughts may be more intense and frequent, and natural vegetation may suffer from water stress. Given interannual seasonality, it is likely that plantations and rain-dependent crops will decrease their productivity in the coming years. In addition, the increase in extreme events could have a significant impact on soils.

159 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53.

160 Global Facility for Disaster Reduction and Recovery (GFDRR), 2019. "Think Hazard tool"

SERGIPE

Precipitation

Average annual rainfall is approximately 735 mm / year decreasing by 12.01 mm since 1981. For the period 1981 – 2019, June has been the rainiest month on average with 124.44 mm while October presents the lowest average rainfall at 29.097 mm. Rainfall patterns are erratic with deviations ranging from -68.27 to 185.09 mm.

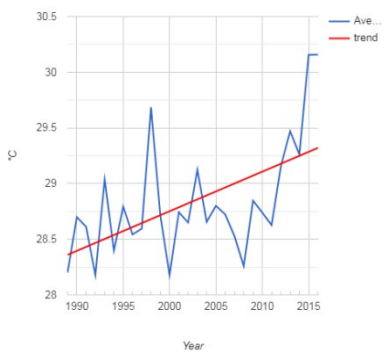
Temperatures

Average annual minimum temperature is 21.°C, while maximum temperature is 29.32°C. For the period 1981 – 2016 December presents the highest average temperature at 31.27°C, while August was the lowest at 19.03°C ; mininimum and maximum temperature have increased by 1.01°C and 0.96°C respectively.

Land Productivity Dinamics

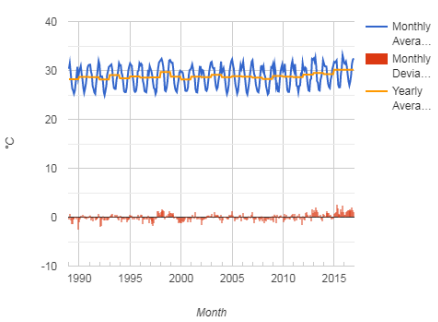
Caatinga portion of Semiard Sergipe has 71% of land territory with declining productivity, an adittional 8.44% present early signs of decline or are stable but stressed. Similar patterns apply throughout the entire region.

Max Temperature 1989 – 2016



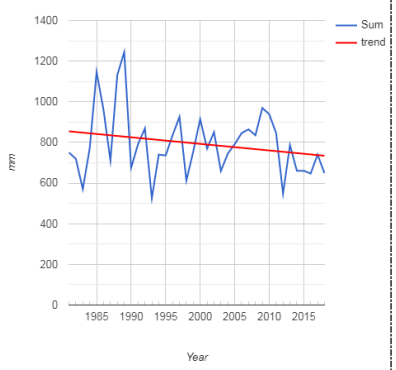
Source: ECMWF; ENSEMBLES

Max temp. Monthly time series 1989-2019



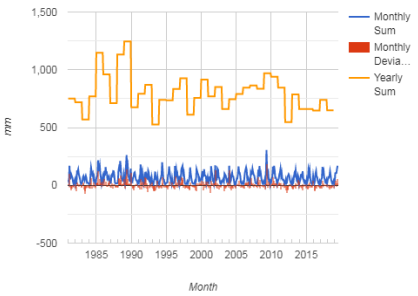
Source: ECMWF; ENSEMBLES

Average Annual Prec. 1981 - 2019



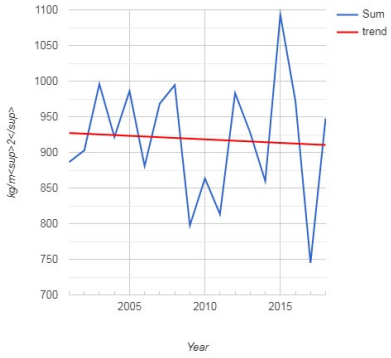
Source: CHIRPS (v2.0)

Prec. monthly time series 1981 – 2019



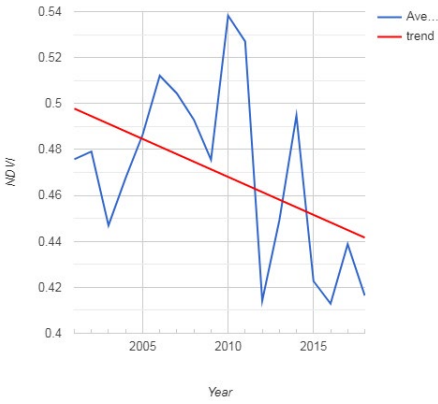
Source: CHIRPS (v2.0)

Climatic Water Deficit 2001 – 2018



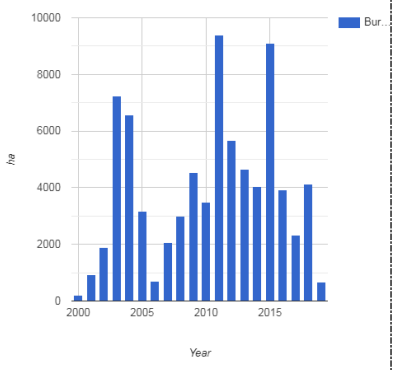
Source: MOD16A2 - MODIS/Terra Net Evapotranspiration 8-Day L4 Global 500 m SIN Grid

NDVI MODIS (250m) 2001-2018



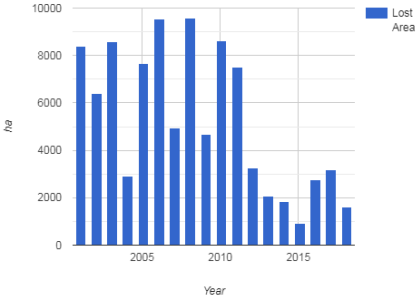
Source: NDVI from NIR-RED bands - MOD13Q1.006 Terra Vegetation Indices 16-Day Global 250m

Burned area per year 2000-2018



Source: MCD64A1: MODIS/Terra and Aqua Burned Area Monthly L3 Global 500 m SIN Grid V006

Forest Change 2000 - 2018



Source: Global Forest Change 2000–2018[161]

Climatic Vulnerabilities and Risks

Modeled projections of future climate identify a likely increase in drought tendency and in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall.The project area is highly vulnerable to droughts, river floods, and wildfire; and medium to high vulnerability to coastal flooding, water scarcity and extreme heat.[162] The annual decrease in rainfall in the region and the increase in temperature could have a negative impact on the agricultural sector if trends continue . The dry period will be even warmer, droughts may be more intense and frequent, and natural vegetation may suffer from water stress. Given interannual seasonality, it is likely that plantations and rain-dependent crops will decrease their productivity in the coming years. In addition, the increase in extreme events could have a significant impact on soils.

161 Hansen, M. C., P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, and J. R. G. Townshend. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." Science 342 (15 November): 850–53.

162 Global Facility for Disaster Reduction and Recovery (GFDRR), 2019. "Think Hazard tool"

Appendix V

IFAD COMPLAINTS SUBMISSION FORM:

Investing in rural people

IFAD COMPLAINTS SUBMISSION FORM

FOR ALLEGED NON-COMPLIANCE WITH ITS SOCIAL AND ENVIRONMENTAL POLICIES AND MANDATORY ASPECTS OF ITS SOCIAL, ENVIRONMENTAL AND CLIMATE ASSESSMENT PROCEDURES (SECAP)

---

i) NATURE OF THE COMPLAINT

What complaint are you making to IFAD? (Choose the one(s) applicable to your complaint)

☐Complaint relating to individuals/communities believing they are or may be adversely affected by an IFAD funded project

☐Complaint relating to IFAD's failure to apply its Social and Environmental Policies

☐Complaint relating to IFAD's failure to apply the Mandatory Aspects of SECAP

☐Initiate the Impartial Review conducted by the Office of the Vice-President (OPV) if unsatisfied by the response from the IFAD Regional Division

ii) COMPLAINANTS' INFORMATION

a) How many Complainants are you? (You must be 2 in order for the Complaint to be admissible)

b) Are you nationals of the concerned country or living in the area? (Complainants must both be nationals of the country concerned and/or living in the project area)

☐YES ☐NO

iii) CONFIDENTIALITY

a) The identity of complainants will be kept confidential if they request so of IFAD.

b) Do you want your identity to be kept confidential?

☐YES ☐NO

c) If YES, Please state why. If NO, please avail your details below:

iv) COMPLAINANTS' INFORMATION

a) COMPLAINANT 1

FULL NAME:

TITLE:

ORGANISATION:

PHONE NUMBER (WITH COUNTRY CODE):

EMAIL:

LOCATION

YOUR ADDRESS/ LOCATION:

MAILING ADDRESS (IF DIFFERENT):

ADDITIONAL GUIDANCE ON HOW TO LOCATE YOU (IF APPLICABLE):

b) COMPLAINANT 2

FULL NAME:

TITLE:

ORGANISATION:

PHONE NUMBER (WITH COUNTRY CODE):

EMAIL:

LOCATION

YOUR ADDRESS/ LOCATION:

MAILING ADDRESS (IF DIFFERENT):

ADDITIONAL GUIDANCE ON HOW TO LOCATE YOU (IF APPLICABLE):

Please provide the names and/or description of other individuals or groups that support the complaint (If any):

First Name	Last Name	Title/Affiliation	Signature	Contact Information

If the space provided above is not enough, attach a separate document with a list of other individuals or groups (with their signatures) who support the complaint.

v) IFAD PROJECT/PROGRAMME OF CONCERN AND NATURE OF CONCERN

a) Which IFAD-supported project/programme are you concerned about? (if known):

b) Project/Programme name (if known):

c) Please provide a short description of your concerns about the project/programme. Please describe, as well, the types of Environmental and Social impacts that may occur, or have occurred, as a result.

d) When did the situation that raised your concerns start developing? (Complaints must concern projects/programmes currently under design/implementation. Complaints concerning projects/programmes that preceded the operationalization of SECAP in 1/1/2015, closed projects or those that are more than 95 per cent disbursed will not be considered)

vi) PROJECT LEVEL

a) Have you raised your complaint with government representatives or NGO(s) responsible for planning or executing the project or programme or the Lead Agency or any governmental body with the responsibility of overseeing the Lead Agency? (The complaint should first be brought to the above authorities. If they don't respond then the matter may be brought to IFAD's attention. The issue may be brought straight to IFAD if the complainants feel they may be subject to retaliation)

☐YES ☐NO

If YES,

First Name	Last Name	Title/Affiliation	Estimated Date of Contact	Nature of Communication	Response from the Individual

b) Please explain why, if the response or actions taken are not satisfactory.

c) How do you wish to see the complaint resolved? Do you have any other matters, evidence or facts (including supporting documents) that you would like to share?

vii)IMPARTIAL REVIEW BY THE OFFICE OF THE VICE PRESIDENT

a) Do you disagree with the response from the IFAD Regional Division in relation to your complaint?

☐YES ☐NO

b) Please provide the details of the response from the IFAD Regional Division in relation to your complaint

c) Please explain why, if the response or actions taken are not satisfactory.

d) How do you wish to see the complaint resolved?

e) Do you have any other matters or facts (including supporting documents) that you would like to share?

Signature and Date (1st Complainant)

Signature and Date (2nd Complainant)

The filled in form shall be returned to SECAPcomplaints@ifad.org