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**ENVIRONMENTAL AND SOCIAL ANALYSIS AND MANAGEMENT PLAN**

**Sustainable Agricultural Development Programme (GY-L-1060)**

**Prepared for the Ministry of Agriculture, Guyana**

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ENVIRONMENTAL AND SOCIAL ANALYSIS & MANAGEMENT PLAN

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# Introduction

This document aims to address the social and environmental impact of the proposed Program considering the fragility of impacted ecosystems and the vulnerability of groups living in the areas where the Program will be developed. This report will help the Guyana Ministry of Agriculture comply with national environmental legislation and regulations, as well as with IDB’s environment and safeguards policy.

The report responds to the consultancy’s TOR[[1]](#footnote-2) addresses the socio environmental context at the national and local level, addresses the indigenous and gender issue, describe and analyze the institutional and regulatory framework, develop and environmental strategic analyze of the program and the lays out a proposed Environment and Social Management Plan.

The report includes data from the interviews conducted in July and August 2016 to different stakeholders of the public sector and some NGO`s in Georgetown, Region 9 and 10 (see list of interviews in Annex 2) and the public consultation developed in 18 August at Lethem (see Annex 3: Public Consultation Report).

# The Program

# Program description

The program aims to increase agricultural and livestock productivity in Guyana while maintaining a sustainable use of natural resources and enhancing climate change adaptation and mitigation in strategic regions (5, 9 and 10).

The program consists of three components:

* 1. **Strengthening of the agricultural innovation and extension system**. The loan will finance the implementation of a comprehensive strategy for innovation, extension and management of natural resources in the country. Agriculture centers will be established / improved, to contribute to local and regional development, including technology transfer, demonstration and training. This includes support to strategic innovation by funding adaptive agricultural innovation projects, with an emphasis on validation of technologies and their transfer to farmers. Two research centers have been identified by the MoA: Lethem / Manari (Region 9) and Ebini (Region 10). In both sites, infrastructure, equipment and innovation programs will be designed and implemented. Research / demonstration programs, identified through a prioritization exercise, will be implemented in collaboration with national and international research and technology transfer centers. These programs will identify specific beneficiary groups, technology transfer and monitoring and evaluation mechanisms, and deliver technology products as expected results. Agriculture Centers will also support activities in other regions of the country. Part of the Agriculture Center activities will focus on reducing vulnerability to climate change through multiplication and conservation of genetic material, including drought resistant varieties;
  2. **Information for policy making and natural resource management**. This component will include the review and design of an Agricultural Information System (AIS), including the preparation and implementation of an Agricultural Census;; and the strengthening of the Monitoring and Evaluation capabilities of the MoA;
  3. **Support for compliance with sanitary and phytosanitary standards.** Access to markets and infrastructure will increase the value and sales volume of meat and dairy products. To this end, the program will finance: (i) the review and update of standards and codes related to products destined for export markets as well as local markets, both current and potential; (ii) the implementation of pilot facilities for meat (and perhaps dairy) processing to evaluate the feasibility and unit costs of complying with standards; and (iii) training and technical assistance for the GLDA and producers associations.

# Main infrastructure and extension services to be developed by the Program

# Region 9

* 1. **Agriculture Center - infrastructure**

The facilities to be constructed for the agriculture center are:

* Buildings
  + Accommodation and Living Quarters
  + Training and Research
  + Administrative Functions
  + Central Workshop
* Agriculture Facility
  + Livestock Fence
  + Germoplasm Storage
  1. **Agriculture center - Land use**

The development of the infrastructure for the agriculture center in Region 9 will use 16,772 acres that are under the property of the government and is in process to be transferred to the Ministry of Agriculture.

Illustration 1: Land Use in site 5 and possible extension

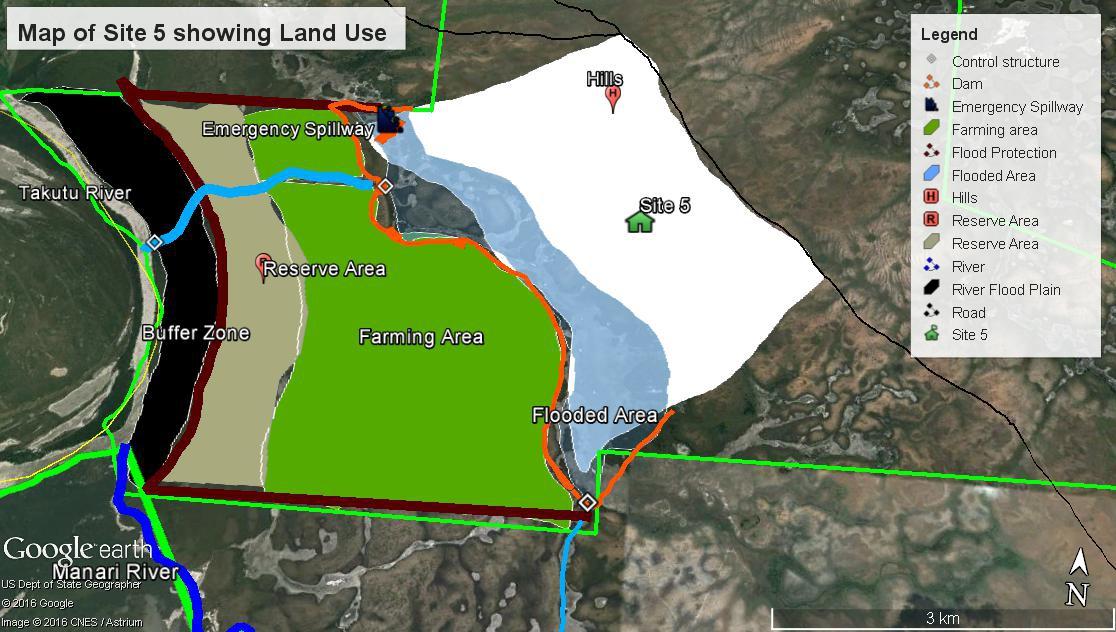


Table 1: Land use for the agriculture center in Region 9[[2]](#footnote-3)

|  |  |  |
| --- | --- | --- |
| # | Land Use | Area (Acres) |
| 1 | Reservoir upstream Catchment | 1641 |
| 2 | Farming | 2059 |
| 3 | Reserve | 768 |
| 4 | River Floodplain | 660 |
| 5 | Flooded area (Reservoir) | 836 |
| 6 | Unused | 10,808 |
|  | **Total** | **16,772** |

* 1. **Agriculture center - research activities developed**

In the Rupununi, research activities are expected to be carried out in farmers’ fields until the research station is constructed. This will allow for the direct transfer of developed technology. Farm schools will also be used to carry out this research under the direct supervision of GLDA and NAREI.

Table 2: Program Activities - Component 2[[3]](#footnote-4)

|  |  |  |
| --- | --- | --- |
| **Proposed research programs and technology transfer** | **Objectives** | **Outcomes expected** |
| Feeds and feeding systems  Pasture Research | Improving the nutritional level of the livestock through the introduction and evaluation of new forage grasses and legumes species.  Introduce into the Rupununi Savannahs forage species with high nutrition quality and adaptability to the climatic extremes of the area.  Select forage species which can provide better quality and quantity of forage to grazing animals than the native savannah grasses.  Develop and provide planting material of selected forage species to the farming community  Develop and extend appropriate technologies for production of selected forage species to the farming community | Identified species of good quality grass and legume forage species for the Rupununi Savannahs  Plant material for the selected grass and legume forage species  Technological packages for the development of grass and legume forage pastures in the Rupununi Savannahs |
| Livestock Research | Promote the sustained increased production of livestock (Beef cattle, Sheep) through improved breeding and breeding techniques in the Rupununi savannahs.  Increase the availability of sufficient numbers of high quality livestock breeding stock  Distribute high quality livestock breeding stock and semen for artificial insemination to the farming community  Train farmers in the husbandry practices for the production livestock in the Rupununi savannahs  Address the impact of Climate Change on livestock production and vice versa | Identified target breeds and breed types  A structure established to breed and multiply selected breeds of beef cattle, sheep and goats  A facility for collection and storage of semen and artificial insemination  Requisite information products developed for the training of farmers in the production of livestock in the Rupununi Savannahs  Marketing mechanism for animal genetic resources established and operating in the Rupununi Savannahs |
| Perennial crops (orchard crops) research | Select crop species and cultivars with high general and specific adaptability for the Rupununi Savannahs (citrus, guayava, mango, passion fruit, acai berry)  Include cultivar resilience to climate change in the selection process.  Produce and distribute adaptable, high yielding seeds, seedlings and planting material to the farmers and producers.  Develop and extend appropriate technologies for production of selected Orchard crop species in the Rupununi Savannahs. | Identified target crop species of the Orchard crops of interest  Seeds and seedling production of the identified orchards crop species  Information products for the production of orchard crop in the savannah areas |
| Promote the commercial production of selected annual crops in the Rupununi savannahs | Crops of Interest are: Cassava, Corn, Peanuts, Rice and Soybeans  To select high yielding crop cultivars with general and specific adaptability to the Rupununi Savannahs  Include cultivar resilience to climate change in the selection process  Produce and distribute adaptable, high yielding seeds and planting material to the farmers and producers.  Develop and extend appropriate technologies for production of the selected crop species in the Rupununi Savannahs | Identified target crop cultivars  Seeds and planting material production of the identified crop cultivars  Information products for the production of the identified crop cultivars in the Rupununi Savannah |
| Soil management | Assess the efficacy of selected soil amelioration practices on soil productivity on the acid, infertile and drought prone soils of the Rupununi Savannahs.  Sensitize farmers to the benefits of using appropriate soil amelioration practices and teach them to use these practices.  Assess the level of soil carbon sequestration possible through the widespread use of biochar in agricultural production in the Rupununi Savannahs | Specific soil management practices developed for the appropriate management of the soils of the Rupununi savannahs  Information products developed for the management of the soils of the Rupununi Savannahs  Estimates of soil carbon sequestration made for possible Carbon trading |
| Technology transfer | To provide the necessary technical support to agricultural producers to facilitate technology uptake thru:  a) On-farm trials and demonstration plots  b) Field day and workshops  c) Distribution of information production from research activities  d) Use of ICT products and facilities | On-farm trials and demonstration plots  Field day and workshops  Factsheets, newsletters, brochures and pamphlets  Early warning weather bulletins |

* 1. **Agriculture center - Water Catchment**

In the process of selecting the site for the development of a water catchment the team composed of experts within the various departments and agencies of the Ministry of Agriculture (MOA, GLDA, NAIRI) proposed a selection criteria including: Land (soil type, availability of land, topography), water resources (adequate supply of suitable water quality, site resilient to drought and flooding), infrastructure (proximity to air strip, proximity to navigable river, year-round road access, existing farm infrastructure, communication infrastructure), environmental impact (effect of proposed works on the natural environment and/or protected areas), social impact (proximity to the nearest town/village, probability of conflict / litigation with existing occupants/ locals).

Site No. 5, located in Manari North (bordered by the Manari and Takutu Rivers), is the preferred site based on the evaluation criteria used and will therefore be taken forward to a detailed analysis, despite an unfavourable ranking for the criteria that assessed existing farm infrastructure, as there are no existing facilities and all farm infrastructures will have to be constructed. All other sites ranked similarly low for this criterion except for Pirara Ranch, which is currently occupied by a farmer.

According to current agricultural land use the demand for water is 910,350m3/month. The size of the water storage reservoir required calculated using the rainfall and water demand data is 10,512 Acres.

The proposed land use of the Agriculture Station was utilized together with the average water consumption of each planned activity to determine the volume of water required. This is presented in Table 3. The first column of the table provides the activities of the station that require water. The second column gives the planned quantity of each, while the third column gives the rate of use for each activity. The monthly demand for each activity is calculated in the fourth column which gives a grand total of 4,903, 268 ≈ 5,000,000 cubic meters per month[[4]](#footnote-5).

Table 3: Agriculture Station water demand[[5]](#footnote-6)

|  |  |  |  |
| --- | --- | --- | --- |
| Description | Quantity | Rate | Water Demand |
| Consumption | (heads) | L/day | (30/1000)m3/month |
| Cattle | 500 | 60 | 900 |
| Ruminants | 5000 | 11 | 1,65 |
| Consumptive Use | (acres) | mm/day | (4046x30/1000)m3/month |
| Aquaculture | 10 | 2.5 | 9,104 |
| Reservoir | 1000 | 7,5 | 910,35 |
| Pasture | 1040 | 10 | 1,262 |
| Crops | 500 | 10 | 606,9 |
| Rice | 500 | 12 | 728,28 |
| Reserve | 950 | 12 | 1,383,732 |
| Total | | | 4,903,268 |

* 1. **Abattoir at Lethem**

The selection of the new area for the construction of the abattoir in Region 9 is on the edge of Lethem, beside the road, with access to electricity of the public system and water of a well. The land owner is the Ministry of Agriculture.

# Region 10

1. **Agriculture center – infrastructure to be improved**

In region 10 the program is focusing in the improvement of the facilities that exist in the actual agriculture research center at Ebini Station. This improvement consists in:

* upgrading the actual infrastructure,
* improve the facilities for water harvesting,
* improve the road access and storage,
* implementation of soil laboratories,
* Improve the areas for livestock.

1. **Agriculture center - Land use**

The land use for the infrastructure activities is located in the area used by MOA and it has no land tenure issues associated with it.

Various creeks presently supply water to the Ebini station. These creeks however do not persist during long dry period aspect that has to be take care in the improvement of the facilities of the agriculture center.

1. **Agriculture center- research activities developed**

|  |  |  |
| --- | --- | --- |
| Proposed research programs and technology transfer[[6]](#footnote-7) | Objectives | Expected Outcomes |
| Perennial crops (Orchard crops) Research | To select crop species and cultivars with high general and specific adaptability for the Intermediate Savannahs which can generate economic benefits to farmers greater than that produced by existing species/cultivars  To include cultivar resilience to climate change in the selection process  To produce and distribute adaptable, high yielding seeds, seedlings and planting material to the farmers and producers.  To develop and extend appropriate technologies for production of selected Orchard crop species in the Intermediate Savannahs.  Promote commercial production of selected orchard crops: Citrus, Avocado, Papaya, Passion Fruit, Sour soup and Water melon | Identified target crop species of the Orchard crops of interest  Seeds and seedling production of the identified orchards crop species  Information products for the production of orchard crop in the savannah areas |
| Feeds and Feeding systems research | Pasture Research:  To introduce into the Intermediate Savannahs forage species with high nutrition quality and adaptability to the eco zone  To select forage species that can provide better quality and quantity of forage to grazing animals than those presently available.  Develop and provide planting material of selected forage species to the farming community  Develop and extend appropriate technologies for production of selected forage species to the farming community | Identified species of good quality grass and legume forage species for the Intermediate Savannahs  Plant material for the selected grass and legume forage species  Technological packages for the development of grass and legume forage pastures in the Intermediate Savannahs |
| Byproduct Feed Research | Assessing the use of the byproducts of crop production and processing as feed stock  Produce high quality livestock feeds from the byproducts of crop production  Test the relative performance of various byproduct feeds on the performance of select livestock species in the Intermediate savannahs | Identified high quality byproduct feeding material from the Intermediate Savannahs crop program  Facility established for the production of byproduct feeds  Facility established to carry out feeding trials |
| Livestock Research | Promote the sustained increased production of livestock in the Intermediate Savannahs.  Livestock of interest: Beef Cattle and small ruminants (sheep).  Increase the availability of sufficient numbers of high quality livestock breeding stock  Distribute high quality livestock breeding stock and semen to the farming community  Train farmers in the husbandry practices for the production livestock in the Intermediate savannahs  Address the impact Climate Change on livestock production and vice versa | Identified target breeds and breed types  A facility established to breed and multiply selected breeds of beef cattle, sheep and goats  Requisite information products developed for the training of farmers in the production of livestock in the Intermediate Savannahs  Marketing mechanism for animal genetic resources established and operating in the Intermediate Savannahs |
| Soil Management | Remove key constraints to crop production through soil plant environment modification in the savannahs.  Ameliorating practices to be used like liming, biochar addition, organic matter addition and agroforestry systems.  Assess the efficacy of selected soil amelioration practices on soil productivity on the acid, infertile and drought prone soils of the Intermediate Savannahs.  Sensitize farmers to the benefits of using appropriate soil amelioration practices and teach them to use these practices.  Assess the level of soil carbon sequestration possible through the widespread use of biochar in agricultural production in the Savannahs. | Specific soil management practices developed for the appropriate management of the soils of the Intermediate savannahs  Information products developed for the management of the soils of the Intermediate Savannahs  Estimates of soil carbon sequestration made for possible Carbon trading |
| Technology transfer | Transfer of technological information to agricultural producers in the Intermediate savannahs.  Provide the necessary technical support to agricultural producers to facilitate technology uptake thru:  a) Farm visit  b)On-farm trials and demonstration plots  c)Field day and workshops  d) Distribution of information on production from research activities  e) Use of ICT products and facilities | On-farm trials and demonstration plots  Field day and workshops  Factsheets, newsletters, brochures and pamphlets  Early warning weather bulletins  ICT products and facilities |

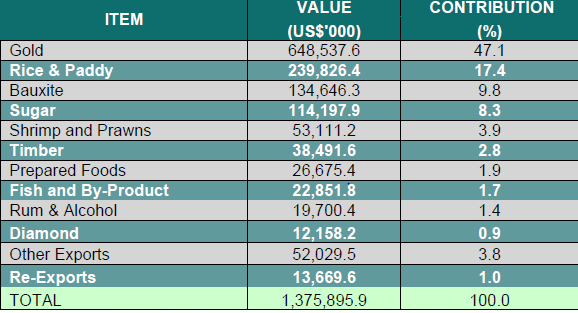
# Environmental and Social Context

# Country Context

Guyana is divided into 10 Administrative Regions and each Region is administered by a Regional Democratic Council (RDC) which is headed by a Chairman. The Regions are divided into Neighbourhood Democratic Councils (NDCs). Georgetown and Guyana's other major cities are important generators of wealth, employment and productivity growth and play a leading role in the national economy. Guyana's rural hinterland accounts for 95% of the land area and 10% of the population, and is home to a number of important economic activities, including agriculture, forestry and mining.

In Guyana, natural resources and biodiversity provide a wide range of goods and services which are critical to the growth and development of the economy and well-being of Guyanese. In 2013, the value that foreign exchange earnings gave to the Guyana economy shows that more than 95% of the earnings were related to use of natural resources and biodiversity/ecosystem services (Table 4). This is expected to increase in the future with proposed increased investment in agriculture, ecotourism and the extractive sector.

Table 4: Contribution of Natural Resource to Guyana Exports



***Source****: Bureau of Statistics, 2014[[7]](#footnote-8).*

**Agriculture**

Agriculture played a crucial role in moving Guyana up from a least developing, highly indebted country in 1990 to being a low middle income country, as well as contributing significantly to the national economy. Approximately 40% of total exports come from agriculture. In 2013, rice exports amounted to US$ 243 M (14% of total exports), sugar US$ 132.2 M (9.5%), shrimp and fish US$ 63.9 M (4.6%), timber US$ 39 M (2.8% of total exports), and other crops (fruits & vegetables) accounted for US$ 4.7 M (0.3% of total exports)[[8]](#footnote-9).

The livestock sub-sector contributes approximately 13,6% of the agricultural GDP is responsible for the production of poultry meat, eggs, beef, pork, mouton and milk and with exception of milk Guyana could be considering to be self-sufficient. Livestock in Guyana is composed of 200,000 beef cattle and 70,000 dairy cattle. The per capita consumption of beef and pork is less than 5 kilograms[[9]](#footnote-10). The GLDA provides some data for livestock (2015) and meat and milk production from 2010 to 2015. Beef production peaked in 2015 at almost 2,000,000 kilograms, and milk production at over 55,000,000 litres. In 2015, the total cattle population for Guyana is reported as 270,000[[10]](#footnote-11).

The agriculture sector is the mainstay of income and employment in many rural communities that are increasingly threatened by climate change and climate variability. The sector is essential to Guyana in terms of its significance for food security, poverty reduction, employment generation and foreign exchange earnings. The agriculture sector in 2009-2013 contributed on average to approximately 20% of Guyana’s GDP and accounted for, on average, 40% of the country’s total export earnings per annum. Agriculture is a critical livelihood activity, both for subsistence and commercial purposes, and provides revenue generating income for about 25,000 farming households, of which approximately 90% are concentrated in coastal areas and 10% in the hinterlands[[11]](#footnote-12).

**Biodiversity**

Guyana’s forest ecosystems and biodiversity are, in many ways, key factors which support community based activities related to culture, recreation, scientific research, and education and ecotourism opportunities. Guyana’s species status as of 2010 stood at an estimated 8,000 plant species, 467 fish, 130 amphibians, 179 reptiles, 814 birds, 225 mammals, 1,673 arthropods, over 1,200 fungi, 33 bacteria, 13 nematodes, 44 algae, 17 molluscs, and an estimated 30 viruses. Of the species known to occur in Guyana, 4.5% of mammals, 0.4% of birds, 3% of amphibians, 3.3% of reptiles, and 0.3% of freshwater fish are threatened[[12]](#footnote-13).

Historically, relatively low deforestation rates have been reported for Guyana. As at January 2012, approximately 87% of the land area is covered by forests – approximately 18.5 million has. A comparatively low deforestation rate is reported, ranging between 0.02% and 0.079% per annum[[13]](#footnote-14).

**Climate Change**

In a 2008 policy decision, the Government signalled its intention and commitment to embark on a climate resilient low carbon approach to development, adopting the “Low Carbon Development Strategy”. For the past six years, the Government has worked at the multilateral level to establish a Reducing Emissions from Deforestation and Forest Degradation (REDD+) framework through which Guyana is paid for forest climate services its forests provide and which has set the stage for payments for forest conservation and sustainable forest management. To date (2014), Guyana has earned three consecutive payments from Norway totalling US$ 115 million within the policy framework of the LCDS. In the last quarter of 2013, the annual third party audit of Guyana’s performance under the partnership established with Norway was completed, clearing the way for a fourth payment.[[14]](#footnote-15)

The development of the LCDS made the government commitment to reorienting Guyana’s economy to a low-carbon, “green” development pathway clear. The Guyana Government decision to sustainably manage forestry resources to derive benefits for the economy and create livelihood opportunities for the people of Guyana has had an influence in achieving one of the lowest deforestation rates in the world. In doing so, new economic opportunities created through avoided deforestation (REDD+) allowed Guyana to be one of the first countries to benefit from financial incentives.[[15]](#footnote-16)

Illustration 2: Potentially Vulnerable Areas[[16]](#footnote-17)



In agriculture, key impacts of climate change include: i) decrease in crop yields as temperature increases, ii) loss of crop yields from inundation and salinization, iii) crop loss and yield reduction due to increased severity of droughts and intensity of floods, iv) reduced yields due to general reduction in available run-off[[17]](#footnote-18).

Guyana`s Low Carbon Development Strategy addresses some key directions to be pursued within the agricultural sector: i) combining forests with agriculture, such as agroforestry systems, which could generate about US$ 580 million per annum (LCDE), ii) investment and employment in Low Carbon Economic Sectors, including the commercial production of fruits and vegetables and aquaculture.

An important challenge in the agriculture sector is the lack of technical knowledge, financing and technology available to farmers for responding to and managing the impact of climate change on their farms, livelihoods and communities. Additionally, the existing legislative environment and institutional support needs to be assessed to ascertain if they enable small farmer development and knowledge expansion in the wake of climate change. Given the important linkages between agriculture productivity, food security, forest management, and livelihoods, the potential impacts of climate change on the agriculture sector could have far reaching impacts on society; therefore, addressing the vulnerability of the agriculture sector to climate change is of high priority to the people of Guyana[[18]](#footnote-19).

Stakeholder consultations in Regions 9 and 10 highlighted that the capacity of the sector to deal with climate impacts is affected by a number of informational, technological, institutional, and regulatory barriers. These include the fact that most agriculture is undertaken by small farmers who lack the technical knowledge, funding and technology to respond to and manage the impacts of climate variability and change. At the institutional level, there is a lack of cooperation and coordination among agencies, creating overlapping responsibilities and gaps. Stakeholders also commented that policies and regulations are poorly enforced, which potentially increases the exposure of agricultural activities to climate impacts (e.g. land-use planning policies and exposure to flooding, water abstraction regulations and exposure to droughts)[[19]](#footnote-20).

**Indigenous Groups**

Guyana has a growing Amerindian[[20]](#footnote-21) indigenous population that possesses communal lands, organized in Amerindian villages or Amerindian communities that are governed by Village Councils. These villages have been provided with primary health facilities and elementary schools. “The standard of living was lower than that of most citizens, and they had limited access to education and health care. Little reliable data existed regarding the situation of women and girls in indigenous communities, although indigenous women tended to face threefold discrimination and vulnerability on the basis of gender, ethnicity and reduced economic status.” (Department of State, n.d.; Amerindian Act, 2006; CEDAW, 2010).

There are nine groups of Amerindian peoples in Guyana – Wai Wais, Macushis, Patomonas, Arawaks, Caribs, Wapishana, Arecunas, Akawaios, and Warraus[[21]](#footnote-22) – each of which has a distinct cultural identity and heritage, language and traditional economic activities. Amerindian communities are at varying stages of integration with the national economy. The communities are typically characterized by the co-existence of well-preserved traditional lifestyles and cultural freedoms with various kinds of income-generating activities. Gradual integration into the production and consumption structures of the national economy is an ongoing process. (Ministry of Indigenous People’s Affairs, 2016)

The 2012 Census shows that Guyana’s population consists of six main ethnic groups and a “mixed heritage group”. One of these groups is the Amerindian group, composed of the indigenous population, which represents 10.5% of the population in Guyana.

The Amerindian population represents the largest ethnic group in Region 9 (20,808 inhabitants) and the fourth largest group in Region 10 with 3,205 habitants (Census Compendium 2, 2012: p. 7). It’s worth noting that most of the Amerindian population of the country lives in Region 9. (Census Compendium 2, 2012: p. 67)

Table 5: Indigenous Demographic Indicator

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Households (HH)** | **HHs headed by women** | | **Size of the family** | **Native language** |
| Total | Percentage |
| Region 9 | 345 | 27 | 8% | 5.42 | Macushi (47%), Wapishana (39%), Portuguese (5.5%) |
| Region 10 | 223 | 98 | 44% | 4.18 | Guyanese Creole (11%) |
| Total | 568 | 125 | 22% | 4.59 | Guyanese Creole (58%), Macushi (54%), Wapishana (45%) |
| Average | 284 | 63 | 26% | 4.80 | Guyanese Creole (19%), Macushi (16%), Wapishana (13%) |
| Source: Inter-American Development Bank | | | | | |

Based on Table 5, 44% of households in Region 10 are headed by women, in contrast to 8% in Region 9. This could be based on a series of factors ranging from migration (both internal as well as overseas), as the net migration for 2015 is 4.8. In addition, communities in Region 9 speak three different languages Macushi (47%), Wapishana (39%), Portuguese (5.5%), whereas in communities in Region 10, Guyanese-Creole (11%) is spoken. These differences are additional indicators of the stark differences between Regions 9 and 10 which need to be accounted for when implementing the Project.

According to the Guyana Lands and Surveys Commission, most of the 170 communities have been titled largely thanks to the Amerindian Act, and currently there are only 30 still in the process.  Some of the challenges they have faced have to do with demarcation.  The Ministry of Indigenous Affairs, with the support of UNDP, are in charge of the consultation for the land demarcation. Based on their experience, they now require written signatures from the community accepting the boundaries.  Not long ago the acceptance of the boundaries was done verbally.  In those cases, when the team in charge of doing the official titling arrived, many would say that they hadn’t agreed with the demarcation.  In addition, there is no legislation that protects religious or sacred land.

The livelihoods of many indigenous peoples are inherently vulnerable to climate change, due to a number of factors that increase sensitivity and exposure, including dependence on ecosystem services and agriculture, and isolation from main infrastructure and transportation networks[[22]](#footnote-23).

The indigenous communities are heavily dependent on small-scale agriculture, particularly for the provision of their main staple, cassava. Agriculture itself is sensitive to climate change due to the close connections between climatic conditions, plant development and animal health, which in turn increases the sensitivity of indigenous peoples' communities[[23]](#footnote-24).

In the interviews with the authorities of the Ministry of Indigenous Affair and NGOs we found that the capacity to deal with climate impacts by indigenous peoples is affected by a number of barriers: informational, technological, institutional, and regulatory, among others. There is also a need for empowerment at the local level and for community members to be able to contribute to policy processes. Information is also limited, consisting of traditional knowledge, available Hydrometer data and a climate change community manual that are not adequately utilized. Furthermore, due to the hinterland location of many indigenous peoples' communities, education opportunities are limited or not readily accessible. As a result, language and concepts related to climate change are not readily understood. Finally, the availability of financial resources to build climate resilience is perceived as low. Although financing is available to various agencies, such as the RDCs and National Drainage and Irrigation Authority (NDIA), for activities that may be classified as resilience building, stakeholders did not refer to this during interviews.

A crucial component for facilitating access is increasing knowledge in the science of agriculture, from use of seeds, types of soil, safe handling of pesticides and other technology and agricultural practices, to information about the weather that has a direct impact on their lives.

The major constraints for Amerindian lands is the delay in issuing titles and extensions prolongs uncertainty which can have a knock on effect such as for REDD+ payments. Other constraints relate to the management of Amerindian lands in that they may not fit in with Government or regional objectives, and there is also actual and potential conflict with other land users regarding mining, logging and agricultural developments[[24]](#footnote-25).

**Gender Issues**

Guyana has made significant efforts to overcome gender violence and gender inequalities in the last decade. Some steps taken toward improving the quality of life for women and children in rural areas include constitutional and legal reforms providing advances for equality, a renewed institutional framework for the three branches of the State and increased spending for the social sector in areas such as education, health, water, sanitation, and housing[[25]](#footnote-26) .

Decentralized gender units throughout the country have helped organize the civil society organizations, providing a forum for consultation and advocacy. In addition, access to a reliable supply of potable water, legal protection of women’s property rights, equal access to employment, education, social security, and health care are protected by affirmative action to ensure priority access for women to these services. Furthermore, due to the significant number (29%) of female-headed households, in 2009 the State introduced a Single Parent Assistance Programme to lend support to these heads of households with financial assistance for day care and skills training and/or retraining (CEDAW, 2010)[[26]](#footnote-27).

Political participation of indigenous women is limited among the local indigenous leaders, known as Toshaos. There are only five women out of 219 Toshaos at the national level. This is another measurable indicator of the gender disparity historically present regarding access to power positions. According to CI-Guyana Report (2016), one of the major problems that indigenous women face in this regard is lack of self-esteem, which in turn makes them ill-prepared to run for office as they won’t develop the skills, networks and know-how required to have community support. As the position is highly political and tied to one of the political parties, these challenges limit indigenous women’s access to candidacies. Therefore, leadership training is crucial to foster the optimal participation of women[[27]](#footnote-28).

The Ministry of Social Protection provided relevant information on some of the programmes as pertaining to gender and indigenous communities. Many of these programmes have actively involved women in agroprocessing (jam, wine, preserved fruit) in Region 1, and cassava production in different regions throughout Guyana, including Region 9. Based on their experience, women are more involved in agriculture-based agroindustry than in any other activity such as fishing or logging, which fall within the realm of men’s traditionally assigned roles[[28]](#footnote-29).

According to the Institute for Gender Studies at University of Guyana, access to resources is one of the major challenges faced by women in the rural areas (mostly indigenous) when it comes to having active economic and social involvement in the agricultural spheres. In agriculture, a large percentage of women are involved in the processing of crops. Hence, there is a great need to access new technologies in addition to training in canning, bottling, packaging, and marketing. As was made evident in the case of a prior pineapple canning project conducted in Regions 3, 4 and 6 (Rouffiange, 1993), if the women are unable to sustain a supply of raw material, the project will not be sustainable.

# Region 9 – Rupununi

1. **Socioeconomic Context**

The Rupununi has a population of 24,212 inhabitants in an area of 57,750 km2, where 89% of the population are Amerindian communities (Wapishana, Macushi, Wai-Wai, and Patamona). Amerindians represent the largest ethnic group in this area[[29]](#footnote-30).

Rupununi is an indigenous mixed-economy consisting of four sets of influences, namely, customary arrangements, the State, the market system and non-governmental organizations (NGOs). The predominantly indigenous population owns 27% of the land in the Rupununi[[30]](#footnote-31).

Households in the Rupununi are engaged in several activities (mixed farming, agroprocessing and wage labour) to provide their livelihoods. A very significant recent development is the overall trend in the Rupununi towards a market-based economy. Over the years money has been replacing barter as a means of exchange and more and more communities are producing for the market or earning wages[[31]](#footnote-32).

The Rupununi population generates low annual incomes but has strong dependencies on natural resources to meet household needs. Households utilize a number of economic activities for their livelihoods. The top three economic activities at the household level are i) agroprocessing, ii) crop production, and iii) paid labour. However, many households (60%) still engage in traditional activities such as hunting, fishing and gathering[[32]](#footnote-33).

The economic activities which generate the most cash income in households are paid labour (mainly outside of the village), logging, agro-processing, and crop production. These activities account for 78% of the cash incomes in the Rupununi. The data also reflect the dependence on the agriculture sector to support community livelihoods. For instance, even though agroprocessing only generates 16% of the income in the region, 70% of the households are involved in this activity. It is troubling that the need for paid labour outside of the villages is causing villagers to migrate in search of employment opportunities[[33]](#footnote-34).

1. **Agriculture Sector**

In this region the predominant agricultural activity has been cattle rearing on natural pastures. Although the total herd population has dwindled to 13,000 heads from a reported high of 65,000, there is still a sense that beef ranching remains the main cultural niche of the indigenous population. The Rupununi Livestock Producers Association (RLPA) appears to be the most vibrant agricultural producer association and its 60 to 70 members are beef and small ruminant producers.

Crop agriculture is undertaken mainly in forests and forest islands, employing mixed farming systems to produce cassava and a range of other crops generally aimed at meeting households food needs. Crop agriculture has grown very little over the years and major increases in the production of traditional and new crops will require significant inputs of new technologies, financial investments, training, and technical assistance. Other limiting factors have been that family labour employs only rudimentary farming tools, lack of guaranteed markets and poor transportation network and infrastructure[[34]](#footnote-35).

The main foods consumed in the Rupununi are cassava products (including *farina*, *casareep*, cassava bread) and fish. However, households are increasingly consuming imported food, which means that more cash will be required to support these purchases. Households use firewood to cook food, including the main staple, *farina*. Cooking gas is used, but the majority of households cannot afford to use it on a daily basis. Hence, firewood is very important for local livelihoods, and its scarcity poses a threat to community wellbeing. Other sources of energy consumed by households are solar panels and generators which are used to provide electricity.

According to SOFA[[35]](#footnote-36), livestock research appears to be the most feasible intervention priority for the region with pasture and feeding material being the primary area, followed by improved breeding efficiencies and breeds. Also of importance, but perhaps as support to this programme, should be a value chain study of the Rupununi cattle industry to determine the range of products which can be provided by this sector.

The high expenditure on external inputs, particularly food, opens up the possibility of investing in food security strategies. In addition, food sovereignty opens up opportunities for small business development in poultry, milled rice and fruit processing, which are presently not being developed[[36]](#footnote-37).

For SOFA, growing crops in savannahs has several advantages; for example, that mechanical equipment could be used and hence more land could be brought into cultivation, crops would grow closer to farmers’ homes and there would be no need to clear forest. However, several challenges will have to be addressed, including farmers’ lack of experience and technical skills in using savannah lands which are shallow, nutrient poor and will require soil supplementation, flooding during wet seasons and need for fencing. Recent investments in the region by Santa Fe and Waikin Ranch mega farms may demonstrate approaches to dealing with some of these challenges, including sustainable ways of utilizing the region’s natural resources and ecosystem in compliance with the government’s Low Carbon Development Strategy.

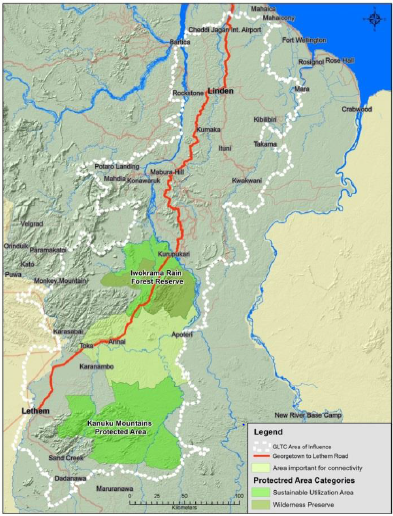
1. **Biodiversity and Ecosystem Services**

The Rupununi Savannah is one of Guyana‘s most unique and diverse ecosystems and among the last great wilderness areas on Earth. It is home to over 9,000 species, including over 2,000 vertebrates and many species that are highly endangered globally (Hollowell and Reynolds, 2005; DIREN, 2006; Conservation International, 2003; Funk et al., 2007). This high diversity is the result of a mix of Amazonian and Guyana Shield fauna, extremely diverse and closely packed habitats, and marked seasonal variability, including extensive flooding[[37]](#footnote-38).

According to CI until recently the region‘s ecosystems have been protected by its isolation. Increasing interest in the region for gold mining, petroleum extraction, and large-scale agriculture is beginning to threaten the spectacular wildlife and natural habitats of the Rupununi.

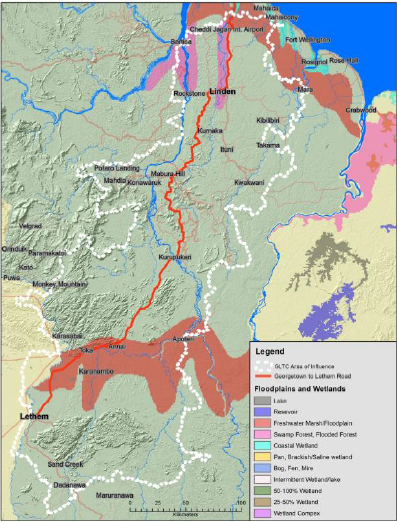
The Rupununi wetlands region is particularly interesting from evolutionary and biogeographically standpoints, as it represents a potential avenue of species exchange between Essequibo and Amazon basins during torrential rains seasons. Extensive flooding of the savannahs between the Takutu and Rupununi basins is thought to promote this potential route of species transfer and gene flow. As such, fish provide a fascinating system in which to examine the history of faunal crossover and interaction in a complex geological and hydrological region[[38]](#footnote-39).

Illustration 3: Suggested area to increase connectivity between the protected areas[[39]](#footnote-40).



According to CI the wetlands, savannah and forested areas between these two protected areas are critical for the maintenance of their integrity and for the movement of wide ranging species. There has been a suggestion that this area could be proposed for the establishment of a RAMSAR site.

Illustration 4: Wetlands in Region 9[[40]](#footnote-41)



The Rupununi Wetlands have been found to play a key role in evolutionary processes as a result of the connectivity between the amazon and Essequibo watersheds with occur within it (de Souza, Armbruster and Werneke, 2012).

Forests and forest islands are the most important natural capital for livelihoods in the region and are the source of wild fruits, nuts, timber for sale, and home-building, the areas where people primarily farm, and the habitats for a range of wild animals which are hunted for food. Aside from subsistence and economic value, forest and wetlands feature prominently in indigenous culture and folklore, and have significant aesthetic value, serving as a primary place of recreation and hunting. Wild and domesticated animals and fish in particular are the main protein sources for villagers[[41]](#footnote-42).

The Rupununi Savannah is divided into two almost equally sized parts by the Kanuku Mountains – the North and South Rupununi. Despite a reportedly high diversity and unique species composition, biological data, particularly from the Southern Rupununi, are still lacking (Watkins et al., 2010). As pressure to develop the region increases, it is essential to have a strong baseline of species and habitat information for the Southern Rupununi in order to make sound management and conservation decisions.

The savannahs are mostly open, hot and dry areas shaped by frequent and regular fires, with a pronounced seasonality characterized by periods of rain and drought that have and impact on activities such as agriculture and water availability. Common trees of the savannah include *Curatella americana* (sandpaper tree) and *Byrsonima verbascifolia*, which is used by the local people as an anti-malaria and anti-diarrhoea cure. The bush islands consist of small patches of forest which are often elevated and rocky within the savannah, with trees often not higher than 10 m. Rocky outcrops form an important part of the savannah; examples include Kusad Mountain, Saddle Mountain, and Shiriri Mountain. The rocky outcrops and mountains are among the most vulnerable of vegetation types, as they are unique in the regional context. Large parts of the savannah are drainage systems of the larger rivers (Takatu, Ireng, Rupununi) with rivers bordered by gallery forests, providing habitats for many other organisms.

Water availability in the Rupununi: there is likely to be excess water during the rainfall period, but a serious deficit in the dry period has implications for livelihoods and agriculture. There is therefore a need, in both places, to provide some form of on-station water storage.

The water areas, creeks and wetlands of the Southern Rupununi are used by the indigenous peoples for domestic purposes, including drinking and food preparation, among others; as such, a water quality assessment identifies whether the waters are safe for this purposes. Moreover, this water quality survey contributes to the limited baseline data available that should be considered in the establishment of water quality standards for surface waters in Guyana and the management of water resources[[42]](#footnote-43).

1. **Climate Resilience**

Climate change is a major threat to the Rupununi because of the fragility of its ecosystems. The diverse sources of food (from the forests and crop production) indicate that the Rupununi population is somewhat resilient to the effects of climate change in terms of food security. The people also possess traditional ecological and agricultural knowledge that may help them to overcome a potential food production issue linked to climate change. However, with an increasing dependence on imported food, and declining fish stocks, the population can quickly become food insecure, especially if agro-ecological systems are negatively affected by the effects of climate change.[[43]](#footnote-44)

Proper management of natural resources is also critical for the maintenance of households. Timber provides significant income for households, and firewood consumption is high. Firewood is essential for the preparation of *farina*, the major staple of the region. Nature based tourism has also begun to generate income for some households[[44]](#footnote-45).

The adaptive measures proposed by the Climate Change Office for the Rupununi are in the Climate Change Adaptation Plan, involving the participation of NGOs. The plan is focused on: i) building a local monitoring system, establishing a monitoring process of at least 30 years to track changes in the climate. This can be done by identifying strategic sites to install weather stations in 2 or 3 of the sub- districts, organizing an inter-agency group to monitor climate change which must be led by the regional authorities or the hydro-meteorological office, etc.; ii) implementing adaptation measures based on ecosystems and traditional knowledge/practices; e.g., water harvesting systems, climate resilient agriculture.

Mainstreaming climate change in the context of the Rupununi means the integration of climate change adaptation and resilience considerations into various programmes, projects, plans, strategies, and policies implemented in the region. This will ensure local awareness of climate change issues, and help communities to adequately prepare for its negative effects. Investments to develop the region must be aligned with the Low Carbon Development Strategy to promote effective mainstreaming of climate change. These actions are part of the Program (GY-L1060).

1. **Indigenous Issue**

The Rupununi Savannah is home to 5,000 indigenous people. Until recently, the region has been protected by its isolation. With improving accessibility, beginning with a road from Georgetown 20 years ago, a bridge across the Takatu River to Brazil in the past five years, and the promise of the paving of the road from the Lethem (Brazil border) to Linden over the coming five years, there is increasing interest in the region for gold mining, petroleum extraction, and large-scale agriculture. These developments are already threatening the spectacular wildlife and natural habitats of the Rupununi, as well as the traditional ways of life of the indigenous communities[[45]](#footnote-46).

Indigenous participants at the St. Ignatius village meeting in Lethem, Region 9, suggested the need to have some sort of formal schooling in agriculture, such as at a school of agriculture developed by the government. Indigenous women emphasized the need to access technical knowledge, such as the best type of cassava to grow based on soil type, seeds and weather conditions. All the participants demand the improvement of knowledge on how to deal with climate change which is affecting their crops.

Cassava, as a crop native to the forest, has cultural significance in the communities in addition to its nutritional value. Cassava is used to make as many as ten different products, ranging from cassava bread to tapioca[[46]](#footnote-47).

In the interviews the indigenous people explained that an obstacle that affects all of the communities around Lethem is the difficulty in having a niche market to sell their products, in addition to transportation.

1. **Gender Issue**

In the interviews applied in Lethem to different stakeholders we found that women are increasingly taking up leadership roles in the household and are contributing significantly to the households’ economy. Thirteen percent (13%) of households were headed by youths (≤ 29 years). Youth have on average 2.5 times more income than older persons in households. Main sources of income are logging, external work, agroprocessing, and livestock[[47]](#footnote-48).

According to the Permanent Secretary of the Ministry of Communities, 70% of organized groups across the country are women. In Region 9 we can see a successful example, like the peanut project, where women from North Rupununi started producing and selling peanuts as one of the main crops in the savannah.  With the support of the Universities of Georgia and Florida they started the Collaborative Research Support Programme in 2002, slowly growing into a peanut butter factory thanks to the Canada Fund and the US Ambassadors Self-Help Fund[[48]](#footnote-49).

Women have traditionally played a role in conventional food supply and agriculture practices. In most communities women perform tasks such as planting crops and transporting produce from farms, while maintaining tasks such as child bearing, cooking, washing, and other household chores. The roles have been changing over the years as many women are now participating more in the labour market or engaging in income generating activities[[49]](#footnote-50).

In terms of gender division of roles in cassava planting, men are the ones who traditionally prepare the soil and women do everything else. Women in Guyana have been at the forefront of agriculture, although, as other countries’ experiences illustrate, they are still marginalized and their contribution is mostly invisible. These findings are consistent with the FAO’s research on agriculture and gender that illustrates that globally, female farm labourers’ wages are lower than men’s while low-paid tasks in agroprocessing are routinely "feminized"[[50]](#footnote-51).

The challenge for the Program is to involve the gender perspective in the extension services that will be provide by the MOA.

# Region 10 – Ebini

1. **Socioeconomic Context**

Region 10, Upper Demerara-Upper Berbice, is found in north-central Guyana. It is bounded by the Essequibo River and Regions 7 and 8 to the west and south, by Region 6 to the east, and by the coastal regions to the North. It has an area of 6,555 square miles (17,040 square kilometres, 1,671,975 has.) and lies south of the Coastal Plain, which is approximately 150-250 km wide.[[51]](#footnote-52)

The landscape is characterized by a relatively flat to very gentle undulating plateau in the north and east of the region, with a hillier and more dissected topography to the south and west. Region 10 is part of the ‘Hilly Sand and Clay’ and ‘Highland Forest’ zone of Guyana (FAO, 2014).

Groundwater resources are in abundance in the north and east of the region at depths of 3, 75 mm. This includes the Dakoura Creek watershed which is approximately 8 km at its widest point, has an estimated annual flow of 52 mm3 and drains an area of 41.3 km2. This watershed is of utmost importance, since it replenishes the fresh water supply for Region 4 and most of Guyana’s coastline.

This Region has a population of 39,452 (2012), the majority of which are Afro-Guyanese. The Region is also home to ten Amerindian settlements up the Demerara River, in the Berbice River and at Rockstone. There are also a small percentage of East Indian inhabitants. English is spoken by all, but most of the population communicates with a local dialect, Creolese. The majority of the population of the region, about 70%, is found in Linden — the largest of several communities within the region, and its town.

Table 6: Communities of Region 10

|  |  |
| --- | --- |
| **Communities** | **Population (approximate)** |
| Linden | 29,232 |
| Ituni | 713 |
| Kwakwani | 2,401 |
| Rockstone | 165 |
| Hururu | 264 |
| Coomacka | 577 |
| Wikki | 236 |
| Tacama | 50 |
| Riversview | 527 |
| 47&58 Miles | 290 |

Source: Statistical Bureau Population Census 2002 and RDC

According to the 2005 household poverty status, 13% of Region 10 households are in absolute poverty and 5% are in critical poverty. This compares with 27% and 13% respectively at the national level, and is appreciably less than the poverty rates in rural and hinterland communities (68% absolute poverty and 56% critical poverty)[[52]](#footnote-53).

1. **Agriculture Sector**

The agricultural sector in Region 10 is composed of small-scale subsistence farms spread across the region. These farms are geared towards satisfying local food demand, but not large-scale commercial production. Thus, production is small in scale, with low to average yields, and is associated with little investment, and limited employment opportunities. Surplus produce not consumed by the family is sold in the region’s markets, but falls far short of meeting regional food demand. In fact, Region 10 imports more than 85% of the food it consumes. Nonetheless, there is great potential for the expansion of agriculture in the region. Unlike the Coast, agricultural areas in the region are not prone to flooding and there is an abundance of land within the region — a key agricultural input. The Intermediate Savannahs represent the second major frontier for agriculture in Guyana. This area is 292,038 hectares (703,813 acres), 30 m above sea level, with 87,078 hectares (209,860 acres) of brown sand soils, which are well drained, easily mechanized and responsive to fertilization. It is ideal for the establishment of medium/large scale agricultural operations.

Table 7: Main Crops in Region 10

|  |  |
| --- | --- |
| Traditional crops | Black eye peas, bora, cabbage, *boulanger* (egg plant), hot pepper, bell pepper |
| Traditional fruits | Pineapple, carmabola, mango, orange, lime, grapefruit, guava, cherry, avocado, sapodilla, passion fruit. |
| Non-traditional crops | Broccoli, cauliflower, sweet corn, cantaloupe, butternut, squash, zucchini, iceberg lettuce. |
| Other crops | Maize, peanut, soybean, cowpea, pigeon pea. |

Enhanced agricultural production, particularly in Linden and the Upper Berbice River area, is thus essential to the sustainable development of Region 10. However, the transition from subsistence to commercial farming is hindered by a number of factors, including: i) limited technical and managerial capacity of crop and livestock farmers to run commercial farms; the current national programme, which offers technical assistance to farmers, is hindered by inadequate financial and human resources, resulting in low outreach, little impact, and lack of focused interventions in Region 10; ii) minimal access by farmers to agricultural implements such as seeds and seedlings; iii) lack of agricultural credit to allow farmers to invest in new technologies, improve efficiency, and diversify production. Farmers often cannot meet the collateral requirements of commercial banks, as the Region has significant land tenure issues. When available at microfinance institutions, agriculture credit carries prohibitively high interest rates.

1. **Biodiversity and Ecosystem Services**

Much of the biodiversity in Region 10 is concentrated in the intermediate savannahs that are located south of the coastal savannahs and north of the southwestern Rupununi savannahs, where abundant wildlife exists, ranging from the small invertebrates (such as bullet ants) to larger mammals ( such as pumas)[[53]](#footnote-54). There are four discrete areas: i) Wiruni, ii) Tacama/Ituni, iii) Kibilibiri/Ederoabo, iv) Ebini/Kimbia/Torani. The intermediate savannahs extend in a south-westerly direction on both sides of the Berbice River to the upland rainforest regions and cover a total area of approximately 270,00 has. They are characterized by rolling to gently rolling topography, and range in vegetation cover from open savannah to a rather sparse scrub savannah with what appears to be typical forest subclimax vegetation.

The soils are mostly coarse-textured, ranging from sands to sandy loams, and are characterized by location-exchange capacity, a high percentage of aluminium saturation, low base saturation, and low available phosphorus, and most of the other nutrients. They are low in organic matter and structurally highly unstable.

Environmental management in the region is ad hoc. While there is a National Environmental Policy, there are no clear regional environmental guidelines. The result is the improper use of the region’s natural resources (for example, mining and timber production are not guided by a regional environmental policy) and disregard for the environment (for example, waste management and disposal in Region 10 does not adequately factor in the environment and poses significant risks to the region’s abundant water resources). There is water pollution (primarily from sewage, agricultural and mining chemicals, and garbage), deforestation and, although not significant, air contamination in the region.

In addition, the introduction of renewable, stable, cheap energy is critical to both the social and economic development of the region. Fortunately, the Government of Guyana has set a green development agenda and prioritized the establishment of mechanisms to harness renewable energies.

As the region seeks to diversify its economy, it will also strive to enhance its environmental sustainability. This will be facilitated by the development of a regional environmental policy that will guide the use of the region’s natural resources for development. Specifically, given their importance to public health, quality of life, and protection of ecosystems, Region 10 will enhance the management and protection of its watershed and establish Resource Protected Areas. The expected result is that the renewable internal freshwater resources per capita will increase by 2% by 2020, and the region will place minimal stress on its water resources towards the achievement of a low rating for intensity of freshwater resource use. Additionally, only a 10% reduction in the volume of forest resource stocks is expected.

1. **Climate Resilience**

Region 10 lies within the tropical, humid, lowland climate. Temperatures vary between 19 (minimum) and 32 (maximum) degrees Celsius. The average annual precipitation is 2,250 mm and the rainy seasons are from April to July, and October to December.

In interviews with local people, the main challenge associated with climate change raised was the loss of crops such as cassava and fruit trees.

1. **Indigenous Issue**

According to the population and Housing Census 2002, only 7.1% of the population in Region 10 are Amerindians. In the indigenous community of Wikki/Caicuni, located in Ebini, Region 10, where we had a meeting with Toshaos and indigenous men and women, they explained some of the main obstacles limiting productivity in the agricultural field, among which is water access and flooding, further aggravated by climate change. Community members in Ebini mentioned the additional obstacle they face in transporting products and the inexistence of links between their products and a viable market. They traditionally plant red beans, pineapples, cassava and corn on a small scale.

Due to high levels of unemployment, coupled with low incentives and scarce opportunities of acquiring knowledge in the agricultural field or technology, many young men leave the communities and go to Georgetown, Brazil or other countries such as the U.S.[[54]](#footnote-55), sometimes permanently.

1. **Gender Issue**

In terms of gender and access to land, women complained that they have no access to farm lands and are left without any income or possibilities of gaining knowledge that could be both useful and empowering. Women mentioned their skills, willingness and readiness to work on any agricultural endeavour as well as in handicrafts, given the knowledge they have producing the latter, provided they have a market to sell their products in, and know-how, including technology[[55]](#footnote-56).

The lack of access to education in these communities is cause for concern. Women rarely finish high school, while young men and also women are lured by promises of well-paid jobs which end up in harsh working conditions in mining fields or forced prostitution. Among the factors are both accesses to schools and trained teachers, as well as unwanted early pregnancies. Incest was reported as another problem engrained in the Amerindian communities (further data needs to be collected to avoid making a correlation between a particular ethnicity and sexual abuse, as it exists across ethnicities)[[56]](#footnote-57).

# Legal and institutional framework for socio environmental issues

# Legal and regulatory framework

Current national environmental policies are based on an integrated approach to environmental management and the need to work towards the goals of sustainable development. The commitment to sustainable development is firmly established in the MOA as well as national development plans based in a Government’s “Vision 2020” green economy.

1. **Legislation pertaining to social and environmental issues**

The main laws of social and environmental significance to agriculture development in Guyana are:

* The Environmental Protection Act and his regulations
* Litter enforcement regulations 2014

The other regulations are indirectly related to the programme, all the regulations are laid out in Table 6. The document presents a complete list of legislation to guide the planning and development prior to and during project implementation, and sets out the relevant legal environment on which the investment programme is expected to operate.

Table 8: Relevant legal instruments

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Legal**  **Instrument** | **Brief Description** | **Natural Area or Issue Covered** | **Implementing Agency** |
| **1** | **The Environmental Protection Act**  **EP Act 1986** | Environmental protection/management is governed by the Environmental Protection Act (EP Act) 1996.  The act is the first comprehensive environmental legislation in Guyana and established the EPA. The Act provides for “the management, conservation, protection and improvement of the environment, the prevention and/or control of pollution, the assessment of the impact of economic development on the environment, the sustainable use of natural resources and for matters incidental thereto connected therewith”. Under the Act the EPA is mandated to coordinate environmental management and outlines the legal process for undertaking sustainable and effective management of the natural environment. | Control of environment impact and regulate the use of natural resources. | EPA |
| **2** | **Environmental Impact Assessment**  Part IV of the Environment Protection Act | Stipulates the process governing EIAs. The Act requires that an EIA be conducted prior to authorization of any project, which may significantly affect the environment. The EP Act mandates the EPA to execute the following functions relating to environmental assessment:  To take steps, as are necessary, for the effective management of the natural environment so as to ensure conservation, protection and sustainable use of natural resources;  To promote the participation of members of the public in the process of integrating environmental concerns in planning for development on a sustainable basis;  To ensure that any development activity which may cause an adverse effect on the natural environment be assessed before such activity commenced and that such adverse effect be taken into account in deciding whether or not such activity should be authorized; and  To provide first development consent regarding any development project.  The EPA has determined that for a project of this nature, an ESIA is a mandatory requirement before the issuance of an environmental authorization. | Describe in detail the processes involved in the preparation and evaluation of EIA`s. | EPA |
|  | **EIA Process Guidelines** | Describe the process of environmental evaluation. | Revises the schedule of developments that require EIA | DOE |
| **3** | **Environment protection Regulation part of the**  **Environment Protection ACT** | The Environmental Protection Regulations, made under the Environmental Protection Act, were gazette in 2000. These regulations govern Water Quality, Noise, Air Quality and Hazardous Waste Management and are aimed at preventing pollution by regulating discharges and emissions. These pollution management regulations will regulate and control the activities of development of each project in Guyana during construction and operation.  The Act also requires measures to be implemented to prevent environmental pollution. Part V Section 19 (1) states that A person shall not (a) Undertake an activity that causes or is likely to cause pollution of the environment unless the person takes all reasonable and practicable measures to prevent or minimize any resulting adverse effect; (b) Discharge or cause or permit the entry into the environment of any contaminant in any amount, concentration or level in excess of that prescribed by the regulations or stipulated by an environmental authorization. The Act ultimately aims toward improvement of environmental quality through the management, conservation and protection of resources and the sustainable use of natural resources. | Regulate water Quality, Noise, Air Quality and Hazardous Waste Management | EPA |
| **4** | **Water Quality Regulation 2000** | These regulations require registration and environmental authorization by any person whose construction, installation, operation, modification or extension of any facility cause the discharge of effluents. They cover parameter limits of effluent discharges, new sources of effluent discharges, fees  for registration and environmental authorization, sampling points, records and reports and general provisions for the registration of water effluent, biological integrity, spills or accidental discharges and  Standards methods of analysis. Guidelines on the discharge of effluents and disposal of sludge are detailed in these regulations.  The Guyana National Bureau of Standards (GNBS) has established Interim Effluent Discharge Standards which have been adopted by the EPA. The Standard sets out discharges limits that should be compiled with by various operations. | Water regulation | EPA and The Guyana National Bureau of Standards (GNBS) |
| **5** | **Air Quality regulations 2000** | These regulations require the registration and environmental authorization by persons with facilities that emit air pollution from any process into the atmosphere are outlined in these regulations.  Elements related to parameter limits on air contaminants and emission samplings are also stated in the regulations.  The list of air contaminants for which parameter limits are to be set by the Agency are also detailed in the regulations. No air quality standards have been developed for abattoir operations to date. | Air | EPA |
| **6** | **Noise Management Regulations 2000** | Under these regulations operations that emit noise in the execution of various activities such as construction, transport, industry, commerce and any institution are required to apply to the Agency for an environmental authorization. The GNBS is responsible for the establishment of standards for permissible noise levels in industry, construction and other areas. The categories for which permissible noise levels are to be fixed by the GNBS were identified as follows: Residential, Institutional, Educational, Industrial, Commercial, Construction, Transportation and Recreational. The EPA has in collaboration with the GNBS developed interim noise standards which stipulate level of:  45 decibels during the night for residential areas  55 decibels during the day for residential areas  70 decibels during the night for industrial areas | Noise | EPA  GNBS |
| **7** | **The environmental Protection Hazardous Waste Management Regulations 2002** | Explain the process to present to the authority the waste management: The document is a EPA Identification that contain:  1. Name, address, telephone number and facsimile number of the applicant  2. Generators of the waste and the site of generation  3. Disposer of the waste and size of disposal  4. Designation and physical description of the waste and its composition and information on the special handling requirements including emergency provisions in case of accidents.  5. Types of packaging envisaged (e.g. bulk, drummed, etc.) for storage, accumulation etc.  6. Estimated quantity weight and volume  7. Process by which waste is generated  8. Method of treatment, disposal  9. Information concerning the contract between the transporter, disposer as the case may be  10. Information relating to insurance  The following hazardous wastes shall not be subject to the requirements of these Regulations: “agricultural wastes including agricultural return flows and pesticide residues”, “residues from recycling processes”, “hazardous waste generated in raw material, product storage, and process unit waste”. | Regulate the management of waste hazardous | EPA |
| **8** | **Litter enforcement regulations 2014** | Regulate the solid and liquid material or product or combination of solid or liquid materials like animal remains, animal waste. | Solid or liquid material disposal | EPA with the municipal authorities |
| **9** | **The Animal Health Act No. 7 2011** | Regulate the control and movement of animals into and within Guyana and to prevent the introduction and spread of animal diseases within Guyana and from other countries, and to ensure the safe and humane movement of to and from Guyana and to regulate the importation and production of animal products and livestock feeds and other matters related thereto and connected therewith.  Establish standards for animal welfare during the life of an animal as well as during its slaughter and destruction;  **No regulations are explained for the management of abattoir**. | Animal Health | Guyana Livestock Development Authority |
| **11** | **Public Health Ordinance** | There are ante-mortem and post-mortem guidelines which are not regulated. Similarly there are Port of entry Quarantine guidelines which are not legislated  There is no animal feed legislation | Control the abattoir | Ministry of Health – Veterinary Public Health Unit |
| **12** | **Occupational Health and Safety Act** | This Act deals with the regulation and registration of workplaces and the occupational health and safety of workers. It gives authorization for OH&S inspectors to enter and inspect workplaces.  Under this Act the employer has a responsibility to establish a joint workplace safety committee consisting of four (4) persons. When the workplace has more than fifty (50) persons, the committee should consist of six (6) persons of which at least half the numbers should be workers who do not exercise managerial functions and should be selected by the workers themselves. The employer can select the remaining members from managerial staff of the committee. Workplace safety and health representatives must be selected by non-managerial workers and not by any person who exercises a managerial function. If however, workers are unionized, the majority may agree that their trade unions can select the safety and health representative(s).  The Act requires the employer to display publicly an abstract of the Act, and other sections addressing various issues addressed in the Act. | Health and Safety in workplaces | Ministry of Social Protection |
| **13** | **Amerindian Act 2006** | The Amerindian Act guarantees the cultural and economic rights of the Amerindian people, and provides for the administration of Amerindian communities. The land rights of the Amerindians are also addressed by the Act. Under the revised Act the recognition of Amerindian land rights is probably the most significant. Amerindians will now be granted lands under the State Lands Act which is “absolute and forever.” The old Act had a number of restrictions on the lands granted, including one which states that the Minister can increase or decrease the land granted at any time. The Minister was not required to have any consultations with the community. That restriction has now been removed. This would mean that no operations can be carried out by the developer without the prior consultation with the communities involved.  Importantly, under the new Act Amerindians will now be able to lease their land. However, to ensure that the communities always maintain the majority of their titled land, they will only have the authority to lease up to 10% of the titled area.  Under the revised Act, communities will maintain their exclusive rights over the forest resources on their titled land. Furthermore, the new Act makes provisions for the communities to seek the assistance of GFC, if necessary, inclusive of the need to inventory their forest stock. Another important aspect of the  Act is that it requires persons, inclusive of the developer, desirous of conducting commercial forestry operations to abide with the GFC regulations. This is a very important provision since many communities have had problems with agreements of this nature. | The Minister may apply this Act or regulations to any area or tract of private land that are indigenous group | Ministry of Indigenous Affair s |
| **13** | **Labor Act** | The Act and its conditions specify the conditions that an employer must observe in the contracting of employees. For example Part V specifies that the entire wages of the employee must be paid as money and not otherwise. However, in occupations where it is customary to make partial payment of allowances in the form of food, toiletries, housing etc. these are acceptable and not considered illegal, if both the employer and employee are agreed on such terms.  Wages should be payable either weekly, fortnightly or monthly, except otherwise agreed. | Labor concern | Ministry of Social Protection |
| **15** | **The Wildlife Management and Conservation Regulations were gazette in 2013** | Protection of trade and conservation of the wildlife species in Guyana. | Protection of the wildlife | Ministry of Natural Resources  Wildlife management Authority |
| **16** | **State lands Act 1903** | Administration of state lands | Land tenure | Guyana Lands and Surveys Commission |
| **17** | **Cultural Heritage Act, 1993** | Anthropological and archaeological research and publication | Cultural heritage | Ministry of Culture, Youth and sports  Ministry of Indigenous Affairs |
| **18** | **Protected Area Act 2011** | Regulation of protected areas and of the Protected Areas Commission (PAC) and two new protected areas (Kanuku Mountain Protected Area and the Shell Beach Protected Area), efforts to create the National Protected Areas Trust Fund, development of a strategic plan for the PAC, development of a plan for the National Protected Areas System (NPAS), management plans for individual protected areas, and establishing field presence in protected areas. | Protected Areas | Ministry of Natural Resources  Protected Areas Commission |

1. **Policies, plans and regulations**

In terms of relevant policies, plans and other regulatory instruments, current national environmental policies are based on the need to take an integrated approach to environmental management and the need to work towards the goal of sustainable development. This section summarizes the policies and plans most relevant to the proposed Project.

The Guyana Constitution (1980), articles 2:25 and 2:36 provides de basis for a national environmental policy.

The Guyana Country Strategy (2012 -2016) sets out the primary development policy framework for Guyana, demonstrating government policy commitment to environmental management and sustainable development. Attention has been given to monitoring and enforcement actions to improve environmental management practices and the Strategy covers aspects related to the promotion of cross-sectoral coordination and integration for environment and natural resources management across the sector.

The National Environmental Action Plan (NEAP) 1994 outlines the focus of government as it relates to environmental management. The plan presents a 12 point approach reflecting sound principles of environmental management and ideal sustainable development.

A draft National Land Use Policy (LUP) 2005 has been prepared by the Guyana Lands and Surveys Commission (GLSC). The draft policy aims to streamline land use planning and to create conditions necessary to achieve types of land uses which are sustainable, socially desirable and environmentally compatible. It provides the framework for coordination among land uses and facilitates integration of land uses and the preparation of a National Land Use Plan. The Commission also aims to prepare regional plans for specific Administrative Regions of Guyana. To date the Commission has prepared two (2) Regional Land Use Plans: (i) Region 6 – East Berbice Regional Land Use Plan; and (Iii) Region 9 – Rupununi Sub Region 1. Additionally, Corridor Land Use Plans for the Lethem – Linden and Linden to Soesdyke road corridors have been prepared.

Guyana has identified food security as a way to end poverty and hunger by 2025 and views agriculture as the vehicle to achieve this. Guyana’s vision for agriculture seeks to change the view that agriculture is for subsistence livelihood while promoting agriculture as a wealth generator and entrepreneurial enterprise, producing food and non-food commodities to meet local and export demands. This vision is based on the premise that agriculture is central to food and nutrition security and to sustained economic growth for Guyana. Agriculture is also seen as the most feasible way to provide economic opportunities for poor, rural and vulnerable communities[[57]](#footnote-58).

NAREI’s Strategic Plan (2013- 2020) envisions NAREI as the major facilitator for a prosperous, food secure and environmentally sustainable Guyana. This will be achieved through enhancing agricultural productivity and quality of produce through generation and dissemination of newer and efficient technologies and services reduced import of agri-produce and products, reduced malnutrition and environmental degradation and enhanced exports taking into consideration the changing global and business environments.

The Low Carbon Development Strategy for Guyana was launched in 2009,. The LCDS aims to transform Guyana’s current economy to that of a “low carbon economy” while addressing issues related to climate change through a compensatory scheme by marketing Guyana’s standing forest. The strategy is built on Guyana’s vision to encourage investments/economic development while protecting and maintaining its forest cover. The strategy has three pillars: i) investment in low carbon economic infrastructure; ii) investment and employment in low carbon economic sectors; and iii) investment in communities and human capital. As part of Guyana’s low carbon economic framework, forestry activities will continue to be highly regulated to ensure compliance with national requirements and international best practice. Guyana has identified 6 priority low carbon economic sector that two of them are in the agriculture sector: fruit and vegetables and aquaculture. Also include for REDD+ project the land of indigenous people that many of those project are concentrated in Region 9 for his richness in forest and indigenous land.

Guyana`s Climate Resilience Strategy and Action Plan 2016[[58]](#footnote-59) is a framework for planning and implementing climate resilience actions so as to achieve the Government’s ‘Vision 2020’ for a green economy. This Climate Resilience Strategy and Action Plan (CRSAP) addresses this gap and aims to provide a comprehensive and overarching framework for adapting and building resilience to climate change impacts. The CRSAP builds on the work that has been undertaken in Guyana over the years and identifies key climate risks and priority resilience building actions. The Strategy and Action Plan are underpinned by the five cross-cutting pillars of adaptation identified in the Second National Communication, namely information, research and systematic observation; institutions and capacity building; policy and legal frameworks; infrastructure and technology; and finance.

Among the main topics is **Building climate Resilient Agriculture Systems** by improving water management, developing climate proof sustainable farm systems and building the adaptive capacity of the sector to reduce the vulnerability of farmers, in particular small and medium scale farmers. The other is **Strengthening Drainage and Irrigation Systems**, by improving the capacity of the network starting with the most critical areas, upgrading the existing drainage and irrigation system with a focus on the agriculture sector, institutional strengthening of the National Drainage and Irrigation Authority (NDIA) and development of a training curriculum on drainage and irrigation.

The Poverty Reduction Strategy Paper (2011- 2015)[[59]](#footnote-60) reinforces provisions of the Environmental Protection Act to ensure sustainable use of national resources for social development like sustainable agriculture.

The National Strategy for the Conservation and Sustainable Use of Guyana`s Biodiversity (1997), provides the basis for the development of the NBAP and identifies Guyana´s national position in respect to the study of conservation and sustainable use of biodiversity.

Guyana`s National Biodiversity Strategy and Action Plan (2012 – 2020)[[60]](#footnote-61) provides a framework for the promotion and achievement of biodiversity conservation, sustainable use of its components, support for fair and equitable benefit sharing. It outlines specific objectives to assess national capacity, identify gaps propose actions and to encourage involvement of stakeholders to support the implementation of the plan. It has nine strategic objectives that are related to agriculture sector, reflects mainstreaming of biodiversity in priority sectors such as agriculture, mining and ecotourism, and in situ and ex situ conservation of biodiversity and promotion of soil health through the prudent utilization of biological, chemical and physical methods in an eco-system agronomic approach.

The National Forest Action Plan (2001) articulates specific measures inclusive of conservation, environmental education, awareness, research and training in order to address the relation between forest and development.

The National Protected Area Strategy (2003) provides a framework for establishing an integrated national system of protected areas.

NBAPII (2007 – 2011), provides for a general planning process for biodiversity use and conservation and within the same framework of NBAP I, with an added emphasis on stakeholders involvement.

Guyana`s National Policy on Access to Genetic Resources and the fair and equitable sharing of benefits arising from their utilization (2008), articulate a national policy on access and benefit sharing that is consistent with other national policies and regulations, and with international treaties to which Guyana is contracting party.

The National Biosafety Framework Policy (2007) provides a framework for controlling and monitoring Genetically Modified Organisms (GMO) and Living Modified Organism (LMO) while preventing adverse effects on the conservation and sustainable use of biological resources in Guyana.

The National Strategy of Agriculture in Guyana (2013 - 2020), Guyana’s vision for agriculture, is one which seeks to promote and develop the sector to produce food and non-food commodities to meet local and export demands. The Strategy seeks to not only expand subsistence agriculture but also to push entrepreneurial enterprise and to diversity agriculture by embracing non-traditional crops and support large-scale agriculture expansion. The Vision for Agriculture 2020 is a mandate for Guyana to use its natural resources and advantages for agriculture as efficiently and sustainably as possible. This will require continuous research, training and adaptation, especially in view of the vicissitudes of climate change, evidenced by more frequent and more intense climate events such as droughts, floods and pests and diseases.

Although Guyana has not subscribed to ILO Convention No. 169, the policy and regulation related indigenous people are cover in the Amerindian Act. Related to the land tenure the government has undertaken to guarantee that titles are awarded to all Amerindian peoples and settlements. Titled villages of indigenous peoples own the forests within their titled village areas. Also the Amerindian law of 2006 gives Amerindian veto power in matters of small and medium scale mining within their village and adjacent areas.This include mining in streams and rivers that pass through their titled lands[[61]](#footnote-62).

Guyana is committed to promoting the equality of women in all spheres based on its obligations arising out of CEDAW[[62]](#footnote-63) and other Human Rights instruments/standards so that women can realize their full potential as equals in society. The Government of Guyana reaffirms its belief in and commitment to upholding fundamental human rights and, it holds that all rights are universal, indivisible, interdependent and mutually reinforcing. New legislation has been introduced which will enhance the capacity of the courts to address crimes affecting women and children and allow for greater protection. To this end, Guyana has amended the Prevention of Crimes Act, Act No. 11 of 2008 to allow for the mandatory supervision of persons convicted of scheduled offences, which include domestic violence, molestation, rape, sexual exploitation, pornography, incest, prostitution and kidnapping.

The State Party also wishes to report that Guyana has enacted a package of children’s legislation (2005 – 2010) which has radically altered the framework for the protection of children. These are the Criminal Law Offences Act No. 16 of 2005; the Marriage (Amendment) Act 2005; the Child Care and Protection Agency Act No. 2 of 2009; the Adoption of Children Act No. 18 of 2009; the Status of Children Act No. 19 of 2009 and the Protection of Children Act No. 17 of 2009[[63]](#footnote-64).

The State Party has comprehensively approached the challenge of reducing poverty and reducing inequalities and disparities in the society. It has holistically addressed the political, social and economic environment through its pro-poor policies and programs[[64]](#footnote-65).

1. **International Conventions**

In order to fulfil its sustainable development agenda, Guyana has signed several important regional and international conventions and agreements and is a member to many regional organizations involved in the management and protection of biological resources. Those that impact biodiversity, cultural and natural heritage and sustainable development are listed below:

* United Nations Convention on Biological Diversity (ratified in August, 1994)
* Cartagena Protocol on Biosafety (2008)
* Nagoya Protocol on Access to Genetic resources and the Fair and equitable Sharing of Benefits arising from their utilization (2014)
* Convention on International Trade in Endangered Species of Wild Fauna and Flora (1977)
* Cartagena Convention for the Protection and Development of the Marine environment of the Wider Caribbean Region (2010)
* Specially Protected Areas & Wildlife (SPAW) Protocol (2010)
* International Plant Protection Convention (1970)
* Convention on the Protection of the World Cultural and Natural Heritage (1977)
* United Nations conventions on Climate Change (signatory 1992, ratified in 1997)
* Montreal Protocol (1993)
* The UNFCCC (1992) (Guyana signed on in 1992) & other conventions.
* Kyoto Protocol (2003)
* Vienna Convention on the protection of the Ozone Layer (1993)
* United Nation convention to Combat Desertification (signatory 1996, ratified 1997)
* International Convention for the Prevention of Pollution (1997)
* Basel convention on the control of Trans-boundary Movement of hazardous Waste and their Disposal (2001)

Stockholm Convention on Persistent Organic Pollutants (2007)

1. Rotterdam Convention on Prior Informed Consent for certain Chemicals and Pesticide in International Trade (2007)
2. Guyana’s submission to the IACHR on the Legal framework of Property and Land Rights of Indigenous Peoples on October 7, 2009
3. Minamata Convention on Mercury (2013)

Within the Caribbean and Latin America, Guyana is a member or official signatory to the following:

1. Caribbean Planning for the Adaptation to Climate Change.
2. Mainstreaming Adaptation for Climate Change.
3. Caribbean Regional Environmental Programme.
4. Caribbean Environmental Programme and its Specially Protected Areas and Wildlife Programme.
5. Latin American Network for Technical Cooperation in National Parks, Protected Areas and Wildlife.
6. Treaty for Amazon Cooperation.
7. Guiana Shield Initiative and Guiana Shield Facility.
8. Guyana is receiving support under the CLME project.

In addition to the Conventions listed above, Guyana participates in activities of the Ramsar Convention on Wetlands (1971) and is a party to the Rio Declaration on Environment and Development (1992)[[65]](#footnote-66).

1. **EIA process in Guyana for development projects**

The development of the program will require adherence to national sustainable development laws, policies and regulations. The dominant structure vetting potential projects in the country is the Environmental Impact Assessment Process. The Environment Protection Authorization Regulation (2002) involves the accomplishment of the Environmental Protection Air Quality, Protection Water Quality, Protection Hazardous Waste Management and Noise Management Regulations for all project that demand an environmental authorization.

An Environmental Impact Assessment (EIA) is a study best carried out at the planning stage of a project to identify and assess the effects, both positive and negative; a project may have on the environment and human well-being. Measures are proposed to lessen negative effects and enhance the positive. The study will also outline a plan for monitoring these effects, and the effectiveness of the mitigation measures put in place, and identifies people and institutions that will carry out these functions.

The EIA is done by a team of independent consultants selected by the developer and approved by the EPA. Each consultant must have knowledge and experience relating to at least one relevant area of the project, and together, the team must be able to comprehensively assess the impacts of the project on all areas of the environment, including the human population.

The EIA process in Guyana is comprehensive and contains elements that are typically used in the region. It normally includes the following stages:

* Screening,
* Scoping,
* Baseline studies,
* Public consultation,
* Review process, and
* Preparation of an Environmental Management Plan (EMP)[[66]](#footnote-67).

The process consists of an initial conceptual stage of project design, a screening phase (to determine if an ESIA is needed), a scoping phase to determine the extent of the ESIA, a preparation stage, a vetting stage and follow-up activities (to ensure that any requirements identified by the ESIA are satisfied).

Studies to support the process include establishment of an environmental baseline, description of the proposed project, identification of and prediction of potential impacts, identification of mitigation measures, evaluation of project alternatives, and selection of the preferred alternative, and preparation of an Environmental Management Plan (EMP).

The ESIA process also calls for various levels of public consultation. This includes meetings with key stakeholders in order to elicit their views and inputs with an emphasis on local communities. At the final stage of approval, the EPA requires the project owner (“developer”) to sign an EMP, a legal document to which the developer needs to adhere.

The EMP should focus on the relevant environmental factors for the proposed/existing development, and these should be agreed in consultation with the Agency and other stakeholder agencies when necessary. The following points should be covered in the EMP:

* A description of the surrounding environment
* Summary of impacts associated with the proposed activity
* Description of mitigation measures.
* Description of a monitoring program that could comprise three aspects; i)Baseline measuring, ii) Impact or performance monitoring and iii) Compliance monitoring
* Implementation schedule and reporting procedures.
* Procedure to provide information on the progress and results of mitigation and monitoring measures.
* Cost estimates
* Training and environment awareness
* Documentation and record keeping
* Reporting procedures
* Auditing
* Emergency response Plan (ERP)

The Environmental Impact Assessment Guidelines outlines the process taken and this commences with the submission of a project application for environmental authorization to the EPA. EPA requires specific information and these include a project summary, design and size of the project, potential environmental impacts [positive and negative] etc. The EPA screens the application and makes a determination whether an ESIA is required or not and then notify the proponent. The proponent is also required to submit a draft

ToR to the EPA and the EPA subsequently publishes a notice in the printed media. The public is given 28 days to submit any written comments/concerns related to the project and its effect on their environment. These submissions detail questions and matters which members of the public consider relevant to the deliberations of the EIA.

A public scoping meeting is also held to present the proposed project and to garner additional comments/concerns from the public, thus, aiding the EPA with the finalization of the ToR. The EPA submits the ToR to the developer and the consultants for the preparation of the environmental impact statement (EIS). During the environmental impact process the consultants are required to conduct field studies to collect baseline information and to consult members of the public, interested bodies and organizations to gather secondary information. All the data are collected and a written report – the EIS –is prepared and submitted to the EPA for evaluation and recommendations.

Upon receipt of the EIS the EPA publishes a notice in the daily print media informing the public that the EIS has been prepared and is available for review within a timeframe of 60-days. EPA also engages relevant sector agencies and, as necessary, other relevant institutions to review the document to ensure their concerns have been addressed. The EPA also facilitates a public meeting for to present the project findings and to provide another opportunity for members of the public to contribute towards designing the management framework for the proposed project by raising environmental concerns related to the project.

The EAB is a body which provides an independent contribution to the development and finalization of the EIA and makes recommendations which uphold the principles of the EP Act. In order to carry out its functions, the EAB is involved in the development of the EIS from the point of EIA scoping to establishing conditions for the issuance of an Environmental Permit. The EAB evaluates the EIS and recommends to the EPA whether it should be accepted and the terms and conditions of its acceptance which are reasonably necessary to protect human health and the environment.

The EPA then takes into account the recommendations of the EAB, sector agencies, comments of the public and its own review, and decides whether or not the project should be approved. For approved projects, the EPA issues an Environmental Permit the terms and conditions necessary to effectively manage the environment.

The National Biodiversity Strategy 2012 – 2020 stipulates that the ESIA process and guidance should be updated and expanded to effectively promote the protection of biodiversity and the sustainable management of living natural resources at all levels of project development including the exploratory and project closure phases.

# Institutional Framework

Governmental agencies, institutions and management committees which have responsibilities for the protection and conservation of natural resources including biodiversity related to agriculture sector are: i) Ministry of Agriculture (including NAREI and GLDA agencies), ii) the Ministry of Natural Resources (Environmental Protection Agency, Protected Area Commission), iii) Ministry of Health, iv) National coordinating Committee on Biosafety and Biosecurity, v) Ministry of the Presidency Climate Change Office, vi) Ministry of Indigenous People`s affair. The local government authorities at region 9 and 10 and also the NGO`s that are developing different program in both regions.

The Ministry of Agriculture MOA is the head authority for agricultural development in the country.

* The National Agricultural Research & Extension Institute (NAREI) has developed the capacity for genetic characterization of economically important species, such as coconut, mango, cassava and avocado by means of a joint initiative between the NARI and United States of America Department of Agriculture (USDA), with funding provided through USAID.

The National Agricultural Research & Extension Institute (NAREI) is the premier organization responsible for spearheading agricultural research and extension activities for productivity enhancement and diversification of the non-traditional crops sector (fruits and vegetables), biofuel development as well as for plant quarantine services. NAREI’s vision is “to ensure food security, prosperity and livelihoods of all, using technological innovations in agriculture”. The Institute is actively engaged in adaptive research that focuses on improving crop production/ productivity for enhanced food security and rural development. Emphasis is placed on crop diversification from high volume-low income to low volume-high income crops such as spices and other cash crops, new vegetables (cauliflower, broccoli, red cabbage and sweet pepper). The promotion of Climate Smart Agricultural Practices inclusive of protected agricultural systems for year round vegetable production, hydroponics and drip irrigation is also given prominence.[[67]](#footnote-68)

* The thrust of the Guyana Livestock Development Authority (GLDA) is to “promote greater efficiency in the livestock product industry and to provide enhanced services in livestock husbandry, livestock health and research so as to make provision for effective administration and regulation of trade, commerce and export of livestock or livestock products and for matters related and incidental.” As one of the newest agencies under the Ministry of Agriculture, it delivers public services related to animal production, animal health, animal genetics, marketing, training and extension services as well as regulatory services[[68]](#footnote-69).

The challenger of the administration of MOA will place greater emphasis on large-scale private investment in farming, especially in the Intermediate Savannahs and Region 9. Some of the crops identified for diversification in the hinterland areas are corn, soybean, cassava and legumes[[69]](#footnote-70).

The GLDA and NAREI has lack of capacities to deal with the inclusion of indigenous people and gender issues in the activities of the program, also to deal with environment issues related to the program.

The Ministry of Natural Resources is responsible for the sustainable management of the natural resources in Guyana.

* The Government of Guyana, through the EPA, enacted the Environmental Impact Assessment Regulations. This and the Environmental Protection Act (EPA), and its specific regulations for water, soil, noise, are the primary legislative instruments pertaining directly to the EIA process, including the administration, vetting and approval of proposed projects for which EIAs have been prepared.
* The EPA has the responsibility for the implementation and enforcement of the provisions of the Environment Protection Act (1996). Specifically to implement the law and enforcement of environmental issue in Guyana. The Agency is governed by a Board of Directors, but falls under the direct supervision of the Office of the President. All the activities in the country are required to prepare an EIA under the EIA Regulations.
* In addition, some government bodies with direct responsibility for the protection of biodiversity and Guyana’s natural and cultural resources include the Guyana Forestry Commission Department and Protected Area Commission (PAC).
* In the different interviews with the representative of the EPA we can see that they have a professional staff to address different impact of the agriculture sector but it hasn’t offices and personal at the regional level and enough budgets to conduct monitoring and supervision process to environmental issue in field.
* The challenger for the EPA is to have enough budgets to implement a unit of supervision at the regional level.

The Ministry of Health with the Safety and Health Commission is the authority charged of the health and sanity surveillance of the abattoirs,

* Current legislation is the Public Health Ordinance, there is a Veterinary Public Health Unit; there are ante-mortem and post-mortem guidelines which are not regulated. Similarly there are Port of Entry Quarantine guidelines which are not legislated; there is no animal feed legislation[[70]](#footnote-71).
* There are lacks of capacities to monitoring the abattoir at the regional level.
* There are lacks of guidelines and procedures to surveillance the health and sanitary issues related the abattoir process.
* The challenger of this institution is to develop and appropriate legislation and supervision system for the abattoirs in Guyana with international standards.

The Ministry of Indigenous People`s Affairs has the responsibility to enable the Amerindian Act and all the issues related the access the management of land and natural resources of the different indigenous group in Guyana. The Ministry is responsible for the implementation of the processes of land titling, demarcation and extension as described in the Amerindian Act. The Ministry also supports the National Toshaos Council (NTC) and meetings of this council.

* This institution is in process of enforcement his capacities and conduct program for indigenous people.
* The challenger is to work closely with the indigenous communities and have an interrelation with the others institution of the government for to address appropriately the indigenous issue.

The Ministry of Labour, Human Services & Social Security ‐ Women’s Affairs Bureau in Guyana, are charged of gender issues. The role of this institution is monitoring the result of the program in terms of gender issues.

Several Non – governmental Organizations (NGOs) are directly involved in activities which contribute to the protection and conservation of biodiversity like Conservation International Guyana, WWF- Guianas, Iwokrama International Center for Rainforest Conservation and Development, Kanuku Mountain Community Representative Group, North Rupununi district Development Board, South Rupununi Conservation Society.

At the regional level we can found the Regional Government, in Region 9 has a division for environment issues that was created 3 months ago. The role of this authority is to be involved in the performance of the abattoir concerning health and sanitary condition of operation.

In conclusion at the institutional level we can found different lacks of capacities and budget to address appropriately the socio environment issues of the program is for this reason we recommended some action to address this issues in the ESMP.

# Analysis of compliance with IDB Operational Policies

According to IDB’s Safeguards Policy (OP 703), the operation was classified as “B”. An Environment and Social Analysis (ESA) will be conducted to guarantee that any possible impact from the small works is minimized and to avoid possible risks from climate change impacts; particularly those related to water availability in savannah environments are considered.

|  |  |
| --- | --- |
| **Classification**: | B |
| Safeguards Policies triggered | B1 (OP 704, OP 765), B2, B3, B4, B5, B6, B7, B9, B11, B16, B17 |

**OP 703 Environment and compliance with safeguards and 2006 Guidelines**

**B1:** The project has the potential to benefit indigenous peoples, improving their agricultural management in such a way as to make them resilient to climate change, improving food security and increasing family income through the sale of agricultural products.

**B2:** Guyana has extensive regulations regarding the environment which coincide with the Operational Policies of IDB. In relation to indigenous peoples, although the country has not ratified ILO Convention 169, it possesses specific legislation, the Amerindian Act, for indigenous peoples. It has no legislation in relation to gender matters. The project must consider specific actions for improving the conditions of women in the agricultural sector and must have the indicators needed for their measurement, particularly regarding indigenous women.

**B4**: Regarding the institutional characteristic of socio-environmental follow-up and monitoring, the EPA is the institution in charge of realizing these activities, although it does not have local offices, specifically not in Regions 9 and 10, nor does it have staff for realizing appropriate monitoring of the project. The MOA does not have staff specialized in socio-environmental matters, which implies that the capacity for carrying out socio-environmental monitoring of the project is limited to the institutions in charge of carrying it out.

Thus, in order to assure that the socio-environmental matter be made transversal in all of the project activities, it is suggested that there be an environmental specialist within the MOA for accompanying all project actions, and who is able to develop specific guidelines on environmental matters for the agricultural sector.

On the matter of other risks, there are those regarding poor local capacity for adapting to the impacts generated by climate change, a matter which will be one of the focal points of the project, and the development of technical capacities and technology in order to be able to implement a sustainable agricultural system which is resilient in the face of climate change, through low levels of water consumption and that is friendly towards the environment, in this way is recommended that the program assume and sustainable approaches for the development of the agriculture practices.

**B6:** A consultation process will be carried out during the design of the project in the framework of the IDB Guidelines.

**B9:** The project infrastructure is located in areas in which there have already been interventions like region 10 and bare land like region 9, due to which it does not represent an impact in soil movement, deforestation or disturbance of the local fauna.

Region 9 is one of the most important regions of Guyana in biodiversity. It has important has important wilderness areas, such as the Rupununi, which is in the process of definition and declaration as a Ramsar site for the protection of the wetlands. For water Under B9 this area is considered critical natural habitat. Another factor which must be integrated in the project is the trend towards developing sustainable agriculture in such a way as to avoid the use of pesticides and herbicides which have an impact on the soil, on water and on biodiversity.

**B11:** The operation has the potential to pollute the environment, specifically due to the activities of the abattoir, which generate solid and liquid waste which must be handled under a closed system so as not to generate local pollution. In order not to incinerate the solid waste, it is suggested that management of this waste be developed, such as through the production of cold meats, thus favoring the efficient use of waste in the location, as well as generating income.

**OP 704 Natural disaster risk management and guidelines for the construction and operation of the plant**

The geographical areas selected for the project are prone to periods of intense drought and floods; therefore, the construction carried out must take into account these climate fluctuations which may present the risk of floods and drought which could directly affect the results of the project in matters of agriculture.

It is suggested that soil stabilization measures be considered for the construction of the water reservoir, including a hydrological analysis identifying the recharging locations in order to implement environmental protection measures, to consider evapotranspiration data for measuring the loss of water as a result of this factor, and to consider the capacity of the reservoir in the face of possible periods of flooding.

The area of the project’s location requires studies on the hydrology dynamics, in order to be able to sustainably manage crops without having a negative impact on biodiversity.

**OP 761 Gender equity in development**

The Policy identifies two lines of action: (i) proactive measures actively promoting gender equity and women’s empowerment in all IDB interventions; and (ii) preventive action which integrates safeguards for preventing or mitigating negative impacts on women or men for reasons of gender as a result of actions of IDB through its financial operations. In the context of this Policy, gender equity implies that women and men have the same conditions and opportunities for the exercising of their rights and for reaching their social, economic, political, and cultural potential. The Policy recognizes that seeking equality requires actions aimed at equity, which implies the provision and distribution of benefits or resources in such a way as to reduce existing gaps, recognizing at the same time that these gaps may harm both men and women. The empowerment of women is understood as the expansion of the rights, resources and capacities of women for decision-making and for acting autonomously in the social, economic and political spheres. Under this concept, the general objective of the Operational Policy allows the active participation and inclusion of women in the project to be developed.

In gender matters it was possible to identify, in the interviews held, that this transversal theme is not being worked on within government institutions, or at the level of the local actors.

However, interviews were held with women’s associations which may be strengthened in the framework of the project on matters of sustainable agriculture.

The group of women who manage the abattoir is a group that the project may strengthen on matters of the organization, the financial management and technical aspects of the project.

The project has the challenge to develop the conditions needed for adequately including the transversal theme of gender in its activities, and to achieve impacts in this sphere.

**OP 765 Indigenous peoples**

The project is aimed at improving the production conditions of the Amerindian communities of Guyana. Although this country has not ratified ILO Convention 169, it does have particular legislation for indigenous peoples through the Amerindian Act, which regulates relations with indigenous peoples, protecting their rights of access to their territory and natural resources.

Guyana is in the process of strengthening the institutions which safeguard the rights and development of indigenous peoples. Under this vision, the Ministry of Communities was created, which is in charge of promoting the development of local communities, including indigenous communities. Also present are the Ministry of Indigenous Affairs – in charge of protecting the rights of and safeguarding the access of indigenous peoples to their land and resources –, and the Ministry of Social Protection. One of the problems identified in the interviews held is that there is no inter-institutional coordination on matters of indigenous peoples, with each ministry having its own work agenda and no coordination between them for achieving better results.

Another relevant aspect is that, although there are no land holding problems, given that the areas in which the project will be carried out and its infrastructure are the property of the Ministry of Agriculture or of the State, it has been observed that in Regions 9 and 10 there is no soil use management plan allowing the adequate planning of the use and management of natural resources serving both for conservation and for use by indigenous peoples and the local population. It is expected that such a planning instrument be developed in the future.

Table 9: Compliance of the program with IDB policies

| **Policy** | **Compliance with IDB policies** | **Action to ensure the compliance** |
| --- | --- | --- |
| Access to information (OP 102) | The project considers, in its spheres of preparation and operations, to disseminate the scope of the project with the inhabitants of the area of influence through consultation mechanisms appropriate for the socio-cultural and linguistic characteristics of the stakeholders. | Consultation during the design of the Program  Public consultation |
| Gender equity in development (OP 270) | The realization of the project envisions promoting the development and participation of women economically and socially, mainly through support in the organization and empowerment of women’s associations involved in agriculture. | Participation of women in the different trainings courses that the program promote |
| Women in development (OP 761) |
| Involuntary resettlement (OP 710) | Does not apply, since the entire infrastructure to be developed in the framework of the project is located in land belonging to the State or to the Ministry of Agriculture. | Non apply |
| Indigenous peoples (OP 765) | The objective of the project is to improve the agricultural production conditions of the indigenous communities in such a way as to increase their food security and their income. | Participation in the process of by design, in the public consultation and in the trainings promote by the program |
| Compliance with environmental legislation and regulations of the country | The institution in charge of the management of the project must monitor the builders and operators of the works to be realized through the project, assuring that they comply with all of the environmental regulations in force in the country, in all phases: execution, operation, infrastructure maintenance and abandonment. | EPA supervision of the program infrastructure and extension |
| Risks related to very sensitive environmental concerns | In Region 9 the program infrastructure and activities has to take care in all their interventions the ecosystem fragility and the importance of the application hydrological studies and management plan for less impact in the environment. | Studies and supervision of the EPA |
| Public consultation | Prior to the execution of the project, it will be necessary for the population directly affected to be consulted and that their perceptions be included in the socio-environmental measures, within the framework of the environmental legislation of Guyana. Furthermore, the project design has considered the interviews of the different stakeholders and has prepared a consultation in the framework of IDB’s policies.  Consultation in the framework of the environmental legislation of Guyana also takes into consideration mechanisms for respecting the own norms and procedures of the indigenous peoples. | Public consultation under the IDB policy in the development of the Strategic Socio environment Assessment and in the public consultation demanding for the environment licences for the infrastructure of the program  Creation of local comities with the participation of local stakeholders |
| Natural habitats (protected areas) and cultural heritage spots | The project may possibly affect a wetland; therefore, in the application of LIDAR, there shall be information supporting the setting of limits of the wetland, which will imply the project considering all mitigation measures in the construction and operation in order to minimize impacts on the wetland.  The project must develop low-impact sustainable agriculture which consumes small amounts of water efficiently, less use of pesticides and herbicides or implement organic production in order not to affect high biodiversity areas. | EPA monitoring  List of species uses by the program  Compliance of the Environmental Management Plan propose in the Strategic socio environmental assessment |

# Environmental and Social Impacts, Risks and Mitigation

This section assesses, based on the physical, ecological and socio-economic environment, the potential impacts of the proposed Program.

The potential impacts are described based on the bio-physical and socio-economic effects during the design, construction, operational and closure phases of the project. The significance of the impact is based on the degree and duration, high probability of occurrence and its effect on sensitive receptors.

Significance is determined by:

* direct,
* indirect,
* cumulative.

The impacts are assessed by:

(+) high, medium or low

(-) high, medium or low

Where high, medium and low measure the intensity of the impact produce by the Program in the environment.

The impacts are addressed considering the area of the infrastructure related the total area of the regions.

Also described are the measures to avoid, minimize or mitigate these impacts or to compensate for them.

# Identification of “key” environmental impacts of the operation

The key environmental impacts of the operation have been identified and classified essentially based on the main activities of intervention included in the different Components of the Program, identifying activities related to the implementation of infrastructure as key according to what follows:

Component 1 – information for policy-making natural resources management

Component 2 – strengthening of agricultural innovation and the extension system

Component 3 – support for compliance with sanitary and phytosanitary standards

Analysed by the different phases of the operation

* Design
* Construction
* Operation
* Closure

1. **Evaluation of environmental impacts agricultural research centers**

The following table summarizes the main impacts identified for the agricultural research centers’ construction phase:

Table 10: Assessment of environmental impacts for the research center construction phase

| **Impact** | **Description / assumptions** | **Assessment** | **Need to apply prevention / mitigation measures** |
| --- | --- | --- | --- |
| Increases in soil contamination risks due to possible spills of fuel, lubricants and oils in the operation and transit of heavy machinery | The operation on the construction site of heavy machinery is anticipated, as is the transport of material and supplies to the work site. | (-) medium, direct, temporary | Having plans for responding to contingencies, their application and having sites adequate for the final disposal of contaminated waste at a site authorized by the environmental authority |
| Increase of erosion risks due to land movement and/or alteration of natural or artificial drainage in the sites where civil works are to be realized | Construction activities are anticipated in savannah areas which are flat or have only a slight slope or moderate slope, which may be susceptible to flooding. | (-) medium, direct | Care for considering in the design the existence of adequate rain drainage systems and erosion control works when needed |
| Generation of solid domestic waste from the day-to-day activities of construction staff | It is anticipated that the construction activities not require the installation of camp sites especially designed for this purpose and that staff employ the services present in the town or at the Ebini center. | (-) medium, direct, temporary | To have, in all work areas, procedures for the selection, collection and delivery of solid waste to the local services |
| Increase in demand for water from construction activities | It is anticipated that construction activities demand the use of water from local supply sources like wells. | (-) medium, direct, temporary | Rational use of the resource  Control of water use for construction activities |
| Alteration of landscape and flora | Considered is the likelihood of alteration of the landscape and fauna due to the construction of the center in Region 9, Manari. | (-) low, direct | Care for the landscape design to be compatible with the surroundings and with the use of soil patterns corresponding to the location site  Limiting effects to what is strictly necessary as per the design  Apply assessment of the flora and fauna habitat before the construction |
| Moving of soil during ground preparation works | The soil will be moved only within the area delimited for the establishment of the infrastructure of the agricultural centers. | (-) low, direct, temporary | None |
| Generation of dust and noise / vibration during the works for preparing the ground (through moving of soil or as a result of the transit of vehicles / equipment) | The use of heavy machinery is anticipated, as is the moving of soil restricted to the limits of the site or the zone delimited for the establishment of the centers. | (-) low, direct, temporary | Preventive and corrective maintenance of machinery and equipment  Based on the availability of water, wetting the areas of vehicle transit |
| Generation of solid waste from remains of construction material (cement, concrete, iron, boxes, bags and other packaging, etc.) | It is anticipated that the construction activities generate construction material waste. | (-) low, direct | Planning of activities, compliance with local stipulations, and requests for the applicable authorization to dispose of this waste in adequate sites |
| Risks of work accidents due to inadequate hygiene and occupational safety practices | Work accidents are considered possible. | (-) low, direct, temporary | Contracting companies must have hygiene and occupational safety protocols and practices. |
| Generation of temporary employment in construction activities | It is anticipated that during construction, local manual labour be employed. | (+) medium, direct, temporary | The company in charge of construction must develop a plan for contracting local manual labour. |

The table indicates that in general the impacts typical of any civil construction activity may be expected, with the most important ones being related to effects on the soil in the savannah, the use of water in this phase and the construction activities and risks they generate. No considerable positive impacts are expected.

The following table summarizes the main impacts identified for the operation phase of the centers:

Table 11: Assessment of environmental impacts for the operation phase of the Agricultural Centers

| **Impact** | **Description** | **Assessment** | **Need to apply prevention / mitigation measures** |
| --- | --- | --- | --- |
| Potential to encourage use of invasive species, excessive use of pesticides and herbicides and water | The agricultural extension services has a potential tendency to encourage the use of invasive species in the pasture, pesticides/herbicides, water demand crops | (-) Medium direct | Develop a list of invasive species that must not be used or promoted, and training as to the risks of their use  Carry out training on topical and efficient herbicide and pesticide use focusing on Integrated pest management practices  Ensure crops are chosen and methods of irrigation developed that reduce water use |
| Increase in the demand for potable water for the realization of the centers’ activities | It is expected that water be used from wells and from the catchment to be built. | (-) medium, direct | Including, in the infrastructure of houses, tanks allowing to collect rainwater  Catchment management in such a way as to efficiently employ this resource in the area |
| Generation of wastewater (sewage and greywater) from the day-to-day activities of staff and users of the center | The generation of sewage and greywater is anticipated as a result of the day-today activities of staff and users of the center. | (-) medium, direct | Having collection / segregation and treatment systems of the effluents for guaranteeing compliance with the environmental regulations for the disposal of domestic discharge |
| Generation of domestic solid waste from the day-to-day activities of staff and users of the centers | The generation of solid waste is anticipated from the day-to-day activities of the centers’ staff. | (-) medium, direct | Having systems for the collection / segregation and temporary storage of domestic solid waste for guaranteeing compliance with municipal and national environmental regulations on the matter  Producing, with organic waste, compost which may serve to improve crops |
| Increase in energy demand due to the realization of activities at the agricultural centers | It is anticipated that the centers require electricity for their operations. | (-) low, direct | Assuring the supply of energy to the centers  It is suggested that an analysis be made of the possibility of employing renewable sources such as biofuel from animal waste. |
| Improvements in the management of soil information | The population will be able to access soil laboratory services, thus generating improvements in their agriculture. | (+) high, indirect | The centers must have conditions appropriate for providing laboratory services and for giving advice to the population based on the results of the crops. |
| Improvements in climate information | Improvements are anticipated in climate information with the establishment of weather stations at each center. | (+) high, indirect | Having weather stations generates information for the farmers which allows them to prepare early warnings for improving their crop yield. The information will also serve to determine what genetic improvements should be carried out in the different crops. |
| Incentives for technology adoption for small farmers | The improvement of technology is sought for the agriculture of small famers. | (+) high, indirect | The aspects in which technology improvement is required must be established, and it must be provided taking into consideration the socio-cultural conditions of the beneficiaries.  Providing technical assistance to women dedicated to agriculture |
| Development of research for supporting improvements in agricultural systems | The interviews in both regions allowed identifying that a need of the population is to have responses to the problems of crops due to climate change. | (+) high, indirect | Developing a means for prioritizing research and a means for it to be accessible to the population which requests it |
| Technical support for farmer associations or cooperatives | The interviews identified the need for technical support for the associations in organizational matters, crop management and markets. | (+) high, direct | Developing a technical assistance plan for these organizations, considering transversal themes such as gender, food security and the environment |
| Improvements in the infrastructure of the centers, benefitting the population | Infrastructure improvements are expected at both centers. | (+) medium, indirect | The construction and improvement of the two agricultural centers will imply improvements in research and agricultural extension, benefitting the population. |

Medium negative impacts have been identified in the operation phase related essentially to the normal operating conditions of the agricultural research centers, for which the efficient use of water and energy, and the proper handling of solid and liquid waste must be anticipated in such a way that they demonstrate their sustainability with pilot projects for the generation of alternative energy and water management through rainwater collection. Control / mitigation measures may be established for all of the impacts identified, in order to reduce their magnitude, guaranteeing compliance with the environmental regulations in force.

It has been observed that the positive impacts of the operation will be high, as they will benefit and improve the agricultural production conditions of small farmers in the two regions, which implies an improvement in the quality of life of the population surrounding the two centers; however, protocols for the use of these spaces must be established for their proper operation and care, and for the services provided by them to be efficient.

1. **Water catchment, Region 9**

No environmental impacts are anticipated in the design phase.

The following table summarizes the main impacts identified for the water catchment construction phase:

Table 12: Gauging of environmental impacts of the water catchment construction phase

| Impact | Description / assumptions | Gauging | **Need to apply prevention / mitigation measures** |
| --- | --- | --- | --- |
| Alteration of hydrological conditions flows in the area | The location will be in a flooding area.  The use of runoff is expected to cover 10.500 acres that will be used for the catchment. | (-) Medium, direct, cumulative | Carrying out hydrological studies prior to the delimitation of the catchment area  Carrying out stability studies of the catchment  Giving consideration to extreme events in the construction of the catchment |
| Alteration of landscape, flora and fauna | It is expected that the landscape, and the flora and fauna be affected as a result of the construction of the water catchment. | (-) medium, direct, cumulative | Care that the landscape design be compatible with the surroundings and with the use of soil patterns of the site  Rescuing fauna and relocating it  Limiting effects to what is strictly necessary, as per the design  Consider the seasonal importance of the wetland for wildlife particularly for migratory birds. |
| Moving of soil during the ground preparation works | The soil will be moved only within the areas delimited for the establishment of the infrastructure. | (-) medium,  Direct | Care that the moving of soil not affect biodiversity interest sites |
| Increase in erosion risks due to the moving of soil and/or alteration of natural drainage | The execution of construction activities is anticipated in areas susceptible to flooding in flat zones with slight slopes or moderate slopes which may flood. | (-) medium,  direct, cumulative | Care that in the design of the ground topography, consideration be given to the natural drainage and that ground erosion control works be applied when needed |

There is a potential medium negative impact from the construction of the catchment which may affect the hydrology of the area. Mitigation measures are suggested for minimizing this impact.

Table 13: Assessment of the environmental impacts for the operation phase of the water Catchment

| **Impact** | **Description** | **Assessment** | **Need to apply prevention / mitigation measures** |
| --- | --- | --- | --- |
| Changes in the water course in the area | Changes are anticipated in the water course; this may alter the fauna and flora, and affect inhabitants downstream | (-) medium, direct,  Cumulative | Applying a management plan for the catchment which takes into consideration all changes |
| Sedimentation and proliferation of weeds in the catchment | Presence of sediment and weeds in the catchment | (-) medium,  Direct | Removing woody vegetation from the reservoir zone prior to flooding it (eliminating nutrients)  Having measures for controlling brush  Harvesting vegetation for compost, forage or biogas  Regulating the discharge of water and manipulating its levels in order to hinder the growth of brush |
| Degradation of the water quality in the catchment |  | (-) medium, direct, cumulative | Removing woody vegetation from the reservoir zone prior to flooding it (eliminating nutrients)  Controlling the use of land, the discharge of waste water and the application of agrochemicals in the water basin  Limiting the retention time of the water in the reservoir  Installing exits at different levels in order to avoid the discharge of water without oxygen  Measuring salinity, pH, temperature, conductivity, turbidity, phosphates, and nitrates; doing limnology sampling of micro flora, micro fauna, and benthic organisms |
| Increase in water-related diseases | Because there will be stagnant water, an increase in diseases from the transmission of vectors is expected. | (-) medium, direct | Design and operate the dam in such a way as to reduce the vector habitat  Controlling the vector  Employing prophylaxes and treating the disease |
| Alteration of the humidity levels | Evapotranspiration is high in the area in which the catchment will be located. | (+) high, indirect, cumulative | Realizing measurements for applying mitigation plans allowing to manage this indicator |
| Changes in water availability | It is expected that this infrastructure will allow having water available in the drought season.  Also is expected for fauna – increased densities due to a new water source | (+) high, indirect | Environmental care of the refilling areas  Planning in the use of water by the different users, involving them in caring for the water  Take care of the new fauna that probably using the water catchment |

1. **Abattoir in Region 9**

The table which follows summarizes the main impacts identified in the abattoir construction phase:

Table 14: Assessment of environmental impacts of the abattoir construction phase

| Impact | Description / assumptions | Assessment | **Need to apply prevention / mitigation measures** |
| --- | --- | --- | --- |
| Increase in flooding risks due to the alteration of natural or artificial drainage at the sites of the execution of civil works | The execution of construction activities in zones with slight or moderate slopes susceptible to flooding is anticipated. | (-) high, direct | Care for the design to consider the inclusion of adequate rain drainage systems, considering that the ecosystem is a savannah |
| Increase in erosion risks due to the moving of soil and/or the alteration of natural or artificial drainage at the sites of the execution of civil works | The execution of construction activities in zones with slight or moderate slopes susceptible to erosion is anticipated. | (-) medium, direct | Care for the design to consider the inclusion of erosion control works when needed |
| Generation of solid domestic waste from the day-to-day activities of construction staff | It is expected that the construction activities not require the installation of campsites especially designed for this purpose and that staff use the services which exist in the town. | (-) medium, direct | To have, in all work areas, procedures for the selection, collection and delivery of solid waste to the applicable municipal services. |
| Generation of solid waste from remains of construction material (cement, concrete, stone, sand, iron, boxes, bags and other packaging, etc.) | It is expected that the construction activities generate construction material waste. | (-) medium, direct | Planning of activities, compliance with local stipulations and requests to the applicable authorities for disposing of this waste in adequate locations |
| Increase in the demand for water for construction activities | It is anticipated that the construction activities require water from local supply sources, well. | (-) medium, direct, temporary | Rational use of the resource  Control of the use of water for construction activities  Use the water of the well and avoid the use of water from the creek |
| Alteration of the landscape and flora in the savannah | The possibility of effects on areas with no interventions in the savannah within land belonging to the Ministry of Agriculture is expected. | (-) low, direct | Care that the landscape design be compatible with the surroundings and with the use of land patterns applicable to the area of the site  Limiting effects to what is strictly necessary as per the design |
| Moving of soil during the ground preparation works | Soil will be moved only within the area delimited for the infrastructure site. | (-) low, direct | Minimizing the moving of soil to what is strictly required by the infrastructure |
| Risks of occupational accidents due to inadequate hygiene and occupational safety practices | Worker accidents are expected. | (-) low, indirect,  Temporary | The contracting companies must have hygiene and occupational safety measures and protocols. |
| Generation of temporary employment in construction activities | It is expected that local manual labour be employed during construction. | (+) medium, direct,  Temporary | The company in charge of building the centers must establish a plan for the contracting of local manual labour. |

It may be said that, in general, significant impacts are expected in the construction phase, mainly related to the particular conditions of the area in which the abattoir shall be established, which a savannah is. It is therefore necessary to consider all of the particular restrictions and/or requirements for the use of land and water. No considerable positive impacts are expected.

Table 15: Assessment of environmental impacts for the abattoir operation phase

| Impact | Description | Assessment | **Need to apply prevention / mitigation measures** |
| --- | --- | --- | --- |
| Animal welfare issues | space and water demands, and where and how the meat will be transported away from the site | (-) High, direct | Abattoir design to reduce animal stress, to address the demand of food and water |
| Generation of residual material and waste | The generation of residual material useful for the fabrication of sub products is expected, as well as waste to be destroyed and/or deposited in dump sites. | (-) high, direct, cumulative | Processing waste when it is fresh  Refrigerated storage of waste until it is processed  Use of closed containers  Treatment of exit air  Manure should be used for agricultural ends.  Entrails and other solid waste may be employed in the processing of cold meats.  Avoiding the use of solvents in final products |
| Generation of waste water by the day-to-day activities of the abattoir (slaughtering and cutting) | A considerable flow of waste water with blood is expected from the process of slaughtering and cutting, as well as from the cleaning of the abattoir. | (-) high, direct,  cumulative | Education on environmental mitigation measures for abattoir staff  Establishment of technical devices allowing a better separation of the blood in the waste water systems  Prior to wet cleaning, picking up the large pieces from the floor of the production locations  Setting up buckets for mud in the floor drains  Setting up sifting mechanisms for the waste water in order to separate solid elements (these elements have a high protein content and may be employed in another abattoir process)  Setting up mud collectors and grease separators  Flotation plants (mechanical treatment through flotation); complementary biological filtering as a second phase of filtering following the mechanical filtering |
| Increase in demand for water | The abattoirs employ water in their processes.  20.000 litters /day (3 day slaughter per week) | (-) medium, direct | Employing an efficient water supply system  Use the water of the well and avoid the use of water of the creek |
| Increase in the demand for energy for the realization of day-to-day activities | An increase in the use of energy is expected during the operation phase.  The place is near to the line power transmission | (-) medium, direct | Employing energy-efficient systems  Making use of waste for producing energy and solar energy to produce the own energy to complement the electric energy. |
| Noise emission | The activities of the abattoir generate different types of noises which affect the environment. | (-) medium, direct | Setting up silencers in ventilation systems  Encapsulating machines  Including anti-noise walls |
| Air contamination due to the emission of odours from the different abattoir processes | The emission of odours is expected from the animals themselves and due to changes occurring in organic matter | (-) medium, direct,  cumulative | Establishing a closed-circuit process  Setting up floodgates  Avoiding the accumulation of matter which emits odours  Including an air exit system with bio-filters |
| Generation of residual heat | Caused by the installation of boilers and slaughter ovens | (-) medium, direct | Always employing heat recovery systems |
| Risk of occupational accidents due to inadequate hygiene practices and occupational safety | It is expected that workers operating the abattoirs be exposed to the possibility of occupational accidents. | (-) medium, indirect | All occupational safety and hygiene measures regulated at the national and international levels must be applied. |
| Emission of greenhouse gases | The abattoir generates greenhouse gases such as CO2. | (-) low, direct,  Cumulative | Making frequent measurements  Developing practices for compensating for these emissions, such as planting trees around the abattoirs |
| Lack of capacity in running the abattoir | The Producer Association need to develop capacities in the management of the abattoir | (-) Medium direct | Provide training and support to the producer association including women’s in management, accounting and technical meat handling skills |
| Lack of capacity of government (EPA, Local Government) to monitor abattoir construction and running | The government at the national level ( EPA, MOA) and at the local level (Municipalities) don´t have technical human resources with knowledge in management and safety an d environment standards of an abattoir | (-) Medium direct | Provide training to EPA, environment Unit of the Local government and Ministry of Agriculture |
| Improvements in abattoir infrastructure under international sanitary standards, benefitting the population | It is expected that infrastructure improve with the project. | (+) high, direct | Considering climate change resilience aspects |
| Improvements in the standards of abattoir management | An improvement in the handling standards is expected. | (+) high, direct | Including closed handling measures, seeking to make use of waste |
| Improvement in the skills of the meat producer associations involved in the program | Improvements are sought in skills, use of standards, best practices, and environmental protection. | (+) high, direct | Developing a technical assistance program for supporting the associations, concentrating particularly on women and indigenous peoples |

Impacts are expected in the operation phase, related essentially to the normal operating conditions of the abattoirs, where there will be a strong emphasis in the handling of solid and liquid waste generated by the productive process and the demand of water of the process that comes to the creek source. Mitigation measures have been identified for these impacts.

An important mitigation measure identified for the abattoirs is to seek to employ all waste by producing cold meats, grease or other products, thus supporting the establishment of a closed circuit which minimizes environmental impacts.

The emission of greenhouse gases is also anticipated. This must be compensated for by planting trees around the abattoir and through the application of mitigation measures to minimize the emissions.

In the social sphere, it has been observed that there are considerable positive impacts, given that the sanitary conditions of meat production will tend to improve, that skills will be developed within the meat producer associations, and that women be involved.

# Environmental viability of the program

This section deals with a comparison of the negative environmental impacts and the environmental and social benefits of the operation, in order to evaluate its environmental viability, taking into consideration the effectiveness of the control measures of the negative impacts and the verification of compliance with the criteria and standards of the environment and for the prevention of environmental risks.

In this regard, based on the previous points, it may be concluded that notwithstanding the existence of considerable risks and negative impacts gauged to be of high magnitude, particularly in the activities of the operation of the abattoirs and in the construction of the water catchment, which may be controlled with the adoption of adequate control measures, particularly given that the positive impacts are considerably transcendent because of their direct relationship with an improvement in the living conditions of the local inhabitants, access to better agricultural production conditions, and improvements in the meat production standards which have a direct impact on the quality of life of small farmers of the Amerindian communities and of the inhabitants of the areas of influence of the project, the execution of the operation is recommended.

# Summary of the positive and negative impacts of the operation

1. **Positive impacts**

There are several environmental benefits associated with promoting the sustainable agricultural development program. Guyana’s sustainable growth in the agriculture sector is linked with food security, improvements in the quality of life of Amerindian communities and small and medium farms, and the health of its natural environment. Protection and management of the natural resources of the country is essential for the development of agriculture in Guyana. In that sense, sustainable agriculture, particularly in Regions 9 and 10, is the response of the development of the two savannah areas that are considered to be the next frontiers for agricultural development in the country.

As emphasized in the Proposal for Operational Development, biodiversity, the ecosystem services it provides, and climate change resilience are fully mainstreamed into the proposed program’s design. In this context, the operation is expected to have positive environmental and social impacts as a result of the strengthening of the government’s capacity for: (i) the establishment of agricultural centers to contribute to local and regional development, including technology transfer, demonstration and training for small and medium farmers in Lethem and Ebini, an integrated management plan for the use of natural resources, environment and disaster risk management, and climate change adaptation sectors; (ii) the enhancement of natural, cultural and agricultural assets in a manner that integrates gender, biodiversity, ecosystem services, and climate resilience; (iii) the control of the sustainable development of the agricultural frontier in both regions; and (iv) the inclusion of the local population, among them, lower income households and Amerindian communities, in the development of the emerging sustainable agriculture.

The program addresses the national priority of food security, climate change and integrating indigenous groups in a region-based approach to sustainable development. The set of interventions have been identified to increase the number of agriculture and livestock production systems that are resilient to climate change in Region 9 and 10.

This vision is centered on the “hub and spoke” farm model system. The hub and spoke farm model allows the inclusion of commercial and smallholder farming in a symbiotic relationship leading to the sustainable development of smallholder farmers. Investments have focused on providing the greatest social and economic gains at the lowest environmental cost, taking into account three key elements: (i) a customized approach to sustainable agriculture development, whereby: (a) gradual growth through the development and innovation of agriculture products, while ensuring the management of natural resources, the cultural heritage of indigenous groups and protection of the environment, which is protected and enhanced in a sustainable and inclusive manner; and (b) controlled growth and stepped-up management of infrastructure to mitigate the negative impacts of unplanned agriculture growth combined with climate change and exposure to natural disasters; (ii) development of facilities for research in agriculture that improve the management of crops for small farms and indigenous communities; (iii) ensuring that the benefits of the program accrue to the local people.

The operation will result in positive environmental impacts in terms of:

* The operation is expected to have significant positive social impacts in terms of best practices in agriculture for small farmers, improving their income. It is estimated that, at a minimum, the program will directly benefit 900 small farmer and Amerindian households of people involved in agriculture, of which an estimated 450 will be women in Region 9 and 10. If well planned, agriculture development can bring about an improvement in the provision of services (water supply, wastewater treatment) for local communities.

The following analysis of positive, direct and indirect environmental impacts of the project provides an insight into the benefits associated with undertaking the project.

According to the assessment conducted during the preparation of the program, the improvements in agricultural centers combined with the institutional strengthening activities will result, among others, in the following direct environmental benefits:

* Improved land use planning, integrating ecological factors and disaster vulnerability with information collected in the census for the development of the agriculture
* Improved waste management in the abattoirs to ensure best practices in their management and to achieve the international standards that benefit the population
* Adaptive capacity and development of technology for improving the management of agriculture in the savannah’s areas with risk management tools for disaster risk and climate change planning, with a focus on ecosystems management, and associated training
* Improved skills of local associations in the management of the abattoirs and agriculture, focusing on indigenous groups and gender issues, thus contributing to the welfare of this population.
* Develop an efficient use of water for agriculture issue and wildlife.

Positive social impacts are expected in terms of increased quality of life for farmers and indigenous groups through improved infrastructure, research, services, and opportunities for the sustainable management of agriculture. Specific activities included in the program will ensure opportunities are offered for strengthening the local associations of women involved in agriculture and in the management of the abattoir, benefiting women and members of indigenous groups, such as Amerindians.

The program has the chance to address the main problems identified in the field, such as weakness in knowledge for addressing climate change, which directly impacts crop production, water scarcity in the drought season, and floods that impact agriculture and the lives of local people.

1. **Negative impacts**

The identification and consideration of direct and indirect negative impacts and the mitigation measures included in project design demonstrate that the negative impacts are not potentially significant and are controllable or can be mitigated. The predominant potential negative impacts as a result of the program are linked to the operation of the abattoirs and the water catchment; these are:

* Increase in resource use (e.g. water, electricity) which could impact surrounding communities
* Increase in solid, liquid and other waste (e.g. sewage, garbage, emissions) that may result in pollution of the environment.
* The water catchment is located in an area which is sensitive in terms of environmental protection. In these areas, projects must strike a delicate balance between development and the environment.

Most impacts related to facility and infrastructure construction are reversible if well located, in the sense that an affected area can return to a pre-existing condition after construction occurs. To mitigate impacts, the ESMP includes specific requirements for siting and design of works.

In general, potential negative impacts are easily identifiable, minor to moderate in magnitude, temporary in duration, and spatially restricted. They are all are preventable or controllable with widely available and cost-effective mitigation measures that are outlined in the ESMP. Potential impacts during construction include: (i) soil erosion and temporary increases in sediment runoff resulting from earth movement for the construction of the agricultural centers and the water catchment; (ii) physical disturbance of the flora and fauna resulting from the construction of the water catchment; (iii) generation of dust, noise and gases associated with the operation of construction equipment and vehicles.

These negative impacts will be mitigated through (i) the requirement to undertake appropriate environmental and social impact analysis according to national environmental regulations, obtaining environmental permissions and IDB policy requirements for assessment; (ii) site specific Environmental and Social Management Implementation Plans including specific measures such as waste management and other measures as defined in the ECP; and (iii) the requirement that the construction of each new facility comply with the corresponding environmental impact analysis according to the national environmental regulations and IDB policies.

In addition, the potential direct negative impacts will be largely mitigated through effective application of environmental mitigation specifications that will be included in tender documents and contracts for construction and supervision, as established in the ESMP. These will be included in the ECP to be agreed on with the environmental authority (EPA), which will be part of the tender documents for civil works.

There are risks associated to the siting of works in areas vulnerable to natural disasters. These will be mitigated through: (a) the mainstreaming of disaster risk management measures in physical land use planning processes for the entire infrastructure; and (b) the inclusion of structural risk reduction measures for the works to be financed by the program (i.e. flood- and wind-proofing, retrofitting, and measures designed to stabilize unstable areas).

The program also includes strategic safeguard measures in its components and execution management structure, including (i) improving the skills of national and local small agriculture farmers and indigenous groups in management for the effective implementation of climate resilience; and (ii) inclusion of the different agencies that deal with agriculture in Guyana for the purposes of environmental review of proposed agriculture enhancement projects and subsequent monitoring of compliance with EMPs; (iii) inclusion of a socio-environmental management specialist as part of the project team in ASDU; and (iv) measures to strengthen local agriculture associations, including specific support for the gender issue, upgrading of product and services quality, including internationally recognized sustainable agriculture standards and other specialized certifications, and conversion to cleaner and green technology.

The program also builds on an intensive consultation process with national and local level stakeholders organized in local agriculture associations, once having received capacity-building training on key aspects of the management of crops, water and measures to be resilient to climate change impacts.

# Environmental and Social Management Plan

The plan to ensure the environmental and social sustainability of the program consists of the following components: (a) siting and design criteria; (b) ESMP supervision and enforcement; (c) monitoring, indicators, measurements and responsibilities; (d) training and capacity building; e) Duties and responsibilities for compliance of the ESMP; f) Public information and consultation of sustainability agricultural development centers program; g) Cost estimates of environmental and social management.

The proposed infrastructure in this project is of small scale. The plan focuses only on mitigating those risks with potentially high and medium impact.

# Siting and design criteria

**New Infrastructure in Region 9**

New infrastructure will be located within savannah areas in Region 9 that are sensitive sites for biodiversity and ecosystem services. Part of this area has been proposed as a future protected area.

Prior to initiating procurement of any civil works, the MOA will obtain all permits and licenses from the applicable authorities, including the EPA for environmental licence via the submission of EIAs for new infrastructure and the water catchment.

New infrastructure should be developed with the use of local materials which blend in with the local environment and that are compatible with existing zoning schemes and management plans.

The infrastructure should be resilient to normal flood and drought cycles, as well as increased flooding under climate change predictions.

The design of the water catchment will take into consideration the hydrological system, considering the replenishment of the catchment and the impacts which could arise downstream due to the damming of the creek. Stability studies must also be considered in order to include measures for dealing with floods due to climate change. The hydrological cycles and wildlife habitat have to be considered in the design.

**Abattoir in Region 9**

The abattoirs in Regions 5 and 9 designs must follow best international standards and include in their design systems for the management of solid and liquid waste in such a way as to not have an impact on the environment. Sources of water for each abattoir that are sufficient and reliable and do not conflict with other users must be identified. Consideration must be given to the treatment reutilization of water at the abattoirs prior to discharging it into the environment.

**Research and training courses**

The operation manual for research and training courses has to include details that invasive species (including Genetically Modified Organisms that are invasive), crops requiring high herbicide and pesticide use and crops or livestock with high water demand must not be researched or promoted during the project.

# ESMP supervision and enforcement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project**  **Activity** | **Potential**  **Environmental / Social**  **Impacts** | **Proposed Mitigation**  **Measures** | **Institutional Responsibilities to implement mitigation measure** | **Cost**  **Estimates** |
| *Construction and operation of abattoir in Region 9 (Component 3)* | Site chosen prone to flooding in Region 9 | Ensure design takes flooding risk into account | MoA | Included within project design (3.1.2 Design and supervision of new agricultural center in Region 9) |
| Animal welfare issues | Follow international standards in design  Improve national legislation in animal welfare | MoA | Included in design (3.1.2 Design and supervision of new agricultural center in Region 9) and (3.4 Update of legal framework and regulations) |
| High water demand for animals and meat processing | Ensure water source does not affect local creek ecosystem service and biodiversity or users | MoA | Included in design  (3.1.2 Design and supervision of new agricultural center in Region 9) |
| Abattoir waste causing environmental pollution | Follow international standards in design including option of composting or incineration of waste | MoA | Included in design  (3.1.2 Design and supervision of new agricultural center in Region 9) |
| Weak supervision of construction risk related to environmental and safety issues | Construction firm has an Environmental supervisor who ensures these risks are minimized | Construction Firm | Included in project component  (3.1.2 Design and supervision of new agricultural center in Region 9) |
| Lack of capacity in running the abattoir | Provide training and support to women’s group in management, accounting and technical meat handling skills | MoA | Including in project component 3.2.1 Strengthening of the producer association in Region 5. |
| Lack of capacity of government to monitor abattoir construction and operation | Provide training to EPA, Ministry of Agriculture including GLDA, NAIRI and Environment Unit of the local municipality | MOA | Included in project component (3.3 Training in Sanitary and Phytosanitary and food safety standards for workers and inspectors). |
| *Construction of agricultural center in Region 9* | Site chosen prone to flooding | Ensure design takes flooding risk into account | **MoA** | Design and supervision of new agricultural center in Region 9 |
| The infrastructure should be constructed outside of the proposed Ramsar site | Ensure design takes the proposed area for the Ramsar site into account | **MoA** | Design and supervision of new agricultural center in Region 9 |
| Potential high water and energy demand | Ensure design considers renewable energy sources, and rainwater catchment | **MoA** | Design and supervision of new agricultural center in Region 9 |
| *Agricultural extension services* | Potential to encourage use of invasive species, excessive use of pesticides and herbicides and water | Develop a list of invasive species that must not be used or promoted, and training as to the risks of their use  Carry out training on topical and efficient herbicide and pesticide use focusing on Integrated pest management practices  Ensure crops are chosen and methods of irrigation developed that reduce water use | **MOA – NAREI** | Included in project  (line 2.5 NAREI and GLDA trained) |
| Potential to exclude women and indigenous groups in training courses | Ensure trainers and courses incorporate techniques to ensure inclusion women and indigenous groups | **MOA- NAREI- GLDA** | Included in project  (line 2.5 NAREI and GLDA trained) |
| *Construction of water catchment* | Catchment site prone to heavy flooding | Ensure design takes flooding risk into account | **MOA** | Included in project 2.1.2 Design and supervision of new agricultural center in Region 9 |
|  | catchment reservoir may affect hydrology of the area | Carry out studies to understand this potential impact better | **MOA** | 2.1.2 Design and supervision of new agricultural center in Region 9 |
|  | Water quality may deteriorate inside the catchment reservoir | Develop a water monitoring program and as necessary mitigation measures | **EPA** |  |
| *Strengthening of EPA (within component 2)* | EPA may not be able to monitor aspects of the projects due to few staff, low capacity and lack of mobility | Develop a plan to ensure EPA can carry out regular inspection of the new facilities in construction and operation, and including the agricultural research and extension program. | **EPA** | Included in project component (2.6 Support to EPA for supervision) |

# Monitoring, indicators, measurements, responsibilities

The monitoring and supervision of the application of socio-environmental and risk-reduction mitigation measures and management are presented in the tables. These include the indicators that will be used to ensure compliance with the ESMP:

1. **Monitoring Construction and operation of abattoir in Region 9**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Proposed**  **Mitigation**  **Measure** | **Indicators** | **Measurements**  (Incl. equipment, methods, location) | **Frequency of Measurement** | **Responsibilities**  **Incl. review, reporting**) |
| Design takes into account the condition of the area for disposal waste management | Design content (EIA) | Review of document | 1 | EPA |
| Design takes flooding risk into account Region 9 | Design content (EIA) | Review of document | 1 | EPA |
| International standards followed in design | Design content (EIA) | Review of document | 1 | EPA |
| National legislation improved for animal welfare | Legislation content | Review of content | 1 | MOA |
| Avoid source of water that affects local creek ecosystem service and biodiversity | Design content (EIA) | Review of content | 1 per year | EPA  Environment Unit al Regional Level |
| Provide training and support to Producer Association | Audit of running of abattoir | Audit review | 2 per year | MOA – GDLA |
| Provide training to EPA and MOA health and safety of abattoir management | Audit of running of abattoir | Audit review | 1 per year | International Audit |
| Construction complies with national health and safety and environmental standards | Reports from construction firm on training of staff, activities to reduce environmental impact and number of accidents, | Report | 2 per year | Construction firm |

1. **Monitoring construction of agricultural centers in region 9 and 10**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Proposed**  **Mitigation**  **Measure** | **Indicators** | **Measurements**  (Incl. equipment, methods, location) | **Frequency of Measurement** | **Responsibilities**  **Incl. review, reporting**) |
| Design takes flooding risk into account | Design content (EIA) | Review of content | 1 | EPA |
| Design considers renewable energy sources, and rainwater catchment | Design content (EIA) | Review of content | 1 | EPA |
| Construction complies with national health and safety and environmental standards | Reports from construction firm on training of staff, activities to reduce environmental impact and number of accidents, | Report | 4 per year | Construction firm |

1. **Monitoring of agricultural extension services**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Proposed**  **Mitigation**  **Measure** | **Indicators** | **Measurements**  (Incl. equipment, methods, location) | **Frequency of Measurement** | **Responsibilities**  **Incl. review, reporting**) |
| Develop a list of invasive species that must not be used or promoted, and training as to the risks of their use | List species | List exists | 1 | MOA-NAREI to be submitted to IDB (ESG) for approval |
| Carry out training on topical and efficient herbicide and pesticide use focusing on integrated pest management practices | Training course attendance  Farm demonstration  Implementation by farmers | Number of attendees  Number of attendees  Number of cases of implementation | 1 | MOA-NAREI |
| Ensure crops are chosen and methods of irrigation developed that reduce water use | Training course attendance  Farm demonstration  Implementation by farmers | Number of attendees  Number of attendees  Number of cases of implementation | 1 per year | MOA-NAREI |
| Ensure women and indigenous groups are included in the trainings | List of participants | Numbers of attendees | 1 per year | MOA- NAREI – GLDA |

1. **Monitoring the water catchment**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Proposed**  **Mitigation**  **Measure** | **Indicators** | **Measurements**  (Incl. equipment, methods, location) | **Frequency of Measurement** | **Responsibilities**  **Incl. review, reporting**) |
| Design takes flooding risk into account | Design content EIA | Review of content | 1 | EPA |
| Studies to understand the potential impact of reservoir catchment on area hydrology | Study results | Review study | 1 | EPA |
| The infrastructure has to be constructed outside of the proposed Ramsar site | Allocation of infrastructure (EIA) | Review the EIA | 1 | EPA |
| Water monitoring program and as necessary mitigation measures | Water quality metrics | Simple water quality measurement by kit | 2 per year | EPA |

# Training and Capacity Building

|  |  |  |  |
| --- | --- | --- | --- |
| **Training Activities and Capacity Building** | **Participants. Focus Group** | **Scheduling** | **Cost Estimates** |
| Environmental measures and international standards of safety in the management of the abattoir | EPA  Environment Unit of the Municipality | Link with beginning of abattoir operation | Included in EPA budget (line 2.6 support to the EPA for supervision) |
| Techniques to ensure inclusion of women and indigenous groups in training courses | MOA – NAREI- GDLA | During the preparation and development of the training process | Included in training budget in MOA  (line 2.5 NAREI and GLDA trained) |

# Duties and Responsibilities for compliance of the ESMP

1. **The Construction consulting firm(s) contracted for the development of the infrastructure**

The Contractor(s) must submit to the MOA an Environmental Management Plan to be implemented during the construction period. This implementation plan, detailing the stipulations of this ESMP, will be approved by the MOA and will be attached to the contract. It will describe the environmental and social safeguard measures to be adopted for the infrastructure.

The Contractor will have the duty to:

* Ensure Health and Safety measures are met;
* Ensure no trees or waterside vegetation are removed except those required for the execution of the works;
* Ensure no contamination of land or water by polluting substances. In case of any accident or potentially hazardous / environmentally damaging situation, the Contractor has to notify the MOA and Supervisor who will inform the EPA;
* Use local labour , where possible;
* Ensure that building material is sourced locally where possible. Thatch used for roofing must adhere to sustainable harvesting guidelines and wood should be sourced from sustainably managed forests;
* Use ecologically friendly materials wherever practicable throughout the construction process;
* On completion of work, all constructions, surplus materials, rubbish, scaffoldings, and temporary works of every kind shall be cleared away and removed from the sites and the sites are to be left in a clean condition and/or rehabilitation of the intervention area is to be realized;

In addition, the Contractor's environmental obligations imply, without prejudice to other official arrangements in force, that:

* The Contractor respects the environmental and socio-cultural laws, regulations and arrangements in force, including the rules promulgated during the project performance period.
* The Contractor respects the contractual arrangements of the present project, as well as the conditions established by the various authorizations required by, and released to, the Contractor for the implementation of the works.
* The Contractor fully assumes the consequences of his choices and actions. In particular, he shall repair at his expenses, according to best practices and in the shortest delay – depending on site sensitivity – harm caused to the environment and the residents by non-compliance of authorizations, administrative arrangements or applicable technical prescriptions, and shall pay the fines, damages or other penalties he is liable to.
* The Contractor mobilizes all his means to assure the environmental quality of the works, notably by applying the relevant prescriptions and arrangements.

The Contractor shall consider the execution of works of an environmental nature as well as risk-reduction measures as being part of the general works implementation program.

To fulfil these obligations, the Contractor will:

* Appoint a manager responsible for environmental, social, health and safety aspects as applicable, reporting directly to the Contractor’s Project Director;
* Control, through regular inspections, implementation of the ESMP;
* Provide 6 monthly reports to the MOA for every incident, accident or deterioration caused to the environment by the works, to be formalized in a specific document countersigned by the MOA;
* Provide training for workers to ensure compliance with health and safety procedures and proper use of protective equipment;
* Apply sanctions against staff who does not respect the environment.

1. **The Environment Environmental Protection Agency**

The EPA is responsible for the following tasks:

* Via the EIA process ensure that location of the new infrastructure falls outside of sensitive areas for biodiversity and ecosystem services.
* Via the EIA process, verification that the design of the new infrastructure (agricultural centre, abattoirs) comply with National Law, are resilient to flooding, will not have significant impact in the areas, meet international standards (abattoirs) and that the water catchment will not have significant impacts on the biodiversity or hydrology of the area.
* Supervision of the construction firm to ensure they follow their ESMP.
* Supervision of the waste management of the abattoirs.
* Approve the list of species and varieties to be used in the agricultural research centres.
* Monitor water quality within the catchment reservoir at the agricultural centre in Region 9.

Also the EPA is about to open an office in Region 9 to ensure better supervision of the facilities and the Rupununi biodiversity in general.

1. **The Ministry of Agriculture**

The Ministry of Agriculture is responsible for the following tasks:

* Provide a list of species and varieties to be used in the agricultural research centres for approval by IDB and EPA.
* Carry out research and extension programs according to the operations manual.
* Ensure programs are inclusive of women and the Amerindian population.
* Map the actors involved in the research process, their roles and the obstacles to full participation they might face based on access to knowledge which goes hand-by-hand with technology.
* Ensure that NAREI support the development of internship and training courses where young men and women from the indigenous communities can be actively involved.
* Ensure the development of capacities of local producers associations for the management of the abattoirs with national and international standards.
* Ensure that the agricultural technological packages will include training and extension services, a methodology that includes an intersectional strategy that incorporates a perspective on gender, indigenous communities and the environment as mutually inclusive.
* Ensure the establishment of a grievance mechanism via the community steering committee throughout the construction and operation phase of the project.
* Ensure that the Census include environmental information like use of pesticides, herbicides, GMOs and use of soil and water in the livestock and crops.
* Ensure that the Census includes gender and indigenous information related the participation of those actors in the agriculture practices.
* Continue the participatory process through the next phase of finalization of the program and will also be an integral part of execution of the program, especially in the consolidation of sustainable agriculture. Semi-annual local public meetings will be held in the both areas (Lethem and Ebini) to inform local people of progress in implementation of the action plans and to provide an opportunity to voice views on how to improve implementation. The EIAs required for new infrastructure as per the national regulations, will entail further consultations. Annual progress reports, evaluations and other project-related information will be published on the MOA website.
* Establish a public information mechanism to capture and resolve people’s concerns related to the program in a timely manner and have these properly documented.

1. **Ministry of Health**

The Ministry of Health is responsible for the following tasks:

* Monitoring that the abattoirs are operated and that the quality of the meat produced meets international standards.
* Ensure all new legislation and regulations pertaining to animal welfare and abattoir hygiene are upheld.
* Provide sanitary certificates to the abattoirs only when standards are met.

# Cost estimates of environmental and social management

The costs associated with environmental and social management are incorporated into the different program components. The cost for training and support of EPA in monitoring and supervision of the project is USD 130,000.

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