

Coastal Resilience to Climate Change in Cuba through Ecosystem Based Adaptation – “MI COSTA”.

Environmental and Social Assessment Report

8 February 2021

CONTENTS

Contents.....	2
1 Introduction.....	7
1.1 Background.....	7
1.2 Description of the Project.....	7
1.2.1 Summary of Activities	9
2 Legal and Institutional Framework for Environmental and Social Matters.....	12
2.1 Legislation, Policies and Regulations.....	12
2.1.1 National Policies and Plans.....	12
2.1.2 National Legislation	15
2.1.3 Law 81 of 1997 on the Environment.....	17
2.1.4 Law 85 of 1998, Forestry Law	18
2.1.9 Decree 179 of 1883, Protection, Use and Conservation of Soils and their Contraventions ...	20
2.1.10 Labor and employment	20
2.1.11 Land tenure	21
2.2 Environmental Impact Assessment in Cuba.....	21
2.3 Multilateral Agreements and Biodiversity Protocols.....	22
2.4 Institutional Context.....	25
2.4.1 National level institutions	25
2.4.2 Sector specific centers.....	27
2.4.3 Sub-national frameworks	28
3 Bio-Physical Baseline Conditions	29
3.1 Physical Environment.....	29
3.2 Topography, Geology and Soils.....	30
3.3 Climate.....	31
3.4 Water Resources (Groundwater and Surface Water)	33
3.5 Flora and Fauna.....	33
3.6 Protected Areas and Fisheries.....	36
3.7 General overview of Intervention sites	37
3.7.1 Stretch I: La Coloma to Surgidero de Batabanó (Southwestern coast).....	38
3.7.2 Stretch II: Júcaro to Manzanillo (Southeastern coast).....	39
3.8 Environmental overview of each Intervention site.....	41
3.8.1 Intervention Sites (subzones) / Stretch I - La Coloma to Surgidero de Batabanó (Southwestern coast)	41

3.8.2	Intervention Sites (subzones) / Stretch II - Júcaro to Manzanillo (Southeastern coast).....	47
3.8.3.	Overview on Protected Area by intervention sites in both Stretches	54
4	Socio-economic Baseline Conditions	56
4.1	Population.....	56
4.1.1	Populations with highest climate change vulnerabilities.....	59
4.2	Land Use and Land Tenure	60
4.3	Employment, Labour and Working conditions	61
4.4	Health	61
4.5	Economic Aspects and Livelihoods.....	64
	Indigenous Peoples and Ethnic Minorities	66
4.6	Archaeological and Cultural Heritage.....	66
4.7	Socio-demographic overview of Intervention sites.....	68
4.7.1	Stretch I: La Coloma to Surgidero de Batabanó (Southwestern coast).....	68
4.7.2	Stretch II: Júcaro to Manzanillo (Southeastern coast).....	69
5	Environmental and Social Risk Assessment.....	71
5.1	UNDP Social and Environmental Standards	71
5.2	Social and Environmental Screening Policy Requirements	71
5.3	Impact Assessment Methodology	72
5.4	Environmental and Social Impact Assessment and Mitigation Measures.....	73
5.5	Summary of activities with environmental and social risks by project intervention sites.....	77
5.6	Assumptions Underpinning the Development of the Environmental and Social Assessment Report 83	
6	Environmental and Social Management Plan	83
6.1	Overview and Objectives of the Environmental and Social Management Plan.....	83
6.2	Institutional Arrangements for the Environmental and Social Management Plan.....	83
6.3	Project Delivery and Administration	84
6.3.1	Project Delivery	84
6.3.2	Administration of Environmental and Social Management Plan	85
6.3.3	General Environmental Contract Performance Clauses.....	86
6.3.4	Environmental procedures, site and activity-specific work plans/instructions.....	86
6.3.5	Environmental incident reporting.....	86
6.3.6	Daily and weekly environmental inspection checklists	86
6.3.7	Corrective Actions	86
6.3.8	Review and auditing	86

6.4	Training.....	87
6.5	Stakeholder Engagement and Public Consultations.....	88
6.5.1	Environmental and Social Information Disclosure.....	88
6.6	Grievance Redress Mechanism.....	89
6.6.1	Grievance Redress Mechanism.....	90
6.7	Budget.....	94
6.8	Key Environmental and Social Indicators.....	95
6.8.1	Geology and Soils/sediments.....	95
6.8.2	Noise, Vibration and Air Quality.....	99
6.8.3	Surface Water And Groundwater.....	105
6.8.4	Terrestrial, Aquatic and Marine Flora and Fauna.....	108
6.8.5	Land Use and Tenure.....	111
6.8.6	Employment, Labour and Working Conditions.....	113
6.8.7	Archaeological and Cultural Heritage.....	115
6.8.8	Waste Management.....	117
6.8.9	Emergency Management Measures.....	120
Appendix A: Standard General Environmental Contract Clauses.....		122
Standard General Environmental Contract Clauses.....		122

Table 1. Regulatory Framework relevant to issues related to Climate Change	15
Table 2. Conventions, Treaties, and Agreements of relevance of the project	23
Table 3. Summary on activities by Protected and intervention sites of the project	56
Table 4. Population and estimated number of beneficiaries in the Stretches where interventions will take place. (ONEI, 2018).....	57
Table 5. Communities projected to be adversely affected by climate change	59
Table 6. Population estimated to be adversely affected by climate change	60
Table 7. Employed by type of economic activity (Agriculture, livestock, hunting and forestry; Fishing)	61
Table 8. Child Infant Mortality in the provinces where project interventions will take place	63
Table 9. Rating of Probability of Risk.....	72
Table 10. Rating of Impact of Risk	72
Table 11. UNDP Risk matrix.....	72
Table 12. Summary on Environmental and Social Risk at the Stretch level.....	73
Table 13. Summary on Activities at intervention sites level.....	78
Table 14. Summary on Activities / Environmental and Social Risk at intervention sites level.....	82
Table 15. Erosion, Drainage and Sediment Control Measures	96
Table 16. Air Quality Management Measures	101
Table 17. Noise and Vibration Management Measures.....	103
Table 18. Water Quality Management Measures.....	106
Table 19. Groundwater management measures.....	107
Table 20. Flora and Fauna Management Measures.....	109
Table 21. Social Management Measures	112
Table 22. Social Management Measures	114
Table 23. Archaeological and Cultural Heritage	116
Table 24. Waste Management Measures	119
Table 25. Emergency Management Measures.....	121

Figure 1. Coastal Stretches Targeted. ‘Tramo 1’ is Stretch 1 and ‘Tramo 2’ is Stretch 2	8
Figure 2. Main Organizations of the Public Administration that have Direct Responsibilities for the Adaptation to CC	25
Figure 3. Karst geology of Cuba.....	30
Figure 4. Political map of Cuba to describe different coastlines.....	31
Figure 5. Climate types in Cuba (modified Köppen classification)	32
Figure 6. Mangroves in Cuba	34
Figure 7. Location of fore reefs (grey color) in the Gulf of Batabanó	35
Figure 8. Location of fore reefs (grey color) in the Cuban southeastern shelf	36
Figure 9. SNAP Cuba	37
Figure 10. Stretch I: Project intervention area spanning from La Coloma to Surgidero de Batabanó	38
Figure 11. Stretch II: Project intervention area spanning from Júcaro to Manzanillo	40
Figure 12. Detail image with intervention in mangroves and swamp forest around La Coloma area.	42
Figure 13. Areas to be affected by CC-related saline intrusion, temporary flooding during hurricanes and SLR. Source: “Manglar Vivo” Prodoc Document	43
Figure 14. Expected impacts for the communities of the Cajío coast due to the sea level rise for the years 2050 and 2100.....	44
Figure 15. Wetland ecosystems on the Cajío coast and expected impact of saline intrusion for scenarios 2050 and 2100.....	45
Figure 16. Batabanó intervention areas.	46
Figure 17. Vulnerability and general characteristics of the sub-sector Stretch II.	48
Figure 18. Rehabilitation areas of mangroves, herbaceous swamps and swamps forest in Júcaro	48
Figure 19. Road and infrastructure in front to the sea, built on areas of mangrove in serious danger	49
Figure 20. Loss of mangroves in Júcaro coast and isolated samples of black mangrove Avicennia sp.	50
Figure 21. Rehabilitation areas of mangroves, herbaceous swamps and swamps forest in Playa Florida	52
Figure 22. Rehabilitation of mangroves and swamps forest in Santa Cruz del Sur.	53
Figure 23. Rehabilitation areas of mangroves in Manzanillo area.	54
Figure 24. Map of Protected Areas present in the Project Intervention Stretches	55
Figure 25. Picture of a tower belonging to the “Troca de Júcaro a Morón”	67
Figure 26. Location of the National Monument “Troca de Júcaro a Morón”	68

1 INTRODUCTION

1. This Environmental and Social Assessment Report has been prepared in support of a project proposal for “Coastal Resilience to Climate Change in Cuba through Ecosystem Based Adaptation – “MI COSTA” Project by the Government of Cuba (GoC) to the Green Climate Fund (GCF). As this project is supported by UNDP in its role as a GCF Accredited Entity, the project has been screened against UNDP’s Social and Environmental Screening Procedure (SESP) and deemed a Moderate Risk project. As such, an Environmental and Social Assessment Report (ESAR) has been prepared for the project. Chapter six (6) of the ESAR provides the Environmental and Social Management Plan (ESMP) for the project.

1.1 BACKGROUND

2. The Government of Cuba with support from UNDP has developed a project proposal on adaptation to climate change impacts through Ecosystem Based Adaptation (EBA) for submission to the GCF. The project will seek to improve the resilience of Cuba’s most vulnerable coastal communities to climate change impacts.

1.2 DESCRIPTION OF THE PROJECT

3. This project will support effective climate adaptation of coastal areas will enable GoC’s implementation of the principal elements of the recently approved National Programme for Adaptation to Climate Change (Tarea Vida). It will do so by responding to the CC-related threats affecting Cuban coastal communities that have been prioritized as the most vulnerable population to CC, mainly sea level rise and increased intensity of hurricanes. It represents a paradigm shift in climate resilience approaches in coastal areas in Cuba, resulting in a full-scale, integrated and sustained application of an EBA approach together with building capacity and awareness among direct beneficiaries and government institutions at all levels. The project will build on baseline of successful experiences and knowledge in ecosystem rehabilitation to support an integrated EBA approach within a coastal ecosystem landscape.

4. Cuba lies in one of the most active parts of the Atlantic/Caribbean hurricane region. The percentage of hurricanes affecting the country classified as intense has risen from a historical average of 26% to 78% in the past 10 years. This trend is likely to intensify in a changing climate, as seen through the increase in intense storms observed across the Atlantic and related to the high temperatures observed in the Caribbean since 1998. Sea level rise (SLR) as a consequence of CC is expected to rise between 0.27m and 0.85m by the year 2100 (resulting in flooding of up to 5,969 km² and affecting over 220 coastal settlements. The narrowness of the main island of Cuba means that no part of the country is more than 60km away from the coast.

5. Cuban coastal communities are extremely vulnerable to the impacts of increasing sea level with a total of 119 (out of 262) coastal human settlements being identified as at risk from a range of CC-related impacts (see Figure 1) and 21 being predicted to disappear by year 2100. In addition, the karstic geology in the country results in a high level of dependence on subterranean aquifers, that are susceptible to contamination from flood and storm events and increasing salinization from seawater incursion, thus posing direct threat to public health and water security.

6. Given this climate context, the project responds to the following CC-related threats affecting Cuban coastal communities that have been prioritized as the most vulnerable population to CC:

- a. **Sea level rise**, causing coastal retreat, loss of agricultural lands, destruction of coastal settlements, salinization of aquifers and loss of ecosystems services of economic importance for communities.
- b. **Increased intensity of hurricanes**, with associated high wind speeds, wave impact, surges, flooding, and extreme rainfall, causing damage to infrastructure, settlements, public services and governance conditions, affecting water quality, with associated health impacts.

7. The project will directly benefit 444,793 people, as well as benefitting 879,321 people indirectly, in 24 coastal municipalities by enhancing the resiliency of coastal landscapes and communities to CC. It will facilitate a shift in

coastal adaptation from a traditional hard risk management and reactive strategies to a holistic, preventive approach based on maximizing the natural infrastructure of Cuban coastal zones through strengthening coastal zones planning mechanisms and local communities.

8. The project will promote the adoption of a new paradigm to guide adaptation efforts in Cuba taking into account the strengths and weaknesses of the baseline and offer a viable, socially and environmentally sustainable cost-effective alternative to existing approaches in addressing CC-related threats to coastal areas.

9. The key elements are:

- a. Rehabilitated ecosystems for coastal protection and resilience to climate change through Ecosystem-Based Adaptation (EBA): management, maintenance and rehabilitation of ecosystems that provide services that enable increase the population’s resilience to the impacts of CC.
- b. Increased adaptive capacity to climate change in communities, sectors and governments: involvement of communities, economic sectors and governments (at local, municipal, provincial and national levels) in adaptation actions and governance, based on consultation, ownership and awareness rising on threats and responses. These are essential activities for ensuring the long-term sustainability of EBA interventions at the local level.

10. The project will intervene in two territorial "stretches" of the Cuban coast, which encompass the project’s 7 target sites, with a length of approximately 1,337 km of coastline and 2,781,200 hectares; 62,95% of which is located on land and 37.05% of which corresponds to marine areas. The two zones are:

- a. **La Coloma – Surgidero de Batabanó:** this zone is extremely narrow (in some places only 30 km wide) making it almost entirely susceptible to sea prone climate change related impacts. This is the most vulnerable zone in Cuba to extreme hydro-meteorological events, such as hurricanes, coastal flooding and intense rains. Rates of coastal erosion are the highest in the country, and agricultural areas are being affected by saline intrusion.
- b. **Júcaro – Manzanillo:** the area is affected by extreme levels of flooding, with an average distance of 0.15km and a maximum of 8.3km. Highly vulnerable due to increased sea level rise (SLR), coupled with extreme storm surges¹. Most of the beaches in this area are affected by coastal erosion. The protective coastal belt of mangroves has been eliminated in several areas, including around coastal settlements. The area between Guayabal and Santa Cruz del Sur has been severely affected by marine intrusion and two of its aquifers face high levels of saline intrusion.



Figure 1. Coastal Stretches Targeted. 'Tramo 1' is Stretch 1 and 'Tramo 2' is Stretch 2

¹ In Manzanillo, a category 4 storm in October 2016 resulted in a storm surge of 2.27m

1.2.1 Summary of Activities

11. This Project integrates 2 lines of action for effective climate adaptation of coastal areas, which will enable GoC's implementation of the principal elements of the recently approved National Programme for Adaptation to Climate Change (Tarea Vida). The project's objective is to increase resilience to the effects of climate change in threatened coastal communities and ecosystems through the implementation of EBA, local community capacity building and mainstreaming EBA within local and national planning frameworks for coastal management. This will be achieved through 2 project outputs:

Output 1: Rehabilitated coastal ecosystems for enhanced coping capacity to manage climate impacts

Output 2: Increased technical and institutional capacity to climate change adaptation in Coastal Communities, Governments and Economic Sectors²

Output 1: Rehabilitated coastal ecosystems for enhanced coping capacity to manage climate impacts

Activity 1.1. Assess and restore coastal wetland functions in target sites by re-establishing hydrological processes

a. This activity focuses on initial actions for the rehabilitation of coastal wetland functions by re-establishing the hydrological processes within coastal ecosystems. This will include the clearing of existing water channels and favouring actions to restore the ecological flow of water including the removal of invasive species. These actions will improve the ecosystems' coping capacity to coastal flooding, climate extremes, and to saline intrusion by restoring water flows and water ways and -along with actions in Activity 1.2- rehabilitate the fluxes between ecosystems.

b. This activity will also invest in the monitoring of coastal wetland functions to verify baseline conditions and monitor the effectivity of the restoration actions (rehabilitating water flows, new plantings, increased in foliage etc.), which in turn will allow for steering accordingly to ensure the ecosystem's flows, nexus and functionalities for coastal protection are rehabilitated.

c. Actions will be focused on degraded coastal wetlands in 7 key sites along the Southern Coastline (see Feasibility Study Annex 1 and Section 6), targeting mangroves, swamp forests and swamp grasslands however having a larger implication in the overall ecosystem maintenance by re-establishing natural hydrological processes. Site selection for interventions was identified through a process that included community and municipal consultation and vulnerability-based mapping.

d. Rehabilitation activities will be coordinated by CITMA's AMA and will be implemented by national forest enterprises with expertise in forest management. Site selection for interventions was identified through a process that included community and municipal consultation and vulnerability-based mapping (Macro project report).

Activity 1.2. Mangrove and swamp forest rehabilitation in target sites through natural and assisted regeneration for enhanced coastal protection

e. This activity is focused on rehabilitating degraded coastal wetlands of the target Southern Coastline, with interventions being made in 7 key sites (Feasibility Study section 7.2). Investments will be made in the rehabilitation of mangroves, swamp forests and swamp grasslands. Interventions for rehabilitation across ecosystems will follow protocols which have proven to be effective through baseline projects and national research (Section B.2). This includes targeted forest rehabilitation, establishing conditions for sustainability of natural interventions.

²Institutions include CITMA (Ministry of Environment), Institute of Physical Planning, National Institute for Water Resources, Ministry of Agriculture and municipal governments

f. This activity will result in the rehabilitation of ecosystem functionalities in 15,443ha of degraded coastal wetlands through natural and assisted regeneration in target sites focusing on mangroves, swamp forests and grasslands. This activity along with actions through Activity 1.1. will directly improve the coping capacity of coastal wetlands to flooding (by increasing sediment trapping, increasing ecosystems health and re-establishing seaward species that have been lost R. mangle), climate extremes (by strengthening the coastal system green structure and reconstructing its protective role with red mangrove) and saline intrusion (by restoring water /infiltration capacity).

g. Rehabilitation activities will be coordinated by CITMA's AMA and will be implemented by national forest enterprises with expertise in forest management. Site selection for interventions was identified through a process that included community and municipal consultation and vulnerability-based mapping (Macro project report).

h. Interventions for rehabilitation across ecosystems will follow protocols which have proven to be effective through baseline projects and national research (Section B.2). These include targeted ecosystems rehabilitation, re-establishing key species, restoring conditions for the sustainability of interventions including protective measures.

i. Rehabilitation activities will be coordinated by CITMA/AMA and implemented by 6 national forest enterprises with in-situ expertise in forest management. GCF funds for this activity will be specifically used for the acquisition of required equipment and software/hardware. Co-financing from the GoC includes the implementation of restoration actions as well as purchase of national insurance for the investment in mangroves rehabilitation during the initial 8 years of project implementation against climatic or accidental eventualities.

Activity 1.3. Record and assess coastal and marine ecosystems' natural regeneration and their protective functions based on conditions provided as a result of restored coastal wetlands

j. This activity is based on functional holistic landscape approach in which interventions in the wetland ecosystems (as described in Activity 1.1) have a positive effect on the health and capacities of seagrass and coral reefs by reducing sediment, nutrients and contamination (key drivers of degradation) thus providing an opportunity to enhance their protective capacity against coastal threats. This activity will strengthen the service of coastal protection of the ecosystem (coastal and marine wetlands) as a whole. Actions for management, control and regulation that favour the recovery and CC resilience of the marine ecosystems will be undertaken to improve the quality of the habitat and enhance the development of the biodiversity as a strategy to increase their resilience.

k. This activity follows a functional landscape approach in which interventions across and along the watersheds and coastal wetlands (as described in Activity 1.1 and 1.2) will have a positive effect on the health and coping capacities of seagrass and coral reefs providing an opportunity for natural regeneration.

l. Hence, this activity will assess and record the restored functional relationships between coastal and marine ecosystems to reduce key degradation drivers such as sediment loads, nutrients and domestic and industrial contamination (fisheries, food and pesticides industries), providing an opportunity for natural regeneration and enhancing ecosystems protective capacity against coastal threats particularly to extreme weather. A volunteer community network for the surveillance of sea grass and corals will also be created to provide support in the repair of corals during extreme weather events.

m. The activity follows recognized best practices for effective recovery of marine ecosystems that have shown to recover once degradation drivers are managed. The results from this activity will provide practical and scientific information that will allow its replication at national and regional scales and strengthen the global argument for EBA in coastal systems. It will also involve communities to create participatory awareness in the protective role of marine ecosystems through monitoring.

n. The activity will be led by ICIMAR and will rely on communities that will be trained through Activity 2.1.3 to support in the monitoring of seagrasses and coral reefs and their role in coastal protection. Information will be collected in the Knowledge Management Platform that will be created through the project (Activity 2.2).

Activity 1.4 Enhance water conduction systems along targeted watersheds to restore freshwater drainage in coastal ecosystems and aquifers to reduce and monitor saline intrusion in target sites

o. The variables of the hydrological cycle will be measured based on the standards established by the World Meteorological Organization and current standards of water quality and will assess: Fresh water quality; Quantity and temporal and spatial distribution of water in the basins; Ability to meet current and future demand; Hydrologic and hydraulic flood simulation in real time; Flood and drought forecasting through automated real time hydrologic and hydraulic simulation. Monitoring will include two basic elements: i) the measurements at the wells: water levels and water quality (salinity, dissolved oxygen, hardness, heavy metals); ii) the measurements of the release water from the reservoirs to deliver the ecological flow: discharge measurements in the rivers are required to verify the release of the corresponding ecological flow; iii) data analysis and evaluation of the impact of the interventions.

p. The real time data obtained with the monitoring and from the implementation of the ecological flow and the management of the aquifers, will also allow the generation of outputs from hydrological models that will support the management of the water resources and salt intrusion during CC extreme events (drought, floods). Liquid and solid runoff will be modelled allowing to predict the evolution in time of the saline intrusion and of the flood risk areas. Hydrological specialists will be trained as part of Activity 2.1.

q. GCF funds for this activity will be used for the investment in measuring stations to be located from near the boundaries of the catchment basins belonging to the intervention areas of the project to the coastal zone, as well as upstream and downstream of the reservoirs. This will allow the accurate estimation of the water balance and provide relevant data on the quantity and quality of water reaching the coastal area to facilitate the control of the flow of water required to strengthen the ecosystems. This activity will be led by INRH that will act as a service provider for this activity.

r. Implementation of this activity will support GoC's own investments in hydraulic works for for the recharge of selected aquifers affected by long periods of drought including 19 wells established in Jucaro and another 38 that will be built with GoC funds in Camagüey. The infiltration of fresh water through these wells will use the following measures:

- Channels that collect rainwater locally and transport water by gravity and through the naturally established topographic system to the infiltration wells.
- Water conduction systems from reservoirs/dams built for other purposes which transfer their surplus water and infiltrate them directly into the wells.

s. GoC co financing will be used to manage anthropogenic impacts to water sources such as the clearing of physical waste from channels, prevent the overexploitation of the aquifers and eliminate polluted discharges into the coastal ecosystem (through water resources management). The GCF is therefore solely funding climate risk reduction improvements (additionality) which are required to overcome climate change threat (salt intrusion). This project will complement the present system of hydro-meteorological stations in order to manage the water resources in a holistic manner. GCF funds will address the climate change additionality by ensuring the required water quantity and quality provided to the coastal ecosystems during drought and flood climatic extremes managing salt intrusion which is currently not possible due to a lack of measuring stations required to manage the water distribution from the upstream to the coastal ecosystems.

Output 2: Increased technical and institutional capacity to climate change adaptation in Coastal Communities, Governments and Economic Sectors

Activity 2.1. Develop a climate adaptation technical capacity building program for coastal communities and local stakeholders (government & economic sectors) to enable adaptation actions and capacities.

t. This activity will develop and implement a capacity building program to be delivered to targeted coastal communities (24 municipalities) to build understanding of CC impacts and vulnerabilities such as coastal flooding (from extreme weather and SLR) and saline intrusion (from droughts and SLR). The program will increase awareness and knowledge for adaptation actions and skills to strengthen the resilience of key stakeholders in

these communities, prioritizing EBA over other management strategies. This will include providing results and techniques derived from the project as seen in Output 1 to ensure their maintenance and replication. It will also allow information from the Knowledge Management Platform (Activity 2.2) to be included and contextualized through a locally relevant learning program.

Activity 2.2. Integrate project derived information, from early warning systems and national datasets into a Knowledge Management Platform, to provide climate information products to monitor, evaluate and inform coastal communities on local (community and ecosystem) capacity to manage climate change impacts.

u. This activity will collect information derived from the local ecosystems rehabilitation actions and hydrological dynamics restoration (Output 1) to integrate it into national databases through a Knowledge Management Platform, which in turn will feed the development of national and local climate information products, including: i) A Protocol for Coastal Resilience Assessment (PERC) ii) enhancing successful existing early warning systems (disasters and emergency attention, EWS for drought in agriculture, forest fires, health, etc.); and, iii) coastal vulnerability and resilience assessments for coastal adaptation that will integrate information on ecosystem monitoring (Output 1) with indicators derived from community monitoring of local conditions.

Activity 2.3. Mainstream EBA approaches into regulatory and planning frameworks at the territorial and national levels for long term sustainability of EBA conditions and investments for coastal protection.

v. Activity 2.3 will provide key inputs for generating the legal frameworks required for the streamlining of adaptation, and in particular EBA, in coastal zones management. This will be done through various mechanisms for addressing the capacity and information barriers that had made this approach impossible, including creating a network for legal and technical support to municipalities and standardizing technical information for the development of national guidelines. The results of this activity will be even more relevant considering the recent constitutional changes that will empower municipal governments in financial and natural resource management. By generating tools and methodologies that can be easily applied and locally relevant, municipal authorities will be able to incorporate an EBA approaches in their own economic and planning instruments generating a development pathway for local governments whose own development is being directly threatened as a result of climate change impacts. More importantly, the legal framework under the project (included as a project development indicator) will be essential in the consolidation of an enabling regulatory environment for EBA initiatives, with their respective national legal support hence creating conditions for long terms sustainability of the EBA investments, approach and facilitating its upscale.

2 LEGAL AND INSTITUTIONAL FRAMEWORK FOR ENVIRONMENTAL AND SOCIAL MATTERS

12. Cuba has comprehensive legal and institutional frameworks that address the challenges posed by climate change and specific environmental issues.

2.1 LEGISLATION, POLICIES AND REGULATIONS

2.1.1 National Policies and Plans

13. There are several important policies, plans and regulatory documents that have been developed by the GoC to tackle climate change and promote climate-resilient development. Among them, the main governing documents are the "State Plan for Confronting Climate Change (Tarea Vida)", the "Guidelines for Economic and Social Policy of the Party and the Revolution" and the "National Plan for Social Development until 2030: Proposed Vision of the Nation, axes and Strategic Sectors."

14. Recently, the Council of Ministers of the Republic of Cuba approved the “**State Plan for Confronting Climate Change (Tarea Vida)**”, which takes into account the current and future impact of climate change for Cuba, outlining a number of tasks that will be undertaken in order to counteract the damage that could occur in Cuba as a result of climate change in the coming years. The plan is based on extensive research on climate change and comprehensive technical and scientific assessments, which were initiated by the Cuban Academy of Sciences in 1991 and later coordinated by CITMA. Most recently in the process, in 2015, 11 agencies of the Central Government and National Entities identified a set of actions (organizational measures, studies and investments) related to tackling climate change until 2020.
15. The results of this process were the basis for Tarea Vida. The document defines 5 strategic actions and 11 tasks that include mitigation and adaptation actions to be developed in the country as part of its policy to confront climate change. To implement the Plan, programs of progressive investments in the short-term (2020), medium-term (2030), long-term (2050) and very long-term (2100) need to be designed and implemented in prioritized locations.
16. The 5 strategic actions specified by the plan are:
- a. Identify the areas where it is most urgent to act today and to direct the efforts and resources immediately. Prioritize the recovery of beaches and coasts, measures to deal with drought and, along with it, carry out other actions as appropriate.
 - b. Present a comprehensive plan containing the steps we must take in an orderly manner, determine priorities and actions to be taken, place by site, to prevent and address the dangers and vulnerabilities to which we are subjected by short, medium, long and very long term. Define in the Financial Economic Commission the financial resources to execute it.
 - c. Ensure and implement the necessary legal basis, with the highest hierarchy, that sustains this Plan and enforce them. The CITMA will periodically report the results of the supervision and control actions that are carried out.
 - d. Explain and raise awareness about this serious phenomenon and its consequences, both for the country's economy and for coastal areas.
 - e. To convert the scientific results obtained so far into proposals to the Government
17. The Plan also specifies 11 tasks, listed below:
- a. **Task 1.** To identify and undertake comprehensive and gradual actions and projects for adaptation to CC, needed to reduce the existing priority vulnerabilities. Actions and projects should consider how the threatened population might act, as well as their physical safety, their food security, and the development of tourism.
 - b. **Task 2.** To implement the legal norms necessary to endorse the implementation of the Plan of State; secure its strict fulfillment with special attention to the measures directed at reducing the vulnerability of heritage constructions, prioritizing threatened coastal communities.
 - c. **Task 3.** Comprehensively preserve, maintain, and restore the sandy beaches of the Cuban archipelago, prioritizing urban and tourism communities, and reducing the structural vulnerability of heritage constructions.
 - d. **Task 4.** Secure the availability and efficient use of water as part drought planning, using water saving technologies and providing enough water to satisfy local demands. Improve and maintain the water infrastructure and implement actions to measure water efficiency and productivity.
 - e. **Task 5.** Manage reforestation for maximum protection of the soil and water in quantity and quality, as well as the recovery of most affected mangroves. Prioritize basins, canals and water regulator stretches of the river basins of the main bays and coasts of the island platforms.

- f. **Task 6.** Stop the deterioration, rehabilitate and conserve the coral reefs in the entire archipelago, especially the ridges that limit the island platform and protect urbanized beaches from tourist use. Avoid overfishing of species that favor coral reefs.
 - g. **Task 7.** Maintain and introduce the scientific results of the Megaproject on Dangers and Vulnerabilities of the Coastal Zone (2050-2100) in urban and land-use planning. Include the Studies on Dangers, Vulnerabilities, and Risk in the Disaster Reduction Cycle. Use this information as an early warning for decision making by OACE, ODE, EN, CAP and CAM.
 - h. **Task 8.** Implement and control the adaptation and mitigation to CC measures, resulting from sectoral policy in the programmes, plan, and projects linked to food security, renewable energy, energy efficiency, urban and land-use planning, fishing, farming, health, tourism, construction, transport, industries, and the comprehensive management of forests,
 - i. **Task 9.** Strengthen the monitoring, surveillance, and early warning alert to systematically evaluate the state and quality of the coastal zone, water system, droughts, forests, human, animal, and plant health.
 - j. **Task 10.** Prioritize the measures and actions to increase the perception of risk, and to increase the level of knowledge and the participation of all population in relation to CC and water-saving culture.
 - k. **Task 11.** Manage and apply all available international financial resources, both those from climate global and regional funds, as well as those from bilateral sources, to implement investments, projects, and actions that result from each of the tasks of the Plan of State
18. “**Guidelines for economic and social policy of the Party and the Revolution**” were initially approved on April 18th 2011³. These policies and strategies cover science, water, forests, soils, and other issues.
19. Guideline number 158 refers to the development of integrated research to protect, conserve and rehabilitate the environment, evaluate social and economic impacts of extreme events, and adjust environmental policy to projected changes in the economic and social context.
20. Guideline 107 refers to: “The accelerated implementation of the directives and programmes of science, technology and innovation, aimed at tackling CC, in all organisms and entities, integrating them into territorial and sector policies, with priority on the agricultural, hydraulic and health sectors. Improve information and training to increase perceptions of risks in society as a whole”.
21. Other important Guidelines include the following:
- a. 101: Implementation of the policies science, technology, innovation and the environment;
 - b. 157: conservation, protection and improvement of natural resources;
 - c. 169: promotion of forest plantations with particular attention to drainage basins;
 - d. 213: tourism sustainability
 - e. 236: planning of water resources
 - f. 237, 238, 240, 241, 242: programme for the integrated management of water resource.
22. An update of the Guidelines took place during the Seventh Party Congress (April 2016)⁴, for the period 2016-2021, which explicitly recognizes the issue of climate change. The need is expressed to accelerate the implementation of the directives and programs of science, technology and innovation, aimed at addressing climate change, by all

³ Moreno, C., et al. (2007): Ten Questions and Answers on Wind Power. Editorial Cubasolar, Habana, Cuba, 335 pp.

³ Rodríguez C., L. Favier, M. Abreu, and A. L. Pérez 2008: Study on the Dangers, Vulnerability and Risk for the Urban Planning and Land Management in Cuba. Institute of Physical Planning, Habana, Cuba, 99 pp.

³ Political, Economic, and Social Guidelines of the Revolution Party (Partido de la Revolución), approved by the VII Party Congress.

⁴ Guidelines of Economic and Social Policy of the Party and the Revolution, approved by the Seventh Party Congress.

agencies and entities. It specifies the need to integrate this into territorial and sectoral policies, with priority in the agricultural, water and health sectors, as well as the importance of information and training around CC risks on a society-wide scale.

23. The "**National Plan for Social Development until 2030: Proposed Vision of the Nation, axes and Strategic Sectors**" was approved in May 2017⁵. It contains several important elements, in particular under the Strategic Axis "Natural Resources and Environment", which defines three general objectives relating to ensure rational use of natural resources, ecosystem conservation and care of the environment and heritage of the nation; raise environmental quality and strengthen national capacities for adaptation to climate change, endorsing among its "specific objectives". This plan specifies the need to take into account the impacts of climate change and adaptation measures, with emphasis on the protection of natural resources and the use of renewable energy sources.

24. Other plans and policies of relevance include:

- a. **National Environmental Strategy 2016-2020**, which defines the impacts of climate change as one of the country's main problems;
- b. **National Biodiversity Programme and National Action Plan (NDAP)**, 2016-2020 (CITMA, 2016), which identifies within the priority areas for the new strategic cycle the potential value of biodiversity and ecosystem services for the implementation of climate change adaptation and/or mitigation measures. Consequently, several goals and actions of the PNDB are aimed at promoting the resilience of natural ecosystems to the effects of climate change.

2.1.2 National Legislation

25. There are also a number of national laws and decrees that have been legislated to address issues related to climate change (Table 1).

Table 1. Regulatory Framework relevant to issues related to Climate Change.

Legal standard	Regulatory status
L / 81 Environmental Law	Law
L / 85 Forestry Law	Law
L / 124 Terrestrial Waters	Law
L 129 / Fishing Regulations	Law
DL / 170 System of Civil Defense measures	Decree-Law
DL / 201Del National System of Protected Areas	Decree-Law
DL / 190 biosafety	Decree-Law
DL / 212 Coastal Zone Management	Decree-Law
DL / 136 forest heritage and wildlife and their contraventions	Decree-Law

DL / 200 System environmental violations	Decree-Law
D / 179 protection, use and soil conservation	Decree
Directive No. 1/2010 of the President of the National Defense Council "for Disaster Reduction"	Directive

Source: Planos et al. (2013)⁶.

26. In particular, those of relevance to this project that address environmental conservation, land use/coastal zones planning, and natural resource management that are of relevance to the climate change adaptation and ecosystem rehabilitation actions are:

- a. Constitution of the Republic of Cuba 1976 (as amended)
- b. Law 81 of 1997, Environmental Law
- c. Law 85 of 1998, Forestry Law.
- d. Law 124 of 2017, on Terrestrial Waters
- e. Law 129 of 2019, Fisheries Regulations.
- f. Decree-Law 201 of 1999, on the National System of Protected Areas
- g. Decree-Law 212 of 2000, Coastal Zone Management
- h. Decree 21 of 1978, on Physical Planning
- i. Decree 179 of 1993, Protection, Use and Conservation of Soils and their Contraventions

27. The Constitution of the Republic of Cuba (1976) is the fundamental law of the Cuban legal framework and contains the foundations of the political, economic and social system of the country. Its text does not expressly refer to climate change, but it does provide protection for the environment and natural resources. Article 11 of the Constitution establishes the exercise of state sovereignty "a) over the entire national territory, consisting of the Island of Cuba, the Isle of Youth, the other adjacent islands and keys, the internal waters and the territorial sea to the extent established by law and the airspace that extends over these, b) over the environment and the country's natural resources; and c) over the natural resources, both living and non-living, of the waters, bed and subsoil of the maritime economic zone of the Republic, to the extent established by law, in accordance with international practice."

28. Article 27 (amended in 1992) introduces the concept of sustainable development as the basis of environmental policy, whereby "The State shall protect the environment and the natural resources of the country. It recognizes its close link with sustainable economic and social development to make human life more rational and to ensure the survival, well-being and security of present and future generations. It is up to the competent bodies to implement this policy. It is the duty of citizens to contribute to the protection of water, the atmosphere, the conservation of soil, flora, fauna and all the rich potential of nature."

29. For the purposes of the Project, it is important to bear in mind that a thorough constitutional reform process has been undertaken. While this process is based on the Economic and Social Development Plan for 2030, the text of the new Constitution reaffirms the environmental and natural resource aspects of the current law, expands on climate change issues, and establish a more decentralized model of national management, with a greater framework of powers for provinces and municipalities, all of which should be conducive to the Project's objectives. Articles 11, 16 and 75 found in the new Constitution are particularly relevant to these important matters:

⁶Planes, E; Rivero, R and Guevara V., Eds. (2013): Impact of Climate Change and Adaptation Measures in Cuna. Institute of Meteorology, Environment Agency, Ministry of Science, Technology and Environment, Havana, Cuba, 430 pp.

- a. ARTICLE 11. The State exercises sovereignty and jurisdiction:
 - a) Overall the national territory, made up of the Island of Cuba, the Isle of Youth, other islands and adjacent keys, internal waters and the territorial sea to the extent established by law, the airspace over these extends and the radio spectrum;
 - b) on the environment and natural resources of the country;
 - c) on the natural resources, both living and non-living, belonging to the seabed and its overlying waters, and the sea's underground belonging to the Republic's exclusive economic zone, to the extent established by law, in accordance with International Law, and on the continental shelf to the extent established by law and in accordance with International Law. Likewise, it exercises jurisdiction in the contiguous zone in correspondence with International Law.
- b. ARTICLE 16. The Republic of Cuba's international relations are based on the exercise of its sovereignty and anti-imperialist and internationalist principles, based on the interests of the people and, consequently:
 - f) promotes the protection and conservation of the environment and climate change confrontation, which threatens the survival of the human species, based on the recognition of common but differentiated responsibilities; the establishment of a just and equitable international economic order and the eradication of irrational patterns of production and consumption;
- c. ARTICLE 75. All people have the right to enjoy a healthy and balanced environment.

The State protects the country's environment and natural resources. It recognizes their close link with the economy's and society's sustainable development, to make human life more rational and ensure the survival, well-being and security of current and future generations.

2.1.3 Law 81 of 1997 on the Environment

30. The Environmental Law, Law 81 of March 11, 1997, is the main environmental law in the Cuban legal system, and its purpose is to establish the principles that govern the environmental policy and the basic norms to regulate the environmental management of the State and the actions of citizens and society in general, in order to protect the environment and contribute to achieving the sustainable development objectives of the country.
31. The Law does not directly address climate change. However, there are several provisions that can be used in the context of adaptation, by establishing the general framework for the protection of coasts, waters, terrestrial and marine biodiversity, forest resources and the bases of the National System of Protected Areas, among others.
32. Among other relevant provisions, Article 3 may be cited, where the Environmental Law develops the duty of the State and society in general, with respect to the protection of the environment and defines the integral components of that duty, which includes, among other elements - a) Its conservation and rational use; b) The systematic fight against the causes that are responsible for its deterioration; c) The corresponding restoration actions; d) The constant increase in citizens' knowledge of the interrelationships between human beings, nature and society; e) The reduction and elimination of environmentally unsustainable production and consumption patterns; f) The promotion of demographic policies appropriate to the territorial conditions.
33. Also, the principles and rights that the law enshrines in Article 4, are very important to the Project. These include: the right to a healthy environment (art. 4a), the duty of citizens to protect the environment (art. 4b), the rational use of natural resources (art. 4c), the Principle of prevention (art. 4d), the precautionary principle (art. 4d), and the principle of access to information (art. 4e).
34. The Law is also the basis of all the instruments that apply to the country's environmental management, which are listed in Article 18 and include, among others, environmental management; environmental licensing; environmental impact assessment; environmental information system; state environmental inspection system;

environmental education; scientific research and technological innovation; economic regulation; the National Environmental Fund; and the administrative, civil and criminal liability regimes.

2.1.4 Law 85 of 1998, Forestry Law.

35. The objectives of the Forestry Law, Law 85 of July 21, 1998, are to establish the general principles and regulations for the protection, increase and sustainable development of the nation's forest heritage; to control forest resources by means of the established regulations and the competent bodies and organizations; to promote and encourage reforestation for economic, protective or social purposes, as well as forestry management in plantations and natural forests; conserve the biological diversity resources associated with forest ecosystems; protect forests against deforestation, irrational logging, forest fires, free grazing, pests and diseases, and other actions that may affect them; regulate the multiple and sustainable use of forest resources and promote the rational use of non-wood forest products.

36. The law contains a category of Protected Coastal Forests ("Article 20"), which it defines as those located along the coasts of the Island of Cuba, the Isle of Youth and the adjacent keys along their entire length. Their main function is protection against wind, coastal flooding by sea penetration, saltwater intrusion, etc., to ensure the defence of the country, and thus contribute, in general, to the conservation of coastal ecosystems. They are also of great importance as a refuge and reservoir for marine terrestrial fauna. Article 21 states that in areas designated as protected forests, activities that result in the permanent removal of vegetation may not be carried out.

37. "Article 27" also states that no logging may take place, irrespective of the type, and that, inter alia, forest strips along the coastline and forests in the Keys shall be subject to special protection arrangements.

38. The legislation complementary to the Forestry Law is also relevant to adaptation and includes, among others, Resolution No. 330 of September 7, 1999, of the Ministry of Agriculture. It contains both the Regulations of the Forestry Law, through which the Forestry Service is structured and the rules are laid down for the classification of forests and forestry projects, among other matters, such as Decree 280 of 19 March 2007, which establishes the Reforestation System.

2.1.4 Law 124 of 2017 on Terrestrial Waters

39. Law 124, "On Terrestrial Waters", of 14 July 2017, is the most recent law issued in the country on the protection and management of natural resources. In general, it is very relevant to adaptation, but it is also the first time in the national legal framework that a legal norm expressly deals with this matter, by means of the declaration of measures to reduce vulnerability to the current or expected effects of climate change, and is thus referred to within the objectives of the Law.

40. Among the objectives of the Law (Article 2) are those relating to (a) ordering the integrated and sustainable management of terrestrial waters, a renewable and limited natural resource, according to the general interest of society, public health, the environment and the economy; (b) establishing measures for the protection of terrestrial waters on the basis of their planning and preservation, in harmony with sustainable economic and social development and the protection of the environment; and (c) establishing measures for the reduction of disasters due to the impact, fundamentally, of extreme hydro-meteorological events on terrestrial waters and the adaptation to climate change.

41. Adaptation is also referred to in the Law as a component of many of its provisions, including Article 9 on integrated water management in river basins; Article 32, on the protection and safety of water infrastructure and Title IX, which deals with "Prevention and response to floods and droughts and adaptation to climate change", and where adaptation is referred to in its connection with Disaster Reduction Plans (Article 91), Water Development Plans (Article 92), and the prevention and response to floods (Article 93), and droughts (Article 99).

42. Law 124 establishes the water quality network that is made up of a) the basic water quality monitoring stations at the sources, surface or underground, at the catchment point; and b) the monitoring stations to know the water quality, surface or underground, in the water bodies (Article 18.2). In addition, it recognizes the functions of the

Ministry of Public Health in relation to monitoring compliance with quality standards in the public drinking water supply service (Article 6).

2.1.5 Law 129 of 2019 on Fishing Regulations

43. In the area of fishing, the main law in Cuba is 129/2019, the Fishing Regulations. This regulation, without directly addressing climate change, includes various measures that have been used to protect fisheries and marine resources, and which are also good adaptation practices. This includes the elimination of the most aggressive fishing practices for the species and the environment; the implementation of new minimum sizes for catches of different species; the control of fishing activity at times of reproduction of some critical species; the introduction of longer fishing bans in reproductive periods and the establishment of Areas under special use and protection regimes. These are defined as legally established protected areas in which fishing activities are governed by special provisions.

44. The Law establishes the Consultative Commission on Fisheries (Article 20), which is considered the "highest advisory body of the Ministry of the Fishing Industry on the management and administration of the aquatic resources of sea and land waters". The operation of this commission is regulated by Resolution No. 23 of the former Ministry of the Fishing Industry, dated 20 January 2020, which empowers it to analyze the state of exploitation of aquatic resources in areas under national jurisdiction, and to propose the management and protection related regulations and measures necessary to achieve sustainable economic exploitation, which refer, among other aspects, to fishing quotas, bans, minimum sizes or weights, and areas under special use and protection regimes.

45. Under the framework of fisheries legislation, coral reefs and scuba diving have also been regulated. Today, it exists a Joint Resolution of CITMA/MIP (1997), which regulates the matter, and includes a regime of prohibitions for activities such as anchoring, dumping of solid waste and coral extractions, while also establishing a set of obligations.

2.1.6 Decree-Law 201 of 1999 on the National System of Protected Areas

46. Decree-Law 201 of the National System of Protected Areas, of December 23, 1999, establishes the legal regime for the approval and management of such areas, and the powers and functions of the Ministry of Science, Technology and Environment. It also regulates the control and administration of the different categories of protected areas, their proposal and declaration, the protection regime and the granting of authorizations to carry out activities in them.

47. According to the Decree-Law, protected areas are defined as specific parts of the national territory, declared in accordance with the legislation in force, and incorporated into territorial planning, of ecological, social and historical-cultural relevance for the nation and in some cases of international relevance, especially devoted, through effective management, to the protection and maintenance of biological diversity and associated natural, historical and cultural resources, in order to achieve specific conservation and sustainable use objectives.

2.1.7 Decree-Law 212 of 2000, Coastal Zone Management

48. Decree-Law No. 212 of August 8, 2000, on "Coastal Zone Management", aims to establish provisions for the delimitation, protection and sustainable use of the coastal zone and its protection area, in accordance with the principles of integrated management.

49. The Decree-Law defines the coastal zone and its protection zone and establishes a classification that takes into account the structure and configuration of the different types of coastline, criteria from which the extension of this zone is established. It also defines the outer limit of the coastal zone towards the sea, includes regulations for the signposting of the coastal zone, refers to its components, defines the various institutional responsibilities, regulates the uses of the zone and the infrastructures that are permitted, and establishes a regime of prohibitions. The execution of works or activities in the coastal zone, including those of protection, are conditional on acquiring the environmental license and compliance with the requirements of the same, in accordance with the provisions of "Article 28" of Law No. 81, Environmental Law, and the corresponding legislation.

50. In support of the management of this legal system, in 2007 CITMA defined the requirements or parameters that allow for the official evaluation and declaration of an area of the coastal zone, under an integrated coastal management regime, whose methodology has been applied in various areas of the national territory.

2.1.8 Decree 21 of 1978, Physical Planning Regulations

51. Decree 21 of 28 February 1978 defines physical planning as the activity which, in accordance with the objectives, tasks and guidelines of the Single Economic and Social Development Plan and through research into the natural, demographic, economic and technical conditions of the country, leads to territorial planning at different levels, with the aim of achieving the most appropriate territorial distribution of the labour force.

52. The Decree defines the different categories of planning, and the process of consultation and approval of the plans. Despite being a rather old standard, which will require modifications in the short term, it remains, to this day, the main standard on which physical planning in Cuba is based.

The issue of "location of permanent facilities in the coastal zone is regulated in articles 15 and 16 of the D-L 212 of management of the coastal zone.

2.1.9 Decree 179 of 1993, Protection, Use and Conservation of Soils and their Contraventions

53. The main sectoral regulations on soils are found in Decree 179 of 1993 on "Protection, Use and Conservation of Soils and their Contraventions". This is one of the oldest provisions regarding the protection of specific natural resources in Cuba and is in need of significant updating in the short term, however, its implementation can be applied in a number of ways to achieve adaptation purposes. The main objectives of Decree 179 are: a) to establish control over the protection, use, conservation, improvement and rehabilitation of soils; b) to determine the order of use of soils, their control and cartographic survey, as well as their characterization and classification; c) to conserve and protect soil fertility and productivity by controlling erosion, salinity, acidity and other causes which may damage it; d) to protect agricultural and forestry soils from the effects of exploitation by mining, geology, industrial and socio-economic installations, construction materials and waterworks, in accordance with the provisions laid down for this purpose; and e) to determine the personal contraventions, and the administrative measures to be imposed for the violations of the provisions of this Decree.

2.1.10 Labor and employment

54. The Constitution of the Republic (1976) establishes that access to a job is a right and a duty for every citizen. The body that governs employment policies in Cuba is the Ministry of Labour and Social Security (MTSS), in addition to the National Institute of Social Security (INASS), the National Office of Labor Inspection (ONIT), the Institute of Labor Studies and Research (IEIT), among others. There is a policy to ensure employment for disadvantaged groups such as people with disabilities, young people leaving the military, and prisoners leaving prison.

55. Article 49 of the Constitution states that the labor conditions that provide protection, security and hygiene of workers are a right of the citizens. It also protects the right to medical attention, subsidy or retirement in case of suffering labor accidents or professional diseases.

56. The Labor Code (2013) stipulates national employment guidelines that refer to labor and working conditions, as well as Decree 326 Regulations of the Labor Code (2014).

57. There is also Law 105 "On Social Security", dated December 27, 2008, which contains the foundations of the national system of occupational health and safety. In addition, there are specific regulations for the protection of workers in the work environment. Resolution 283/2014 of the Ministry of Public Health, dated June 16, 2014, establishes the "List of occupational diseases and the procedure for their prevention, analysis and control in the National Health System", which includes "Diseases caused by pressure higher or lower than atmospheric." Consequently, Resolution 284/2014 of the Ministry of Public Health, dated June 16, 2014, establishes the "List of activities that, due to their characteristics, require the performance of pre-employment medical examinations and

specialized periodicals”, dated June 16, 2014. One of the hygienic-epidemiological risks identified in this legal standard is “Exposures lower or higher than atmospheric”. This risk applies to workers who carry out diving activities as part of their work activities.

58. Trade unions have the power to demand compliance with regulations that promote the improvement of working conditions, for which they participate in the drafting of occupational safety regulations and in investigations in the event of accidents, as well as in the conclusion of Collective Labour Agreements in each workplace⁷.

59. Various legal norms regulate the wage policies of the country. Pay levels are closely associated with labor contribution and productivity. Social security benefits 1,676,988 people, including people with disabilities, older adults and families protected by social assistance. There is a policy of guaranteeing employment for socially disadvantaged groups such as persons with disabilities, young people who end their military service, and inmates leaving prisons.

2.1.11 Land tenure

60. According to the Constitution of the Republic, the socialist state holds ownership rights to "lands that do not belong to small farmers or cooperatives integrated by them, subsoil, mines, natural resources, both living and non-living within the Republic's maritime economic zone, forests, waters and communication routes"⁸. There are also non state-owned properties, which constitute the Basic Unit of Cooperative Production-UBPC, Cooperative of Agricultural Production-CPA, Cooperative of Credits and Services-CCS, owners and usufructuaries⁹.

61. The country has a total area of 10,988.4 Mha, of which 86.2% is state-owned. The rest is distributed between cooperative property (CPA) with 4.7% and small farmers with 9.1%. Of the 10,988.4 Mha, 4,995.1 Mha is agricultural area and the rest is considered non-agricultural area (forest, unsuitable, watery and others). In relation to specifically agricultural land, the state owns 79.3% of it, while 6.8% is cooperative property (CPA) and 13.9% belongs to small farmers. In the case of the non-agricultural area, 95.4% is owned by the state, while the rest belongs to cooperative forms (2.8%) and small farmers (1.8%). (ONEI, 2018)¹⁰.

2.2 ENVIRONMENTAL IMPACT ASSESSMENT IN CUBA

62. Law No. 81 of July 11, 1997, "On the Environment", defines as one of its objectives (article 9, paragraph e) "to regulate the development of environmental assessment, control and monitoring activities" and by virtue of this, establishes, in its Chapter IV, the general provisions of the Environmental Impact Assessment process, the management of which corresponds to the Ministry of Science, Technology and the Environment.

63. The purpose of this procedure is "... to avoid or mitigate the generation of undesirable environmental effects, arising from plans, programmes and projects by means of a prior assessment of the environmental modifications that such projects would bring about and, as appropriate, the denial of the necessary license to carry them out or their granting under certain conditions, including detailed information on the monitoring and control system to ensure compliance with them and the mitigation measures to be considered " (Article 8).

64. As an associated concept, the Law introduces the Environmental Impact Study, which it defines as the "detailed description of the characteristics of a planned project or activity, including its technology, which is presented for approval within the framework of the environmental impact assessment process. It should provide a well-founded basis for the prediction, identification and interpretation of the environmental impact of the project and describe the actions that will be taken to avoid or minimize adverse effects, as well as the monitoring program that will be adopted. (Article 8)

⁷ Ministerio de Trabajo y Seguridad Social». EcuRed.

⁸ Constitution of the Republic of Cuba

⁹ Panorama land use. Cuba 2016

¹⁰ Panorama land use. Cuba 2018.

65. In accordance with a system of lists, Article 28 of the Law establishes a list of works or activities that must be submitted for the consideration of the Ministry of Science, Technology and the Environment in order for the appropriate environmental impact assessment process to be carried out.

66. A modality of "Strategic Environmental Impact Assessment" is introduced by Article 39, which states that the Ministry of Science, Technology and Environment, in coordination with the competent bodies and organizations, " ... may submit to environmental impact assessments the plans or policies relating to urban or industrial development, forest management, water, tourism development, mining, fishing and land management. This evaluation process does not require the granting of an environmental license.

2.2.1 Environmental Impact Assessment Process

67. Resolution No. 132 of August 11, 2009, of the Ministry of Science, Technology and Environment, contains the "Regulation of the Environmental Impact Assessment (EIA) process,

68. This Resolution regulates the EIA process, defining the following as responsible authorities in the Ministry of Science, Technology and the Environment's system for its execution (Article 8): the Environmental Inspection and Control Centre belonging to the Office of Environmental Regulation and Nuclear Safety and the Territorial Delegations of this Ministry. Within the framework of the process, the Office of Environmental Regulation and Nuclear Safety has the power to grant, modify, renew, suspend and revoke environmental licenses that, due to their complexity, scope and economic and social significance, require it (Article 9).

69. The Office of Environmental Regulation and Nuclear Safety, at the request of the Environmental Inspection and Control Centre, determines the projects whose Environmental Impact Assessment is of interest to the Centre itself and to the Territorial Delegations of the Ministry of Science, Technology and the Environment (Article 10). The bodies of the Government Central Administration and the bodies that, as part of the Environmental Impact Assessment process, are consulted by the responsible authority in relation to a work or activity project are responsible for evaluating and issuing the corresponding criteria (Article 15).

70. The process begins as soon as the head of a project or activity subject to environmental impact assessment submits, prior to its execution, the corresponding application for an environmental license to the responsible authority. For those work or activity projects that respond to the investment process, the environmental license application is presented in the pre-investment phase, once the feasibility study of the project has been approved, in accordance with the Guidelines for the Investment Process issued by the Ministry of Economy and Planning (Article 17). The information that must accompany the request is listed in Article 18 of this standard.

71. The responsible authority reviews the information contained in the environmental license application within ten (10) business days from the date of its submission by the applicant (Article 21), in order to adopt one of the following decisions: a) Accept the environmental license application with the requirement to submit an Environmental Impact Assessment; b) Accept the environmental license application without the requirement to submit an Environmental Impact Assessment; c) Reject the environmental license application.

72. The environmental license may be granted at the different stages of the project under evaluation, according to the size or complexity of the stages of implementation of the project (Article 39). Various regulatory modalities are established for high-risk or small-scale activities.

73. The applicant may lodge an appeal against the decision of the responsible authority within ten (10) working days from the date of notification, as the case may be, (Article 61) and the Authority shall decide within fifteen (15) working days from the date of filing the appeal (Article 62); no appeal may be lodged against the decision (Article 63).

2.3 MULTILATERAL AGREEMENTS AND BIODIVERSITY PROTOCOLS

74. Cuba is a signatory of more than 100 international and regional agreements and conventions, which are related to the environment. Table 2 reflects some of the key instruments to which Cuba signed/ratified/adhere since 1992.

75. Some International Environmental Agreements signed by Cuba in the period 1992-2017, relevant to the Project.

Table 2. Conventions, Treaties, and Agreements of relevance of the project

Convention/Treaty Includes the date on which it was opened for signature and the date on which Cuba became a party.	Main Objectives
<p>Convention on Biological Diversity (1992).</p> <p>Cuba: 09/03/1994</p>	<p>The objectives of the Convention are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, through, inter alia, adequate access to those resources and the appropriate transfer of relevant technologies, taking into account all rights to those resources and technologies, as well as through appropriate financing.</p>
<p>United Nations Framework Convention on Climate Change (1992).</p> <p>Cuba: 05/04/1994</p>	<p>It declares as its ultimate objective, and of any related legal instrument to be adopted by the Conference of the Parties, to achieve, in accordance with the relevant provisions of the Convention, the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. This level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to continue in a sustainable manner.</p>
<p>United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (1994).</p> <p>Cuba: 13/03/1997</p>	<p>The objective of the Convention is to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa. This is achieved through effective action at all levels, supported by international cooperation and partnership agreements, within the framework of an integrated approach consistent with Agenda 21, to contribute to the achievement of sustainable development in affected areas.</p> <p>Achieving this goal will require the implementation in affected areas of integrated long-term strategies that simultaneously focus on increasing land productivity, rehabilitation, conservation and sustainable use of land and water resources, all with a view to improving living conditions, especially at the community level.</p>
<p>Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar) (1971)</p> <p>Cuba: 12/08/2001</p>	<p>It aims to establish a framework for national action, and international cooperation, for the conservation and rational use of wetlands and their resources. It is the only environmental agreement that focuses on a specific ecosystem - wetlands. The three "pillars" of action on which the Convention is based are the rational use of all wetlands, the designation and management of wetlands of international importance, and global cooperation.</p>

<p>Kyoto Protocol to the United Nations Framework Convention on Climate Change (1997).</p> <p>Cuba: 30/04/2002</p>	<p>It shares its objective with the Framework Convention on Climate Change, adding more specific commitments, particularly for a group of industrialized countries.</p>
<p>Cartagena Protocol on Biosafety to the Convention on Biological Diversity.</p> <p>Cuba: 11/09/2003</p>	<p>In accordance with the precautionary approach contained in Principle 15 of the Rio Declaration on Environment and Development, the objective of this Protocol is to contribute to ensuring an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity, taking also into account risks to human health, and specifically focusing on transboundary movements.</p>
<p>International Treaty on Plant Genetic Resources for Food and Agriculture (2001)</p> <p>Cuba: 15/12/2006</p>	<p>The objectives of the Treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, consistent with the Convention on Biological Diversity, in accordance with sustainable agriculture and food security.</p> <p>These objectives will be achieved by closely linking the Treaty, with the Food and Agriculture Organization of the United Nations and with the Convention on Biological Diversity.</p>
<p>Stockholm Convention on Persistent Organic Pollutants (2001).</p> <p>Cuba: 21/12/07</p>	<p>Bearing in mind the precautionary approach enshrined in principle 15 of the Rio Declaration on Environment and Development, the objective of the Convention is to protect human health and the environment from persistent organic pollutants, recognizing that these pollutants have toxic properties, are resistant to degradation, bioaccumulate and are transported by air, water and migratory species across international borders and deposited far from the place of their release, accumulating in terrestrial and aquatic ecosystems.</p>
<p>Convention on the Conservation of Migratory Species and Wild Animals (Bonn Convention) (1979)</p> <p>Cuba: 06/02/2008</p>	<p>It aims to conserve terrestrial, aquatic and flying migratory species and their habitats globally by providing for strict protection of endangered migratory species listed in Appendix I of the Convention, by concluding multilateral agreements for the conservation and rational use of migratory species listed in Appendix II, and by promoting joint research efforts.</p>
<p>Nagoya Protocol on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization. (2010)</p> <p>Cuba: 16/12/2015</p>	<p>The objective of the Protocol, under the Convention on Biological Diversity, is the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. This includes through appropriate access to genetic resources and through appropriate transfer of relevant technologies, taking into account all rights over such resources and technologies and through appropriate</p>

	financing, thereby contributing to the conservation of biological diversity and the sustainable use of its components.
Paris Agreement, under the United Nations Framework Convention on Climate Change (2015). Cuba: 27/1/2017	The Agreement aims to enhance the implementation of the Climate Change Convention, including the achievement of its objective. It aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty.

2.4 INSTITUTIONAL CONTEXT

76. In Cuba there are multiple organizations at the national, provincial or municipal levels that are related to the management of natural resources and issues related to the impact of climate change. The particular way they are related has led to a sectoral approach to the national policies that guide the adaptation measures to climate change in the country.

2.4.1 National level institutions

77. The main national governmental bodies that have direct responsibilities for climate change are listed in Figure 2. They are further described in this section, in addition to others that are of relevance to this project.

Figure 2. Main Organizations of the Public Administration that have Direct Responsibilities for the Adaptation to CC



2.4.1.1 Science, Technology and Environment

78. The Ministry of Science, Technology and Environment (CITMA) is the lead agency of the environmental sector within Cuba. It is responsible for directing, executing and controlling State' policies in relation to science, technology, environment and their coherent integration into national sustainable development. As such, it is the focal point of the UNCCD and coordinates the National CC Group that brings together national sectors involved in the issue (energy and mines, land use, agriculture, external relations, transport, fishing, construction, water resources), which also counts with the participation of academic institutions and different NGOs. Other relevant institutions involved in adaptation include the Institute of Physical Planning, in charge of spatial planning.

79. The main actions developed by the CC Group (Resolution 43/2015 CITMA), are:

- a. To identify the national measures required for CC adaptation and mitigation and propose a programme of actions for their implementation.
- b. To evaluate the impact of the international environmental policies related to CC and their possible implications at national level, proposing options in accordance with the country's principal lines of economic and social development.
- c. To present proposals for the permanent updating and improved implementation of the policies and programmes for tackling the effects of CC.

2.4.1.2 Physical Planning

80. The Institute of Physical Planning, created in 1960, is in charge of overseeing the policy established by the State in matters of territorial planning and urbanism, through the provincial and municipal directions of Physical Planning. Its functions include locating production and service activities, preserving the land needed for social use and using natural resources while protecting the environment.

81. The Provincial Directorate of Physical Planning is the state entity belonging to the Board of Directors, which governs land use and urban planning. The Municipal Directorates are in charge of preparing and implementing territorial and urban planning plans and detailed location studies; preparing and approving micro-locations and other instruments of territorial control at their level, applying the measures established in matters of territorial planning and urbanism and carrying out inspection in these spheres.

2.4.1.3 Fisheries

82. Fishing activity in Cuba is governed by the Ministry of the Food Industry (MINAL), which is an agency of the Central Administration of the State created in 2009, as a result of the extinction of the Ministries of Fisheries and the Food Industry, with the mission of executing, controlling and directing the application of the policy of the State and the Government in the development of the food industry, as well as that relating to the research, conservation, extraction, cultivation, processing and commercialization of fishery resources.

83. As specific functions in the area of fisheries, MINAL is responsible for proposing the corresponding policy to the Government and once approved, exercising its direction and control. In addition, the MINAL directs the use and preservation of fishing resources in the territorial sea, the exclusive economic zone and inland waters.

84. It is also the power of the MINAL to grant, renew, modify and cancel fishing authorizations, establishing the corresponding requirements and mechanisms for their granting and control.

85. For the development of this mission and functions is supported by the work of the National Office of State Inspection (ONIE), the Fisheries Research Center (CIP) and the Maritime Fishing Institute "Andrés Gonzalez Lines".

2.4.1.4 Forestry

86. The forestry sector is made up of the Dirección Forestal Flora y Fauna Silvestre (DNFFFS), the Grupo Empresarial Agroforestal (Agroforestry Business Group), which groups and manages 30 Agroforestry Companies, the Instituto de

Investigaciones Agroforestales (INAF) and other Research Institutes, and several institutions of the Ministry of Science, Technology and Environment (CITMA), the three existing Forestry Engineering Faculties in the country, the National Company for the Protection of Flora and Fauna (ENPFF) which administers more than 80 Protected Areas, the Forest Guardian Corps (CGB) of the Ministry of the Interior (MININT), and other forest resource tenants among which the Cooperative and Peasant Sector stands out.

87. In 2005, the National Reforestation Commission was created, chaired by the Minister of Agriculture and replicated in the country's 15 provinces and 168 municipalities. The Commission is headed by the presidents of the provincial and municipal governments, respectively, and is made up of organizations, agencies and institutions linked to the country's forestry development, including: the DFFFS, whose director serves as secretary, the CGB, GAF, INAF, ENPFF, the National Institute of Hydraulic Resources (INRH), the Ministry of Education (MINED), the National Association of Small Farmers (ANAP) and AZCUBA.

88. The National Fund for Forest Development (FONADEF), created in 2000, provides financial support for the establishment of long rotation productive forest plantations, including inputs such as seeds and plants; short rotation plantations when they are of State interest; and silvicultural treatments and forest restoration or enrichment when management costs exceed the value of the timber produced.

2.4.1.5 Agriculture and Soils

89. The structure for soil management in Cuba, is headed by the Department of Soils and Fertilizers located at the central level of the Ministry of Agriculture, the Institute of Soils which in turn has four provincial units (Pinar del Río, Cienfuegos, Camagüey and Guantánamo), the 15 provincial departments of soils, 14 provincial laboratories, 160 municipal specialists for the attention to soil activity, in addition to specialists in companies responsible for attending this activity.

90. The National Programme for Soil Conservation and Improvement (PNCMS), established in 2000 and coordinated by MINAG's Soil and Fertilizer Department and with the support of the Soil Institute, is the main public policy instrument in this area.

2.4.1.6 Water resources

91. The structure for the management of terrestrial waters in Cuba is headed by the National Institute of Hydraulic Resources (INRH), which is the entity in charge of organizing and directing, in coordination with the competent agencies, the protection of terrestrial waters, basins, natural channels, hydraulic works and installations against the dangers of pollution, silting and other forms of degradation and deterioration, as well as the systematic control of water quality. At the provincial level it is organized through Territorial Delegations of Hydraulic Resources.

2.4.2 Sector specific centers

2.4.2.1 Environmental Studies Centers (ESC) of CITMA

92. CITMA has provincial and local representation through its various agencies, territorial delegations, and provincial learning centers. These include provincial Environmental Studies Centers (ESC), which are learning centers that coordinate and manage local environmental research studies. They also provide specific services to municipalities and localities including capacity building on environmental and biodiversity management as well as technology innovation that is appropriate for the areas in which they are located.

2.4.2.2 Capacity Building Centers (CCC) of CITMA.

93. In support of the above, the Ministry of Science, Technology and Environment (CITMA) creates the Local and Community Development Centre attached to its Social Sciences Council. The Science and Capacity Building Center of CITMA, promotes horizontal policies, synergies and dialogue on local development in Cuba.

2.4.2.3 Risk Management Centers (RMC) of Civil Defense

94. The National Chiefs of Staff of Civil Defense (Estado Mayor Nacional de Defensa Civil) is an institution that has become of great relevance to the GoC's response to CC, mainly in its capacity to act upon early warnings, evacuation and protection of the population in the event of natural disasters¹¹ The GoC, through its Civil Defence and other institutions has in fact developed a world class early alert system to inform and act preventively to address threats from incoming storms and extreme individual climate events.

95. This includes the development of local Risk Management Centers (RMCs) which are supported by civil protection services and national hydro-met institutions and are integrated within local government structures. These RMCs are linked to communities through early warning focal points who act as first responders, observers and monitors to incoming natural disasters.

96. In relation to inter-sectoral coordination there are strong linkages and coordination on measures for natural disaster adaptation and obtaining and evaluating meteorological data at a local level, provincial meteorological centers ascribed to the National Meteorological Institute (INSMET) exist to provide local monitoring. The Council of Ministers also has an important role of coordination and control of compliance with the actions foreseen in Tarea Vida and other actions related to CC adaptation

2.4.3 Sub-national frameworks

97. Cuba is divided into 15 provinces and one Special Municipality (Isla de la Juventud), and a total of 168 municipalities. Provinces and municipalities have their own legal status for all legal purposes, with their respective representative assemblies and Government structures, although they are strongly dependent on central authorities.

98. Tarea Vida, has provided an opportunity for national policy to mainstream CC projections into economic and planning decisions at a local and national level. As such it requires all organisms and territories to include in their financial planning the resources required for adapting to CC while integrating existing research and knowledge that has been accrued at a scientific level while taking into account intersectoral coordination.

99. Tarea Vida thus entrusts provincial and municipal governments with the responsibility to:

- a. Increase coordinated actions within their systems of inspection and environmental control
- b. Carry out the adjustments required to make investment in their economic plans while focusing in the areas prioritized in Tarea Vida, through various sources, channels and mechanisms of financing
- c. Intensify actions and initiatives to seek alternatives of internal and external finance to support the implementation of Tarea Vida.

100. The Cuban Constitution reaffirms that the provincial government, the Municipal Assembly and the People's Council (described below) actively work to meet the needs of the nation's economy and health. Providing educational, cultural, sporting and recreational assistance, as well as prevention efforts and social care, promoting greater public participation and local initiatives to achieve them. Also, they have the responsibility to guide and coordinate in the territory, economic, cultural, scientific, social and defense political activities that the state has in place.

101. However, while work has begun nationally in including management of CC in high level normative instruments, at a local level Cuba still does not have a specific strategy to actually implement CC adaptation, nor does a permanent institutional framework exist with the resources needed to provide the required sources of investment.

2.4.3.1 Provincial Government

102. The Provincial Government's fundamental mission is to work for the economic and social development of its territory, in accordance with the general objectives of the country, and acts as coordinator between the Government of the Republic and the municipalities, for which it directs, controls, guides and contributes to the harmonization of

¹¹ Cuban Official Daily. Ordinary Edition, Habana, May 19th, 1997, Year XCV, No. 16, pp. 242.

the interests of the province and its ministries, and exercises the powers and functions recognized in the Constitution and the laws; contributes to the development of activities and demands and controls development plans and territorial and urban planning.

2.4.3.2 Municipal Assembly of Popular Power

103. The new text of the Constitution grants greater importance to the municipalities, from the recognition of their autonomy, which they exercise in correspondence with the interests of the nation. It provides that the municipality is the local society, organized by law, which constitutes the primary and fundamental political unit of the national organization, enjoys autonomy and legal personality, proper to all legal effects. The autonomy of the municipality includes the power to decide on the use of their resources, in the framework of the strengthening of institutions in the country, all of which should favor the project objectives.

104. They will allow the incorporation of EBA practices into policies and tools for territorial planning, as well as their direct implementation at the municipal level.

105. The Municipal Assembly of Popular Power is the highest entity for representation at municipal level. It is made up of delegates who are elected in each electoral zone for a period of 2 and half years, from candidates who are proposed in popular assemblies. The Assembly elects the Council of the Municipal Administration, which is the organ of municipal Government. The president of the Assembly is the president of the Council.

106. The Municipal Assembly of People's Power has its own revenues and receives allocations from the Government of the Republic, in terms of economic progress, social development of its territory and other state purposes that must approve the territorial and urban planning plan, and control of its fulfilment.

2.4.3.3 Popular Councils

107. The municipalities are divided, to facilitate relations with voters in popular councils composed of delegates themselves and chaired by one of them.

108. It is relevant that the new draft Constitution reaffirms that the People's Council represents the population of the territory where it operates and at the same time the Municipal Assembly of People's Power. It exercises control over production entities and local advocacy services, and is a representative local People's Power Body, invested with the highest authority for the performance of its functions and, without constituting an intermediary body for the purpose of the political-administrative division that is organized in cities, towns, neighborhoods, towns and rural areas.

3 BIO-PHYSICAL BASELINE CONDITIONS

3.1 PHYSICAL ENVIRONMENT

109. The Cuban Archipelago has an area of 109,884.01 km², with a coastline spanning more than 5,746 kilometers with more than 4,000 keys and islets.¹² The coastline is highly irregular and includes diverse features and ecosystems including steep cliffs, extensive low-lying and swampy coastal zones, fringing coral reefs, marine terraces, bays, deltas, beaches and inlets, as well as seagrass beds, mangroves, wetlands and dunes. There are complex ecological and productive relationships between these different coastal and marine ecosystem components that function as a whole. But these coastal ecosystems are at risk. The rate of retreat has risen to up to 3m/year, with an average of 1.2m/year, resulting in the loss of infrastructure and dunes over the last 50 years¹³.

110. These ecosystems play vital roles in supporting local economies, in particular the fisheries and tourism sectors. They are also crucial in protecting coastal communities against impacts of waves associated with tropical storms,

¹² ONEI. Environmental Panorama, (2017)

¹³ Informe Técnico del Proyecto 2. Macroproyecto. Gobierno de Cuba.

hurricanes, cold fronts and southerly winds. They therefore help slow coastal erosion, while also reducing the risk of coastal flooding and saline intrusion into aquifers.

3.2 TOPOGRAPHY, GEOLOGY AND SOILS

111. A variety of different geological processes have brought about the development of a rich coastal morphology. By area, 75% of the land mass corresponds to plains, 18% by mountains and the remaining 4% by coastal wetlands. There is a submerged marine platform surrounding Cuba, covering a surface of 67,831 km².

112. Inland, karstic geology covers 67% of the country. It develops from the surface of limestone massifs, yielding deep underground aquifers that are susceptible to contamination and salinization (Figure 3)¹⁴.

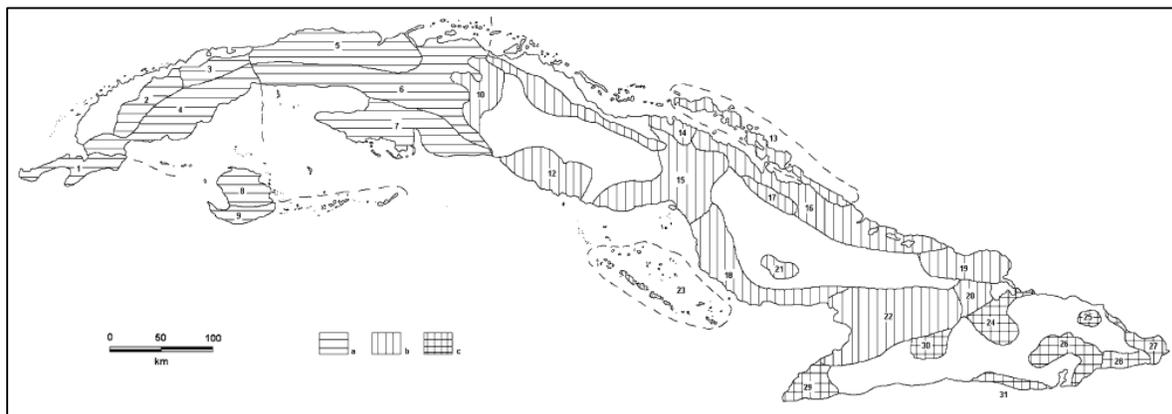


Figure 3. Karst geology of Cuba

113. Broadly, coasts in Cuba can be grouped into two types: 1) low coasts, swampy, with complex substrate of sand, silt and peat, partially flooded, and 2) high coasts with a rocky substratum, either cliffs or with emerged marine terraces¹⁵.

114. The northern coasts of Cuba are formed mainly by low and generally swampy littorals in the province of Artemisa, stretching over 528 km. In the province of Matanzas, extending along 406 km of coastline, there are high cliffs of the “seboruco” terrace, a geological formation with highly characteristic karst soil (Figure 3)

115. The project interventions will take place along Cuba’s southern coast. To the east, the coastline ranges from high cliffs extending along a stretch of 1 329 km in Guantánamo, to low and swampy coastlines stretching along 944 km in the province of Camagüey. The outer portion of the southern coast of Cuba is extremely varied and diverse with lots of group of keys (succession of islands, islets, reefs and cays), sandy beaches, and reef systems that are important for the broader Caribbean marine ecosystem. The inner portion of the same coast is dominated by flat coast, of silty soils, dominated by extensive mangroves. In the province of Granma there are some of Cuba’s most important marine terraces, constituting the southern flank of the orographic groups of Sagua-Baracoa and Sierra Teacher, extending along 680 km (Figure 3).

116. To the west, in the province of Sancti Spiritus, there are mainly low and swampy areas, which are generally uninhabited, extending along 741 km long coastline. In the province of Matanzas the 252 km long coastline is formed

¹⁴ Molerio León L. and Paris M. (2008). Managing environmental problems in Cuban karstic aquifers. *Environ Geol* (2009) 58:27 The north coast of the island is defined from Cabo San Antonio to Punta Gobernadora, in the province of Artemisa, 528 km long, formed mainly by low and generally swampy littorals. Between Punta Gobernadora and Punta Hicacos, in the province of Matanzas, 406 km long, exhibits high coastlines in which the seboruco terrace predominates with a very characteristic karst soil form.5–283

¹⁵ Iturralde and Serrano (2015)

mainly by karstic soils in origin by elevations of coral platforms. In Pinar del Río, there are low and often marshy coastal systems, which are also present in the provinces of Artemisa and Mayabeque. Finally, at the extreme west end of the island, which forms the Guanahacabibes peninsula, is bordered by high cliffs, sandy beaches, and rugged ground karst rocky (locally called Seboruco) along 131 km (Figure 3).



Figure 4. Political map of Cuba to describe different coastlines

117. The southern coast is bordered by two mountain ranges, the Cordillera de Guaniguanico Heights Havana and Matanzas. This great plain, elevated during the Miocene, extends from Cove Cortes (Pinar del Río) to the Zapata (Matanzas). Although this entire region constitutes a unit from a geomorphological point of view, it can be divided into two subregions: 1) a western subregion, which extends from Cortés to Artemisa (Southern Coastal Plain) and 2) an eastern subregion that extends from Artemisa to the Ciénaga de Zapata (Red Plain of Havana-Matanzas).

3.3 CLIMATE

118. Cuba's tropical climate is characterized by high but very seasonal levels of rainfall and high temperatures, linked to its geographic location being very close to the Tropic of Cancer. With semi-continental and marine influences, the island is often exposed to hurricanes, storms and extreme winds. The archipelago receives high levels of solar radiation throughout the year, which results in high temperatures, while its proximity to the tropics exposes it to the seasonal effects of tropical and non-tropical atmospheric circulations.

119. Between May and October, the location and intensity of the North Atlantic (Azores-Bermuda) anti-cyclone largely determines weather in Cuba. There is little variation in meteorological conditions, which are only interrupted by the passage of tropical disturbances (barometric waves from the east and tropical cyclones), resulting in increases in rainfall.

120. Between November and April, by contrast, the weather is much more variable, in accordance with predominant processes and phenomena of extra-tropical circulation. Cold fronts result in lower temperatures, although there are still frequent hot days in the warmer periods between these fronts. These phenomena predominantly affect the western part of the country. The presence of extra-tropical low-pressure systems to the north of the country precedes the entry of cold fronts and generates strong, dry and hot winds from the south (termed "sures"), which can affect crops.

121. Physical and geographic conditions also affect the climate. Despite the generally flat or rolling nature of its relief, the location and height of the principal mountain systems, coupled with local patterns of atmospheric circulation, result in a transition from the tropical wet and dry climate that predominates in the country to other types and subtypes in certain areas. According to the Köppen Climate Classification System, these climate areas are (Figure 5):

- a. Tropical rainforest climate (Af), with average precipitation of at least 60mm (2.4in) in every month: principally found in the windward side of the Nipe-Sagua-Baracoa mountain group, on the north-eastern slopes of the eastern part of the country; total annual rainfall exceeds 3,000mm (118in), with greatest amounts between November and April, in contrast to the rest of the country.
- b. Dry steppe climate (BS), with annual rainfall of not more than 600mm (24in): principally in the southern coastal belt of the provinces of Santiago de Cuba and Guantánamo.
- c. Temperate climate (C), of medium latitudes and greater altitude, with rainy season between May and October. There are two variants: monsoon-influenced humid subtropical climate (Cwa) in Guamuhaia and the eastern mountains, and Subtropical highland climate or temperate oceanic climate with dry winters (Cwb) in the highest peaks of the Sierra Maestra and the Nipe-Sagua-Baracoa Group.

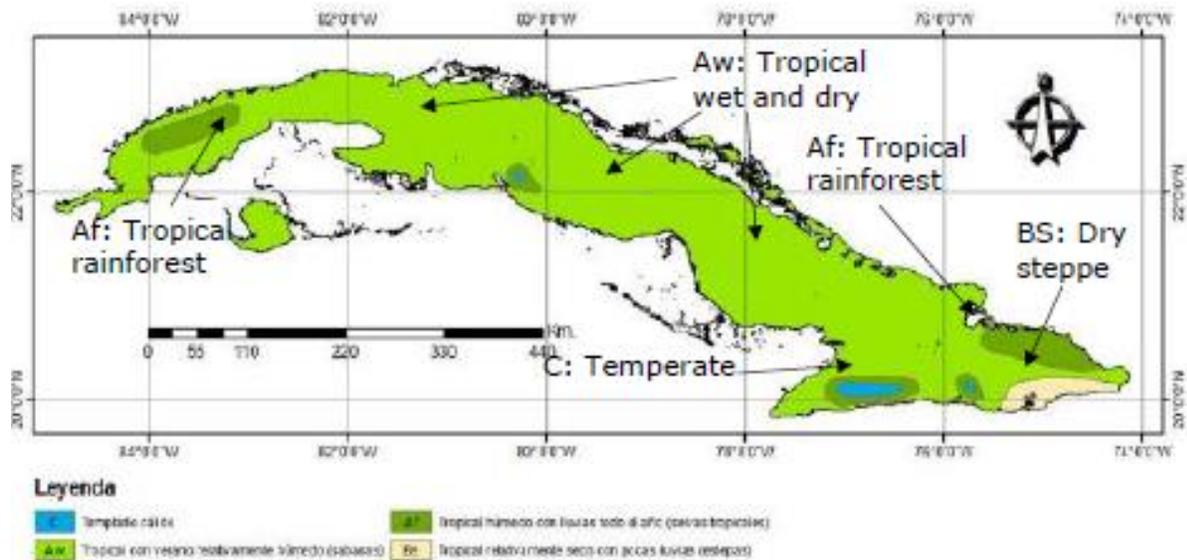


Figure 5. Climate types in Cuba (modified Köppen classification)

122. Other geographic factors, such as marine currents and distance from the sea, play important roles in determining climatic conditions in the country. The Gulf Stream guarantees high surface sea water temperatures, resulting in a rainy climate at a latitude otherwise dominated by deserts. The long, narrow configuration of the country, meanwhile, ensures that no part of the country is very far from the sea, which buffers climatic variations.

123. Median annual temperatures range from 24°C on the plains to 26°C or more on the eastern coasts, and less than 20°C in high parts of the Sierra Maestra. There is some seasonal variation in temperatures, with the July-August period being warmest and January-February the coolest. Daily temperature variation is greater than annual variation.

124. The largest rainfall amounts are associated with tropical cyclones cold fronts, local storms and tropical waves. Median annual rainfall across the country is 1,335mm (53in), although drought events do occur that sometimes last for several years.

125. The highest risks of damage arise from meteorological phenomena such as tropical cyclones and severe localized storms (with tornadoes, hailstorms, waterspouts and high winds). The cyclone season lasts from July 1st to November 30th, with most activity happening in September and October and the most intense cyclones in October. The annual frequency of cyclones ranges from 0 to 4, with an average of one per year. The most affected region is the East part of the country. Severe local storms occur throughout the year, but most frequently between March and October, and in the afternoon.

3.4 WATER RESOURCES (GROUNDWATER AND SURFACE WATER)

126. In the Cuban archipelago, rain constitutes the only source of fresh water for the ground and surface systems. With an average annual rainfall of 1,335 mm, the country has about 38,100 million m³ annually as potential hydrological resources. The exploitable hydrological resources are assessed to be around 24km³ per year, 75% of which correspond to surface waters and 25% to deep groundwater sources. There is an important watershed boundary that runs through the main island's longitudinal axis, which determines the formation of smaller basins with karst being predominant geology.

127. Extensive hydrological infrastructure has been built to counteract long droughts and protect the nation from flooding, corresponding to 241 dams, 730 reservoirs, 60 secondary canals (“*derivadoras*”), 780km of main canals, and 8 large pumping stations for decanting.

128. This infrastructure also secures water provisions for the country, with 13.7km³ yearly of available water (1,220m³ per person), representing 57% of the exploitable hydrological resources. These reservoirs have created problems in terms of the fragmentation of terrestrial ecosystems, increased levels of evaporation from the reservoir surfaces, the damming of surface currents and the decrease in the nutrients necessary for maintaining ecosystem services.

3.5 FLORA AND FAUNA

129. The Biological Diversity of the Cuban Archipelago is characterized by a high level of endemism of its flora and fauna, such that it is recognized as an exponent of regional and world heritage. Cuba is the island with the greatest biological diversity of the Antilles, both in terms of total species richness and the degree of endemism. More than 50% of the plant species in Cuba are endemic and around 35% for groups of fauna. Subgroups of particular importance are insects, mollusks and herpetofauna, which have a level of endemism between 80 and 90%¹⁶.

130. The national territory has a great diversity of ecosystems and landscapes, terrestrial and marine, from semi-desert and arid, to tropical humid forests. Among the best represented ecosystems in the coastal zone in Cuba are mangroves as well as coral reefs, sea grasses, beaches and coastal lagoons, which together constitute coastal wetlands.

131. The ecological integrity of coastal and marine ecosystems is particularly at risk from Invasive Alien Species, the spread of which is facilitated by the scarcity of competitors and predators due to the country's geographical isolation.

132. Swampy woodlands have been highly affected by a range of factors, including the advance of the agricultural frontier due to rice production, the grazing of water buffaloes, the establishment of forest plantations (mostly with exotic species), and the use of agricultural chemicals and fire in the neighboring farmlands. As a result, this forest is now highly degraded and fragmented, reducing the physical stability of the wetlands and their ability to trap sediment (which otherwise will flow into adjacent coral reefs, smothering them and undermining their EBA functions).

133. Closely linked to the mangrove ecosystem, coastal lagoons play a very important role in the protection and stabilization of the Cuban coastal zones through protection against the effects of high water flows in rivers draining into the coast due to extreme rainfall events, retention of sediments, organic matter and pollutants, which reduces leaching; and the provision of an environment for recreation and tourism.

134. Sea grass beds and coral reefs in Cuban coastal areas play an important function in protecting the coastal zone against wave impacts by increasing the friction between water and the sea floor and thereby reducing wave energy and retaining sediment and thereby reducing coastal erosion.

¹⁶ V Informe Nacional de la República de Cuba al Convenio de Diversidad Biológica. Ministerio de Ciencia, Tecnología y Medio Ambiente. La Habana, 2014. 271 pp

135. **Mangroves:** Cuban mangroves occupy 5.1% of the area of the country and are found on 70% of the coasts (Figure 6). They are a valuable forest reserve, representing 20.1% of the forest area of the country¹⁷.



Figure 6. Mangroves in Cuba

136. The evergreen mangrove forests of Cuba are made up of four tree species, network mangrove (*R. mangrove*); black mangrove (*A. germinans*); patabán (*L. racemosa*) and *yana* or pseudomangrove (*C. erectus*)¹⁸. Other plant species associated with mangroves, include *Batis marítima*, in sites with greater salinity, generally accompanying *Avicennia germinans* forests; *Thespesia populnea*, (Florida majagua), *Hibiscus tiliaceus* (majagua), *Bontia daphnoides*, (aceituna americana), *Dalbergia ecastophyllum*, *Acrostichum aureum* (mangrove fern) and several tree species of the genus *Bucida*¹⁹.

137. Mangroves have been highly affected in recent years. The loss of biological diversity on the coasts of Cuba is mainly associated with the modification of the natural habitat of species as a result of the intense processes of deforestation that have occurred in the process of the social/historical development of the country. Plant species such as *patabán* (*Laguncularia racemosa*) and *yana* (*Conocarpus erecta*) have been used for the production of tobacco, charcoal and firewood boxes, for the construction of rustic fishing boats and for the extraction of substances for tanning.

138. **Seagrass beds:** Northwestern Cuban coastal waters contain about 2,050km² of seagrass²⁰. The ecosystem services generated by seagrass beds influence the coastal environment as a whole, including other ecosystems such as coral reefs and mangroves. They serve to increase the substrate available for the growth of different organisms, to protect the sea floor from high light levels, and allow the development of a microenvironment at the base of the sea grasses. They also create high concentrations of dissolved oxygen resulting from photosynthesis and function as an

¹⁷ Menéndez L., J. M. Guzmán, L. Rodríguez, N. Gómez, Z. Cuervo, L. Almeida and A. Álvarez de Zayas (2013). "Affectations of the Forests of Mangroves in the Bahía of Cárdenas and Changes in the Ecosystem Services". 143-151 pp. In: (L. Fernández and A. Vanina Eds.) "Evaluation of the Changes of States in Degraded Ecosystems in Iberoamérica". RED CYTED 411RT0430. 283 pp.

¹⁸ Menéndez L., J. M. Guzmán, L. Rodríguez, N. Gómez, Z. Cuervo, L. Almeida and A. Álvarez de Zayas (2013). "Affectations of the Forests of Mangroves in the Bahía of Cárdenas and Changes in the Ecosystem Services". 143-151 pp. In: (L. Fernández and A. Vanina Eds.) "Evaluation of the Changes of States in Degraded Ecosystems in Iberoamérica". RED CYTED 411RT0430. 283 pp.

¹⁹ Oviedo, R. & M. Labrada. 2006. "Mangroves in the Ciénaga de Zapata Wetlands". pp. 219-229. In: L. Menéndez Carrera & J.M. Guzmán Menéndez (eds.): Mangrove Ecosystem in the Cuban Archipelago. Editorial Academia. Habana, Cuba.

²⁰ Buesa (1974)

important entry point for energy into the coastal and marine system as a whole through detritus inputs, in association with herbivores such as sea urchins. Additionally, they provide physical sites for breeding, refuge and feeding of many juveniles of fish and invertebrates, a function related to that of mangrove forests and coral reefs.

139. **Coral reefs:** Growing along virtually the entire border of the Cuban coastal shelf (>98%), coral reefs extend in shore and to the edge of the shelf, covering 2,150km of the northern coast and 1,816km on the southern coast. In shore reefs are dispersed in the western Gulf of Guanahacabibes and Gulf of Batabanó, and the eastern Gulf of Ana María-Guacanayabo (Figure 7 and Figure 8). Coral reefs in Cuba have suffered deterioration over the last 20 years, with serious ecological and socioeconomic implications in terms of reductions in the important ecosystem services that they provide. Around 70% of reef crests in Cuba are highly deteriorated, due to a combination of factors. In particular, the excessive growth of algae associated to declines in aquatic herbivores populations and bleaching due to pollution and sea temperature. Current prediction models estimate a structural disappearance of coral crests around Cuba within around 40 years²¹.

140. **Beaches:** There are 499 sandy beaches in the Cuban coasts. Recent studies have found that 82% of these have been affected by erosion, with an average rate of coastal recession in areas of sandy beaches of 1.2m/year. These beaches provide ecosystem services in the form of protection and stability of coasts; main natural resource for the growing tourism industry and their natural vegetation serves as a refuge and feeding and breeding sites for animal of species of conservation importance including marine turtles, Antilles manatee and crocodiles.

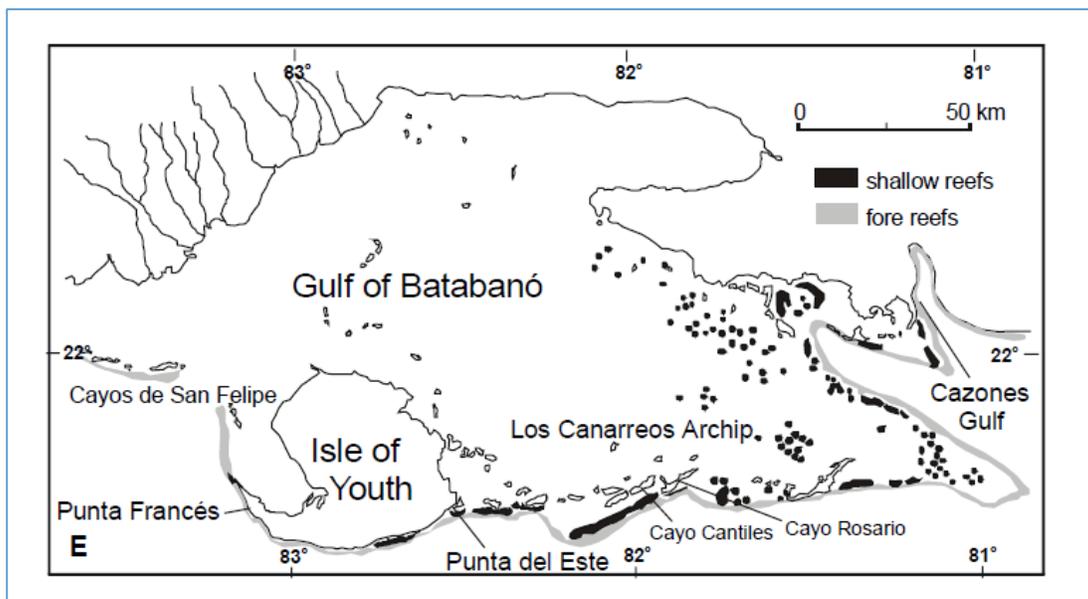


Figure 7. Location of fore reefs (grey color) in the Gulf of Batabanó

²¹ Alcolado et al. (2009)

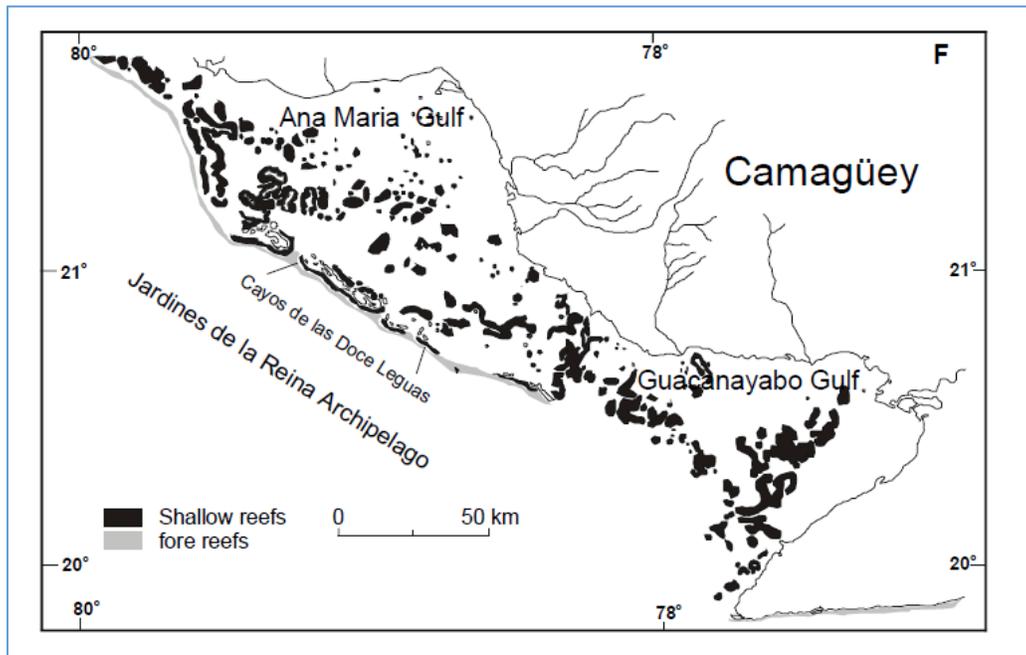


Figure 8. Location of fore reefs (grey color) in the Cuban southeastern shelf

3.6 PROTECTED AREAS AND FISHERIES

141. Cuba's National System of Protected Areas (SNAP) was established to protect the high level of endemism of its biological diversity and natural resources in the country. The national system covers 25% of coastal-marine areas and almost 20% of the terrestrial area. The protection categories established in Cuba are homologated to those of the International Union for Conservation of Nature (IUCN).

142. There are 211 areas identified by SNAP, which are classified into three categories:

- a. 77 Protected Areas of National Significance covering an area of 83.21%;
- b. 134 Areas of Local Significance, covering an area of 16.79%;
- c. Special Regions of Sustainable Development.

143. Within these areas, there is also a subgroup of areas that are internationally recognized for their biological and ecological value. These include:

- a. 6 Biosphere Reserves;
- b. 6 Ramsar Sites,
- c. 2 Natural World Heritage Sites
- d. 2 other World Heritage Sites

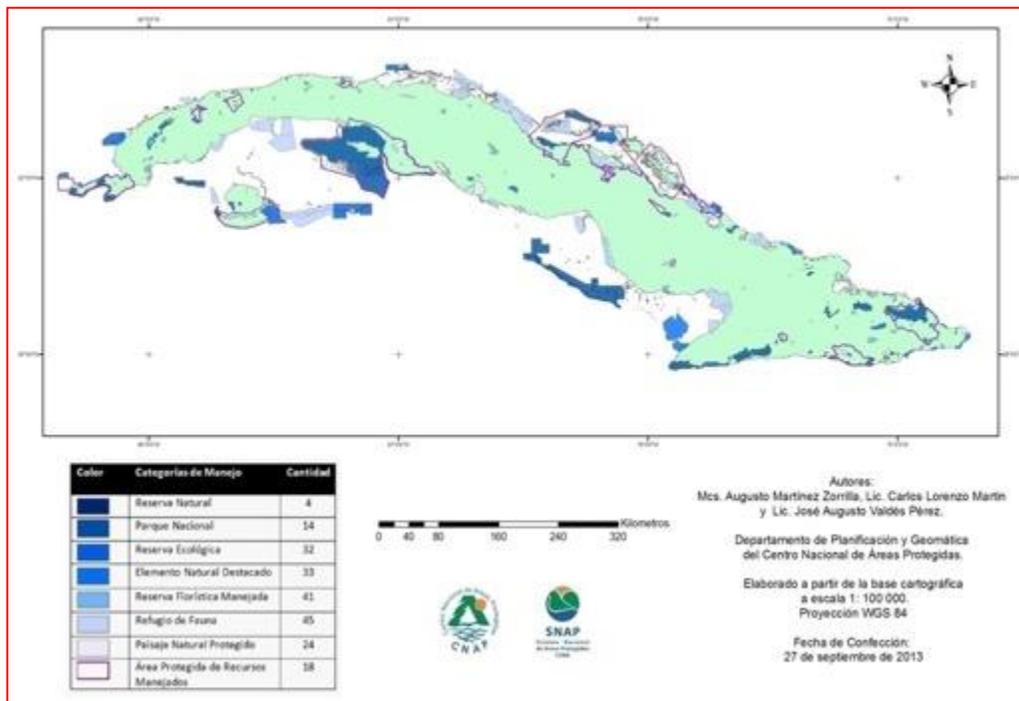


Figure 9. SNAP Cuba

144. SNAP has a structure of a National Coordinating Board, which meets at least twice a year. It is made up of all the Organisms that have an impact in conservation, including the productive sectors, which allows for integrated decision-making and creates an adequate space for conflict analysis and resolution.

145. Of particular relevance to this project is the close coordination between the National Center of Protected Areas and the Fishing Sector. This allows the analysis and coordination of activities carried out in protected areas, their buffer zones and surrounding areas. The establishment of Protected Areas of Managed Resources is a unique sustainable use and conversation regime. It includes special regulations for fishing activities, accounting for ecologically important sites of feeding, migration, nesting, etc. of species present in the marine platform. This has also been a key strategic alliance with the fishing sector.

146. In the Southern Coast of Cuba where this project will be implemented, there are two main fishing areas. Integrated Coastal Zone Management activities have been carried out in these areas, through a UNDP/GEF project that was recently executed. This facilitated a significant increase in joint work and harmonization between the fishing sector and the system of protected areas.

3.7 GENERAL OVERVIEW OF INTERVENTION SITES

147. Two stretches of coastline have been prioritized by the project, which encompass the project's 7 target sites:

- a. La Coloma to Surgidero de Batabanó (Southwestern coast)
- b. Júcaro to Manzanillo (Southeastern coast)

148. They are some of the most sensitive and vulnerable areas to the effects of climate change, particularly salt-water intrusion and erosion. They include the most threatened and degraded mangroves in the country, as well as some of the areas with reef crest and or greater frequency of deterioration or extreme deterioration²².

3.7.1 Stretch I: La Coloma to Surgidero de Batabanó (Southwestern coast)

149. This stretch covers 421 km of coastline and 745,200 hectares. Of this territory, 138,100 ha is terrestrial and 607,100 ha is marine (Figure 10). The principal features of this area include low-lying, often swampy, coastal areas, in which the predominant type of vegetation is mangrove, associated with coastal lagoons, interior beaches, seagrass beds and coral reefs, with a broad insular platform bounded by a line of keys and small islands.

150. The Gulf of Batabanó (Figure 10) is important for the conservation of threatened endemic species, such as sea turtles, manatees, and the Cuban crocodile. The Gulf includes the *Ciénaga de Zapata* at its western end, which is the largest and most important wetland in Cuba and the Caribbean, with rich biodiversity.

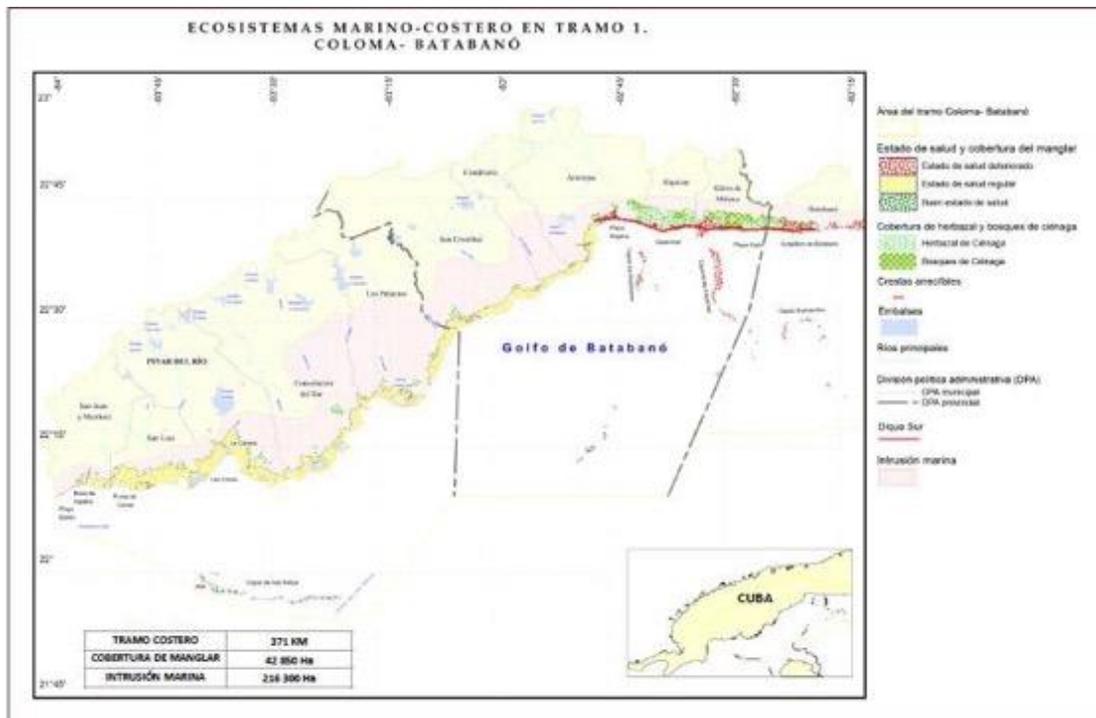


Figure 10. Stretch I: Project intervention area spanning from La Coloma to Surgidero de Batabanó

151. This area is characterized by low, easily flooded areas, where the sustained rise of sea level and coastal erosion will have medium- and long-term impacts. Although these locations are naturally protected from low-lying waves, the strip of mangroves and swamp forests (which should represent an important barrier against winds, waves and coastal erosion) has been impacted by the increase in salinity and waves in coastal areas, as well as the increased frequency and intensity of climate impacts. These processes are exacerbated by impacts of logging, land use change, pollution and urbanization.

²² Iturralde and Serrano (2015)

152. Its karst morphology makes this stretch particularly vulnerable to saltwater intrusion and coastal flooding. The occurrence of heavy rains, tropical storms, cyclones and hurricanes impact agricultural productivity. There is also an ecologically important marine sponge reserve in the province of Mayabeque.

153. The use of grey infrastructure and other measures of coastal protection in the past intending to reduce flood flows and sediments has had important effects on the degradation of ecosystems. In the 60's the problem of salt intrusion led to the construction of the so-called Southern Dike. It is about 50 km long, and divides the coastal area from the mainland, creating a dam of fresh water. While it allows longer residence time of fresh waters and promotes greater percolation – which helps contain saline intrusion, at least temporarily – the effectiveness of this infrastructure is at risk due to climate change²³. Additionally, the dike disrupts runoff flows to mangroves, causing degradation of these swampy forests through an increase in salinity of the combined effect of the absence of freshwater runoff and penetration of high tides with surges and increasingly intense and frequent storms and hurricanes. Due to damage to its structure and composition of species, the mangrove has lost its ability to protect the coastline and is being eliminated by wave energy that could previously stand, which is rapidly eliminating the coastline up to 2 meters by year.

3.7.2 Stretch II: Júcaro to Manzanillo (Southeastern coast)

154. This area covers four provinces (Ciego de Ávila, Camagüey, Las Tunas and Granma) and three municipalities (Venezuela in Ciego of Ávila, Santa Cruz del Sur in Camagüey and Manzanillo in Granma). The marine part of this area includes the Gulfs of Ana María and Guacanayabo (Figure 11).

155. The coastline here is dominated by low-lying and swampy coastal areas, with many mangroves, and coastal wetlands associated with coastal lagoons, numerous sandy beaches, seagrass beds and coral reefs, together with many human settlements. Its keys contain many species of importance for the fisheries sector.

²³ Iturralde and Serrano (2015)

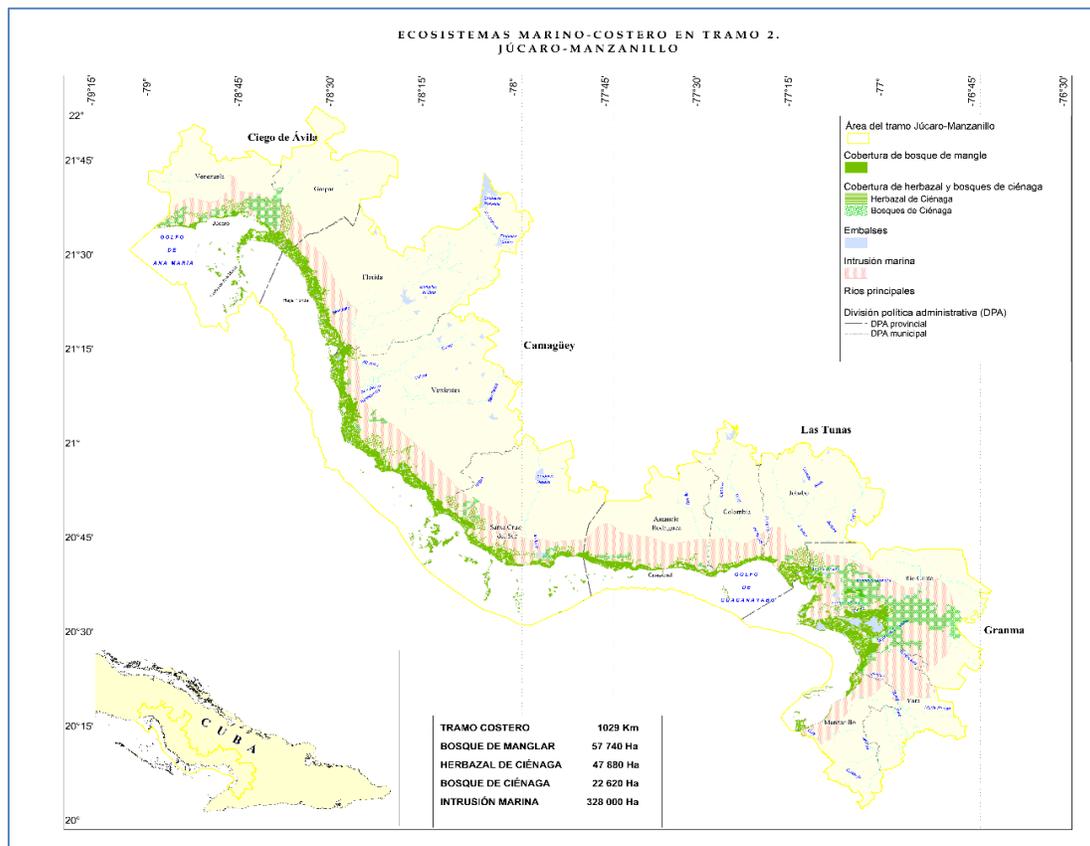


Figure 11. Stretch II: Project intervention area spanning from Júcaro to Manzanillo

156. The extensive mangrove forests exhibit varying degrees of degradation and fragmentation, particularly affected by livestock²⁴. It is predicted that the greatest impacts to the mangrove ecosystem, due to the increase of the mean sea level, will occur in the coastal section of the southern provinces of Ciego de Ávila, Las Tunas and Camagüey²⁵.

157. One of the main climate vulnerabilities identified in the area is beach erosion, which has affected most of its beaches. In addition, saltwater intrusion is becoming increasingly significant due to a combination of sea level rise and over-exploitation of its karst aquifers. The upper aquifer of the Cauto delta is mostly affected by saline intrusion, affecting the aquifer along its entire length.

158. As with Stretch I, grey infrastructure also exists in this area. There is an interior freshwater reservoir, bounded by a string of cays and coral reefs, which separates the coastal area from the open ocean.

159. Notably, the community of Júcaro (municipality Venezuela, Ciego de Ávila province) is located in the buffer zone of the Cayo de Ana María Wildlife Refuge and the Jardines de la Reina National Park area has high ecological value.

²⁴ Iturralde and Serrano, 2015

²⁵ Menéndez et al., (2000)

3.8 ENVIRONMENTAL OVERVIEW OF EACH INTERVENTION SITE

3.8.1 Intervention Sites (subzones) / Stretch I - La Coloma to Surgidero de Batabanó (Southwestern coast)

Interventions in La Coloma subzone

160. **La Coloma is located in the municipality of Pinar del Río, province of Pinar del Río.** The municipality of Pinar del Río is located approximately in the central-southern portion of the province. It has an area of 70,780 ha, and ranks in the ninth place in territorial extension with respect to other municipalities of the province. Pinar del Río limits to the north with the Viñales and Minas de Matahambre municipalities, to the south with the Gulf of Batabanó, to the east with Consolación del Sur municipality and to the west with San Luis and San Juan y Martínez municipalities. Geological formations of recent age predominate in this territory, mainly from the Quaternary, although to the Northeast there are older geological formations dating from the Mesozoic (Jurassic and Cretaceous periods). There are 9 types of soils present in the municipality according to the Genetic Classification but most of the territory is occupied by three types of soils: Ferralitic quartzite yellow leached (44.7%), Sandy quartzite (12.7%) and Gley ferralitic (0.3%). They have a moderately warm and seasonally humid climate (with a regularly intense and prolonged dry season). The prevailing thermal regime is quite homogeneous, although precipitation and humidity increase in a latitudinal direction from South to North, due to the increase in convection towards the mountainous massif.

161. The intervention site of La Coloma is located on the southern coast of Pinar del Rio in an area of approximately 500 hectares, strongly developed for the establishment of agriculture (Figure 12).

162. The land area that surrounds the communities includes 938 hectares of Mangroves and 1,020 hectares of swamp forests (see Figure 12 below). The marine zone is dominated by a system of keys that includes islands and islets that protect the interior coasts, at least to the east of the area. Moreover, there is a protected in this intervention site: “Parque Nacional Cayos de San Felipe.”

163. The rehabilitation proposal presented below includes a group of baseline actions being undertaken by the government in nearby areas, aimed at improving protection services of ecosystems in La Coloma. GCF resources will be invested in mangrove and swamp forest rehabilitation focusing entirely on the additionality of generating the conditions for coastal resilience.



Figure 12. Detail image with intervention in mangroves and swamp forest around La Coloma area.

164. The project will be focused on the following activities:

- Restore water flows to the coastal zone (drainage ditches, channeling, cleaning and maintenance of channels)
- Eliminate pressures on the coastal zone (landfill disposal, invasive alien species, pollution).
- Rehabilitate strips of red mangrove and other key dominant species of the forest, mostly red mangrove.
- Eradication of Invasive Alien Species (IAS).
- Monitor the impacts of interventions on water quality, the health of coastal wetlands, seagrasses and coral reefs.

165. The co-finance by the GoC will contribute to the effectiveness of the EBA investments implemented with the GCF resources will be implemented by INRH, CITMA and MINAG and will include the following complementary activities:

- Prevent overexploitation of aquifers and ensure the ecological flow of dams located north of the site.
- Restore water flows upstream to the coastal zone (drainage ditches, channeling, cleaning and maintenance of canals, build speed bumps on roads and access roads).
- Eliminate and reduce pressures on the coastal zone (clean sewer ditches and solid waste, eliminate landfills, clean and maintain channels and drainage ditches).

Interventions in Cajío Beach subzone



Figure 13. Areas to be affected by CC-related saline intrusion, temporary flooding during hurricanes and SLR.
Source: “Manglar Vivo” Prodoc Document

166. **Playa del Cajío (Güira de Melena municipality, Artemisa province).** The municipality of Güira de Melena is located in the Province of Artemisa. It limits at its northern end with San Antonio de los Baños municipality, to the east with the Quivicán municipality, to the west with the Alquizar municipality and to the south with the Gulf of Batabanó. Highways are among the main access roads linking Güira de Melena with other municipalities. These highways are the following: Güira de Melena- San Antonio de los Baños, Güira de Melena - Alquizar, Güira de Melena - Boca Cajío - Quivicán. The municipality’s coastal sector is part of the southern coastal section of Artemisa, with a somewhat curved coastline and without impressive coastal feature, it has an area of 12 kilometers and its land limits are: to the north with the 5-meter altimetric curve, to the south with the coastal border, to the east with the Quivicán municipality and to the west with Alquizar municipality. Generally, in the territory, temperatures are high in the order of 23 to 26 ° Celsius, with an average annual temperature that ranges between 23- 24 °Celsius in the territory’s interior, caused by the presence of a completely flat relief. In the Coastal zone, temperatures are higher, ranging between 24 - 26 ° Celsius.

167. The Cajío area is located in the eastern region of the southern coast of Cuba, it is a particularly important area for the national economy because it represents the most important agricultural region. This area has very flat topography and is dominated by soils that combine alluvial and karstic soils with variable dominance by region, with limited surface water availability. This area is particularly subject to the problem of saline intrusion into its subterranean aquifers, which are typically located between 20 and 30m below sea level.

168. The area is also one of the main sources of drinking water for the city of Havana. The narrowness of the island in this area (which in places is little more than 30km wide) means that it is susceptible in almost it’s entirely to water extraction issues (see Figure 13).

169. Playa del Cajío (Güira de Melena municipality, Artemisa province): This is an urban settlement with 196 households and a total population of 524 inhabitants. All its population has electric service (100%) and 62% have water systems. The community medical services include five medical offices and a pharmacy. It also has a school.

170. Its main economic activity is forestry for wood and charcoal production, with the municipality of Güira de Melena being the most important for the industry. Another source of revenue is the marketing and use of water and sludge with high sulfur and iodine which are sold for pharmaceutical purposes and for tourism and cosmetic treatments.

171. This area is also an important area for the finfish and lobster fisheries, as well as an important region for the production of charcoal through local forestry companies based on the extraction of exotic species such as almond (*Terminalia catappa*) and Australian pine (*Casuarina sp*).

172. El Cajío is an excellent example of the negative impacts on the system of marine and coastal ecosystems due to the use of gray methods for containment of environmental threats. The presence of a coastal contention wall, as well as a gabion, at the mouth of the el Cajío Chanel in the community have brought erosion to the west. This has added to the existing problems for the mangroves causing rapid deterioration and a silty-sandy deposit to the north.

173. Other example is the presence of the South Dike, which resulted in dramatic changes in local hydrology, resulting in a considerable increase in salinity downstream, reduced freshwater flow into the mangroves and thus the loss of dominance red mangroves in the coastal strip. These changes resulted in the loss of the most effective species to prevent physical impacts of storms, hurricanes, "sures" winds and oceans or waves on the coast.

174. Because the Cajío is a flat lowland area with plains dominated by mangroves (50.4 hectares) and swamp grasslands (123 hectares) Figure 14 below, it is quite sensitive to changes in hydrology. The region has the tendency to divert surface water that now does not drain to the wetlands and has reduced its structure and composition size, making it more sensitive to the effects of CC.

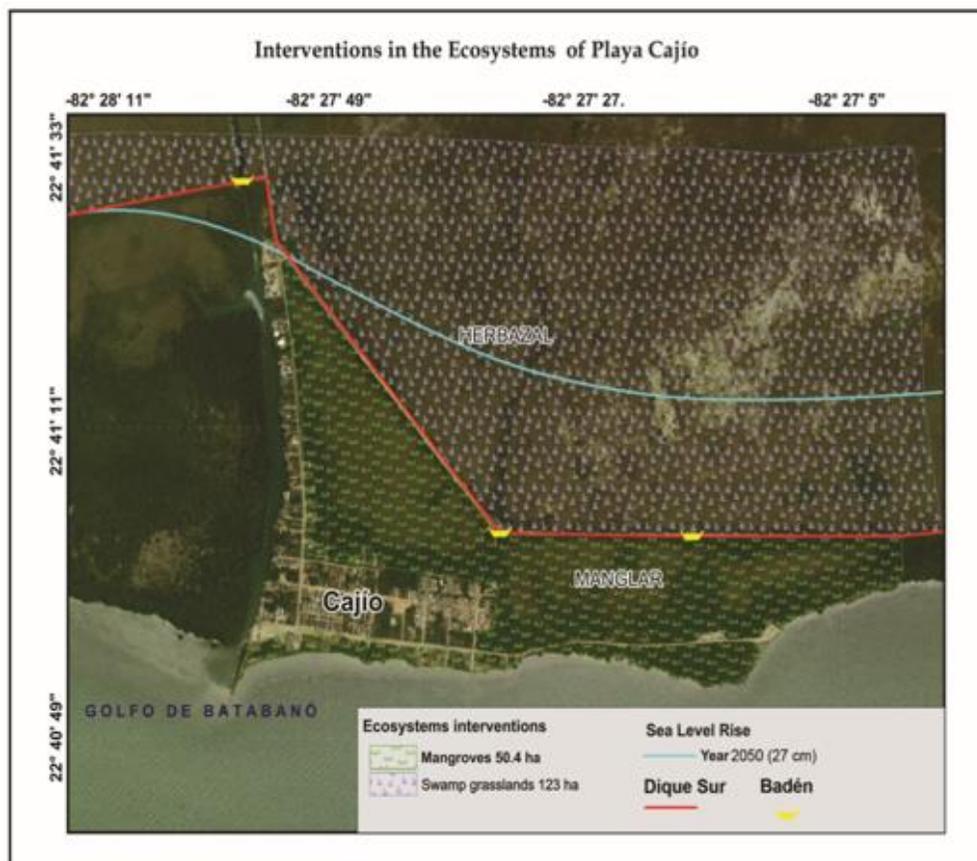


Figure 14. Expected impacts for the communities of the Cajío coast due to the sea level rise for the years 2050 and 2100.

175. The inherent vulnerability of the target areas to climate-related effects is reflected in, and exacerbated by, the high levels of degradation that have been suffered by their coastal ecosystems. Some of the highest levels of beach erosion in the country have occurred in this area: the beaches of Majana, Guanimar, Cajío, Mayabeque, Caimito, La Pepilla, Tasajera and Rosario were left completely without sand as a result of the erosive waves generated by Hurricanes Ike and Gustav in 2008. At La Pepilla beach, the coast is receding at a rate of up to 2m/year (Guerra et al.

2000). The mangroves of the area also have some of the lowest health index in the western region of the country (Iturralde y Serrano, 2015).

176. Figure 15 shows schematically how the communities of Cajío would be vulnerable to the levels of saline intrusion on the coasts, as well as the levels of flood by marine penetration in the 2050 and 2100 scenarios on the impacts of CC reported by Iturralde and Serrano (2015).

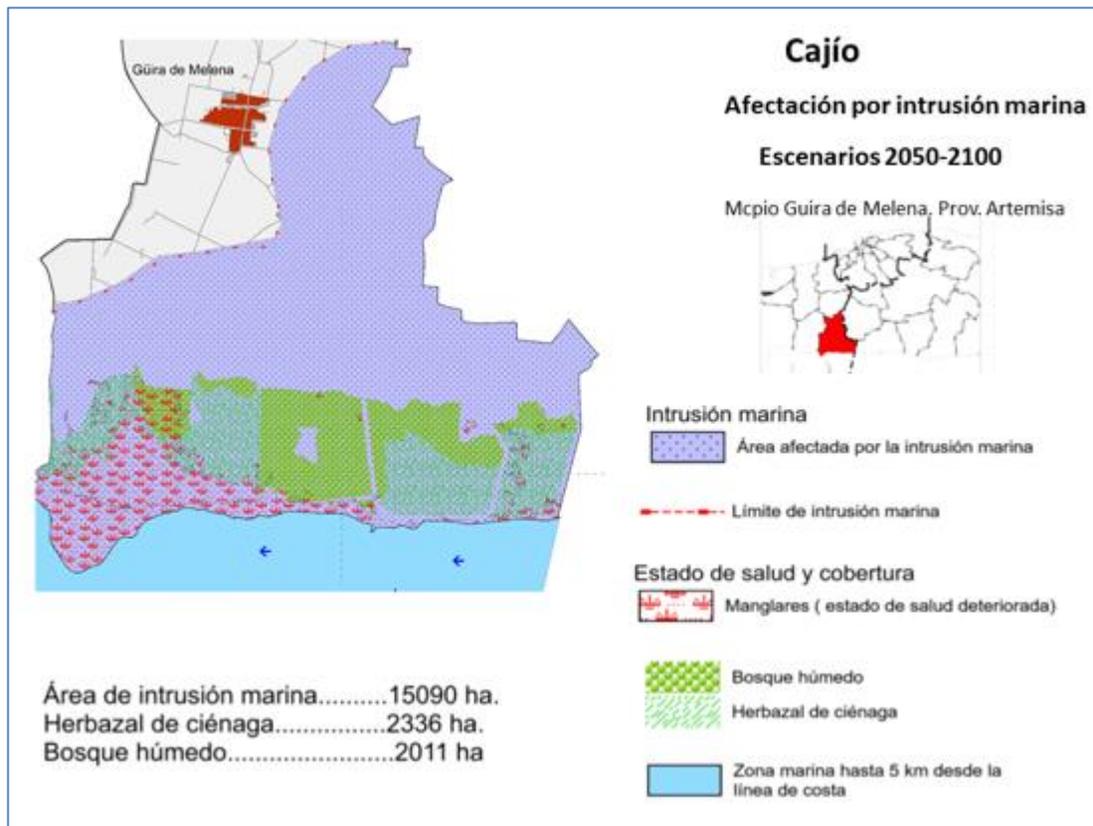


Figure 15. Wetland ecosystems on the Cajío coast and expected impact of saline intrusion for scenarios 2050 and 2100.

177. The issues described above makes this section an area highly sensitive and vulnerable to CC. The Adaptation Fund project "Manglar Vivo" has worked on the rehabilitation of mangroves and mangrove swamps in the western part of this area. It is proposed that the GCF project invest in the rehabilitation of the eastern zone by applying EBA measures in the mangroves and in the swamps and swamp grasslands. The GCF project will collect data and monitor the entire area to verify the progress of rehabilitation and its effects, taking advantage of the initiatives of the "Manglar Vivo" Project and combining them with its own experiences.

178. The proposed interventions in this sub-zone of El Cajío include a series of measures to be implemented by the government of Cuba, as co-finance in support and strengthening to the EBA measures and the use of its climate and planning tools to improve the resilience of the on-site costs financed with GCF project resources.

179. The activities proposed in the GCF project include the rehabilitation of freshwater flow in coastal ecosystems with seasonal oscillations, facilitating the restoration of the laminar flow of water in ecosystems. Once the hydrology has been restored, actions will be required to rehabilitate the structure of the ecosystems, support the natural zoning

of the mangrove on the coasts with clearings of black and white mangrove zones and favoring the establishment of red mangroves, mainly in areas with direct access to the waves. The elimination of exotic species both in the swamp grasslands and in the swamp forests will be some of the actions required for these sites. Below is a brief description of the proposed activities:

- Restore water flows to the coastal zone by means of drainage ditches, cleaning and maintenance of channels
- Rehabilitate and build speed bumps or steps through the South Dock in order to improve water flows to the coastal wetland
- Eliminate invasive alien species such as casuarina, almond, leucaena and marabou
- Rehabilitate strip of red mangrove and other species of the bog forest
- Actions of various government sectors (National Institute of Hydraulic Resources, Ministry of Agriculture and Ministry of Science, Technology and Environment) will focus on the rehabilitation of coastal hydrology, through the reordering and maintenance of existing ditches and canals, eliminating micro-dumps in the coastal zone (Government of the municipality, Aqueduct and Sewerage Base Business Unit and Municipal Administration Council).

Interventions in Surgidero de Batabanó subzone

180. **Surgidero de Batabanó (Batabanó municipality, Mayabeque province).** The municipality of Batabanó is located in the southern portion of the Mayabeque province. It limits the North with the municipality of San José de las Lajas; to the East with the municipality Melena del Sur; to the West with the municipalities Quivicán and Güira de Melena and to the South with the Gulf of Batabanó. Its extension is 185.5 km² and it has a population of 26 614 inhabitants per km². It is characterized by being a runoff zone since on average the municipality is located 2 meters above sea level, there being no fluvial currents, the coastline leads to a large number of ditches and channels, the most outstanding being the Refugio channel. The soils are fertile and of a high quality for sowing, the reddish ones (ferralitic) where iron predominates are more fertile for the cultivation of bananas, tomatoes, corn, sweet potatoes and other meats and vegetables. Brown or gray soils are found further south, they have a high content of decomposing organic matter which makes it more ideal for growing watercress and rice.

181. Surgidero of Batabanó is a very flat area, subject to heavy flooding and is mainly dominated by agricultural landscapes and livestock, as well as coastal wetlands. The remaining natural ecosystems located around the town and adjacent to the coast are mainly 164 hectares of mangroves and 291 hectares of swamp forest in very deteriorated condition (see Figure 16 below). Moreover, there is a protected area in this intervention site: “Refugio de Fauna – Golfo de Batabanó.”

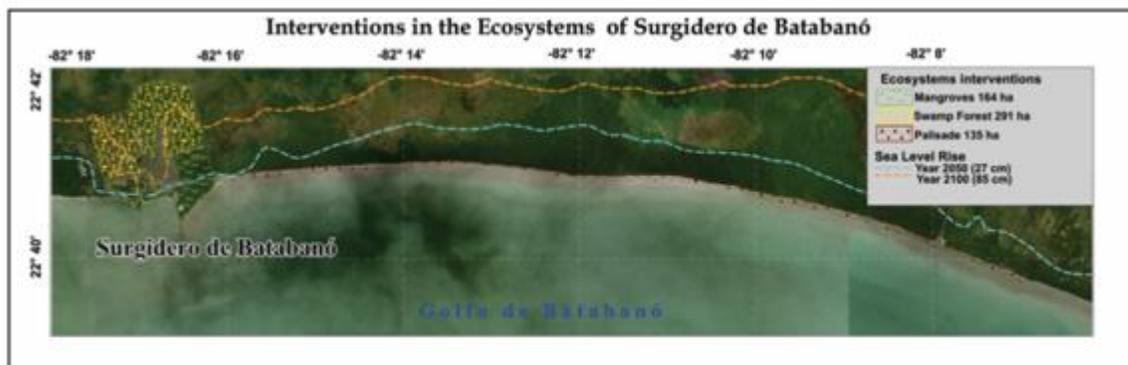


Figure 16. Batabanó intervention areas.

182. In Figure 16 in green is the area of mangrove rehabilitation and in yellows the swamp forest rehabilitation area. Note in this section of the coast there is no swamp grassland. In the right side of the image is the construction of a palisade to promote the development of the red mangrove rehabilitation.

183. The project will focus the EBA activities in the following actions:

- Restore water flows to the coastal zone (drainage ditches, channeling, cleaning and maintenance of channels)
- Eliminate pressures on the coastal zone (landfill disposal, invasive alien species, pollution)
- Rehabilitate strip of red mangrove and other species of the swamp forest.
- Construction of a fence “estaquillado” near the coast that contains the sediments and minimize their transfer due to the effect of waves and wind. This will facilitate the development and recovery of the red mangrove strip

184. The GoC (INRH, CITMA, MINAG) will focus on complementary activities as part of the co-finance like rehabilitation of water flows to the coastal area (drainage ditches, channeling, cleaning and maintenance of channels, build speed bumps on roads and access roads, ensuring the ecological flow of the dams located north of the site. As well as eliminate and/or reduce pressures on the coastal zone (clean 14 km of sewer ditches and solid waste eliminate landfills, clean and maintain channels and drainage ditches.

3.8.2 Intervention Sites (subzones) / Stretch II - Júcaro to Manzanillo (Southeastern coast)

Interventions in Júcaro subzone

185. **Júcaro (municipality Venezuela, Ciego de Ávila province):** The municipality of Venezuela limits the north with the head municipality of the province; to the east with the municipality of Baraguá; to the south with the Gulf of Ana María, within which is the Jardines de la Reina archipelago, which enters its domains from Cayo Bretón to five Balas, including Rabiahorcado, Arenas, Tío Joaquín, Caoba, Campo, Campito, Balandros, Guásima, Dos Hermanos, Flamenco, Flamenquito, Obispo, Obispito, Horoba, Jorobita, Encantado, Laguna and La Tea and to the west with the territories of Majagua and Sancti Spíritus. Soil types found are those from the Ferralitic and Hydromorphic groups, although there are small parts that correspond to the characteristics of the fersialitic and vertisolite. Ferrolytics are of the typical red and concretionary red type; the hydromorphic ones are located in the north, west and south, as well as in the east of the first ones, composed by the union of the gleyferrolytic, ferrolytic and typical red type. The local climatic conditions respond to the plains and elevations with relatively stable seasonal humidification, high evaporation and high temperatures, among which slight differences are observed between the inland and coastal plains in all indicators. The fauna in the municipality includes ants, arachnids, butterflies, mammals, reptiles, endemic birds, among which the snail hawk, Kestrel, Toco-ro-ro, the Bijirita and Flamingos. The original savanna vegetation of herbs, shrubs and trees are Algarrobo, Guasita, Ocuje, Palma real, Palma cana and Guanía predominated. Mangrove vegetation predominates on the coast: Black and red mangrove, yana and patabán. In the southern portion there is a coastal stretch that, between Punta de Carapacho and Ensenada Baja Grande that is characterized by being a biogenic mangrove coastline. To the west of Punta Carapacho and on the stretch to Palo Alto there is a cumulative abrasive coastline due to the sea having undermined the coast.

186. El Júcaro, is part of “La Trocha” and it is constituted by a geological mount formed by limestone rocks of the Miocene. The limestone rocks that form the subsoil are very similar to those of the Havana-Matanzas Plain and form large, very cracked and fractured banks. Despite the rapid absorption of water by the cracks of limestone rocks, which produces a very active underground drainage, in this area there are many more rivers than in the Havana-Matanzas karst plain.

187. This section is located in the buffer zone of the Cayo de Ana María Wildlife Refuge and the Jardines de la Reina National Park area, and as such has a high ecological value. It is the closest human settlement to these protected natural areas.

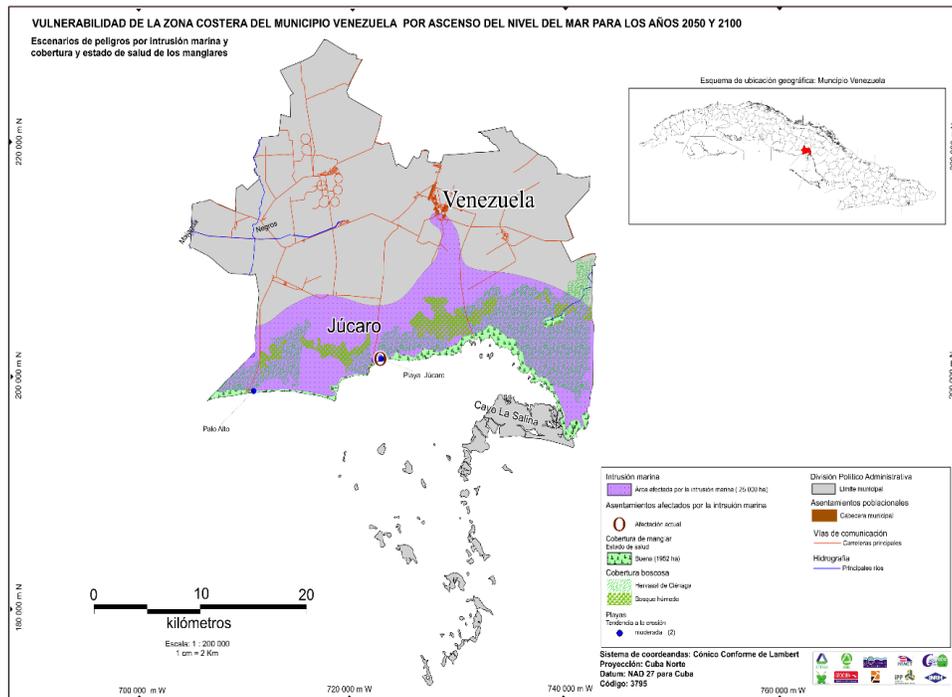


Figure 17. Vulnerability and general characteristics of the sub-sector Stretch II.

188. The intervention area in which Júcaro is located is an ecosystem dominated on the coastal edge by Mangroves with 673 hectares, followed by an 805 hectare herbaceous swamp, which is bordered by 835 hectares of swamp forests forming a functional ecosystem, the Júcaro is perched between the coast and these wetlands is highly sensitive to the direct and indirect impacts of CC (see Figure 17 and Figure 18).

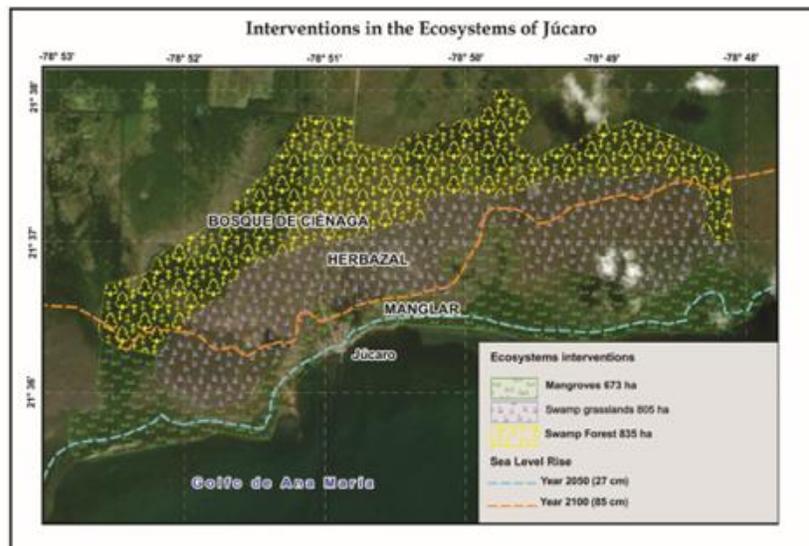


Figure 18. Rehabilitation areas of mangroves, herbaceous swamps and swamps forest in Júcaro

189. The settlement of Júcaro is located within the South Ciego de Ávila geological basin, which has a direct relationship with the sea, so the fresh-saltwater interface line moves in correspondence with the behavior of several factors among which are:

- High exploitation of wells along the areas near the coast that causes significant decreases in the levels of the aquifer and favors soil salinization.
- Clearing of a high percent of the mangrove that make up the wetlands in the coast lines, which causes the aquifers linked to them to be more vulnerable to the processes of saline intrusion.
- The coastal zone of Júcaro has been widely altered by different human interventions. The following images show how a road parallel to the coast has acted as a dam that impedes the natural flow of the waters (Figure 18 above) and how the shoreline has receded leaving only some isolated mangrove trees.
- Penetration of saline wedge flows inland, putting the health of the population at risk and the possibilities for agribusiness and aquaculture activities in the area.
- The community was built in what was once a mangrove area, without any protection from the sea, producing a high risk of surges, hurricanes and storms, as well as the impact of marine invasion, saline intrusion and flooding.

190. The land area has characteristic ecosystems surrounding the communities, that include 673 hectares of mangroves, 805 hectares of swamp grasslands and 835 hectares of swamp forests.



Figure 19. Road and infrastructure in front to the sea, built on areas of mangrove in serious danger



Figure 20. Loss of mangroves in Júcaro coast and isolated samples of black mangrove *Avicennia* sp.

191. The rehabilitation proposal presented below includes a group of actions, which will be undertaken by the government, aimed at improving the water supply to the coastal zone and recharging the aquifers to prevent saline intrusion. The Hydraulic Utilization Company of Ciego de Ávila, for example, manages a total of 90 systematic observation wells, of which 15 are measured monthly and constitute the information network that is used for the hydrological bulletin of the province. All this information will be used as a baseline to evaluate the impacts of the actions of rehabilitation and planting of mangroves.

192. In the area of Susana-Júcaro-Venezuela there are a total of 26 wells, which recharge part of the surface runoff that is caused in the area during the wet periods and a volume that will be allocated annually for the balance of the Zaza-Ciego canal, all this will contribute to elevate the loads of fresh water to the groundwater level in the territory and therefore avoid the phenomenon of saline intrusion.

193. The main interventions in the area of the Júcaro Village are based on the rehabilitation of the wetlands, recovery of mangroves profiles in the coast, rehabilitation of grassland swamps and rehabilitation of swamp forest, around the main population and the monitoring of the salt intrusion.

- Main area of the intervention: 673 Ha of mangrove (Figure 20 above).
- 805 hectares of Swamp grasslands rehabilitated.
- 835 hectares of swamp Forests rehabilitated
- Monitoring of saline intrusion and testing of wells established by the government.

194. Project interventions will focus on the following activities.

- Restore water flows to the coastal area by eliminating the section of road that runs parallel to the coast
- Rehabilitate 673 Ha of mangrove forests
- Monitor water quality in 29 bathometric wells
- Evaluate the effectiveness of aquifer recharge using 4 limnigraphs

- Monitor the impacts of interventions on water quality, the health of coastal wetlands, seagrasses and coral reefs.
- Eliminate pressures on the coastal zone (elimination of landfills, invasive alien species, pollution)

195. Complementary actions to be financed by the government of Cuba will contribute to the effectiveness of the EBA investments implemented with the GCF resources. These include the following actions:

- Reactivation of the system of natural drainages, for its sanitation, with actions of structural and functional maintenance such as cleaning of sediments and other obstructive materials, with the participation of community actors, the Júcaro Popular Council, the Agroforestry Unit of Venezuela and Unit del National Institute of Hydraulic Resources.
- Eliminate pressures on the coastal zone (elimination of landfills, invasive alien species, and pollution.)

Interventions in La Florida subzone

196. **Playa Florida (Florida municipality, Camagüey province).** The Florida municipality limits to the north with the Carlos Manuel de Céspedes and Esmeralda municipalities, to the south with Vertientes, to the east with the Camagüey municipality and to the west, with the Baraguá municipality of the Ciego de Ávila province and the Caribbean Sea. The center-west of the province, it is characterized by being a flat area, bathed by the waters of the Caonao River, with a medium elevation,. The climate does not differ from the rest of the province, with a wet period and a dry period, with an average rainfall of 35 mm per month, a wet or rainy period (accumulates 95% of annual rainfall) which corresponds from May to October and another period of little rain, known as the dry period or simply dry (accumulates a monthly average of 39.5 mm of rainfall). The municipality has been hit often by cyclones and hurricanes.

197. An example of changes to the ecosystem this area can be seen in the marsh vegetation near the access road in 1956, which was transformed into a lagoon. These changes reflect the increase in sea level due to the process of sinking of the platform and the increase in sea level itself, due to climate change as well as the actions of a man-made aspects that have influenced on the transformation of not only the coastline, but in the structure of the mangrove. Mangrove in this área constitute the most important vegetation type. The main trend observed in the dynamics of the vegetation in the last 54 years is the increase in mangrove area, which also includes mangrove, lagoons and herbaceous vegetation below the tide line. This increase is explained by the fact that the displacement of this type of vegetation to the land phase was greater than the decline recorded in the shoreline.

198. Situated in the southeast of the municipality, Playa Florida, sits in an area of sandy land that suffers the effects of the continuous retreat of the coastline, with the collapse of the marine platform, which gradually reduces the area available for the development of economic and daily life activities.

199. Science and Environment specialists from the province have stated that among the causes of the death of a large part of the Florida beach mangrove and other effects on the biomass of the area, is the embankment of entrance to the community, created in the 1940s, which divided the lake and cut off the required flow of water, essential for the life of the flora and fauna species.

200. Along with this, contamination by insecticides and fertilizers from rice production and fishing with non-compatible gear are other causes of environmental degradation and the disappearance of various marine species from the coastal platform of Playa Florida, therefore province leaders have stated the importance of increasing t that actions aimed at environmental education for the population, an activity that will be considered through the project.

201. The main interventions in the area of the Playa Florida village are based on the rehabilitation of the wetlands; recovery of mangroves profiles in the coast, rehabilitation of grassland swamps and rehabilitation of swamp forest, around the main population and the monitoring of the salt intrusion. Moreover, there is a protected area in this intervention zone: “Refugio de Fauna Macurije – Santa María.”

- Main area of the intervention: 1,760 Ha of mangrove (Figure 20 below).
- 316 Ha of swamp Forests.

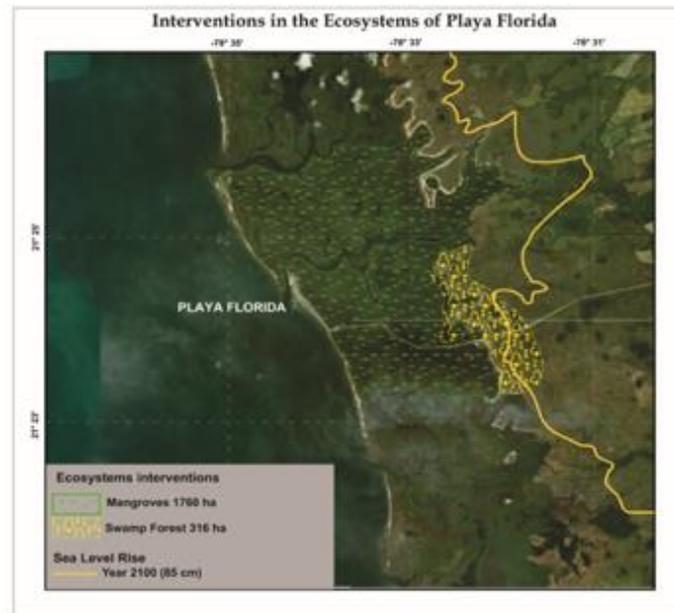


Figure 21. Rehabilitation areas of mangroves, herbaceous swamps and swamps forest in Playa Florida

Interventions in Santa Cruz del Sur subzone

202. **Santa Cruz del Sur (Santa Cruz municipality, Camagüey province)**. The Municipality of Santa Cruz del Sur is geographically located on the South Coast of the province of Camagüey and comprises a total area, including the Keys, of 1234.0 Km (Cayos 111.3 Km) which represents 7.9% of the surface of the province, being the fifth municipality in terms of size. It limits to the North with the Najasa Municipality, to the East with the Amancio Rodríguez Municipality, to the South with the Caribbean Sea and to the West with the Vertientes Municipality. Its coastline reaches a total of 49.3 linear km, of which two are beach. It has a surface area of 94.3 km with water. Its road infrastructure consists of 100 km of road and 93.3 of roads. The predominant natural characteristics are those typical of the southern coastal areas of Camagüey, arranged in the form of strips parallel to the coastline. The vegetation of the area is essentially composed of sandy sheets and bushes of different varieties. The soils are clayey, plastic with coastal deposits, mixed with deltaic and swampy alluvial sediments from the Najasa River sub-basin, the prevailing temperature is high as is the relative humidity, which oscillates between 27 and 28 degrees centigrade, its climate is that of tropical zones, with two well-defined seasons, summer and winter.

203. Santa Cruz del Sur is also defined by its coastal plains. Several of them are semi-submerged in the southern part. The low and muddy plains are conditioned by a flood regime that extends in times of rain. The swamp-like coast of this part of Cuba sometimes exhibits deep estuaries, almost all of them in the southeast, on the border with the town of Vertientes, where the Remedio or Negro river flows into an Agua Dulce estuary. Not far from there is also the mouth of the Najasa River and different streams that pour their flows into the Ensenada de Manopla. The Santa Cruz del Sur region is a refuge for seabirds such as the flamingo, the coconut, the wood pigeon, the seagull, the heron, the gannet and the corúa, among others.

204. The main interventions in the area of Santa Cruz Village (Figure 22) are based on the rehabilitation of the wetlands; recovery of mangroves profiles in the coast and rehabilitation of swamp forest, around the main population and the monitoring of the salt intrusion.

205. Main areas of the intervention include 4,125 Ha of mangrove and 626 Ha of swamp Forests (Figure 22 below).



Figure 22. Rehabilitation of mangroves and swamps forest in Santa Cruz del Sur.

Interventions in Manzanillo subzone

206. **Manzanillo (Manzanillo municipality, Granma province).** The City of Manzanillo, is one of the thirteen municipalities that make up the eastern and current province of Granma, this being the largest and most important from the economic-geographical point of view. It is located in the Southwest of the province, limiting to the Northwest with the Gulf of Guacanayabo, to the South with the municipality of Bartolomé Masó, to the East and North with the municipality of Yara and to the West with the municipality of Campechuela and the Gulf of Guacanayabo. It has a territorial extension of 498.4 km². Soil agroproductivity is variable (productive, moderately productive and not very productive soils). Soils are affected by limiting factors such as: as concretion, hydromorphy, negative physical and / or chemical properties, soil depth and rockiness. The municipal fauna is mostly Anthropogenic, due to the destruction of the habitats of the original fauna and the occupation of most of the new ecological spaces modified or arisen during human activity by tolerant and adaptable animals. The current predominant vegetation is cultural: agricultural crops, pastures and secondary vegetation. Of the natural vegetation, virtually only the evergreen mangrove forests remain, with a certain degree of deterioration, at the mouths of the Guá, Yara and Hicotea rivers. The mangroves constitute the area of greatest conservation interest in this region.

207. The main interventions in the area of Manzanillo Village are based on the rehabilitation of mangroves profiles in the coast, around the main population and the monitoring of the salt intrusion. The main area of intervention has mangrove 3,582 ha. shown in Figure 23 below. There are 2 protected areas in this intervention zone: “Refugio de Fauna Delta del Cauto” and “Refugio de Fauna Ensenada del Gua y Cayos de Manzanillo.”



Figure 23. Rehabilitation areas of mangroves in Manzanillo area.

3.8.3. Overview on Protected Area by intervention sites in both Stretches

208. There are 7 protected areas located within the project intervention stretches (see table below). The project will carry out interventions in these areas, which correspond to what is defined in the Management Plans for these Protected Areas as “objetos de conservación” (conservation objects). These 7 Protected Areas are present in 5 of the 7 project intervention sites. This information can be found in the table below, as well as in section 5. The "Environmental and Social Risk Assessment" delves into the risks generated by the activities to be carried out within the Protected Areas and their management measures.



Figure 24. Map of Protected Areas present in the Project Intervention Stretches

209. Interventions related with 3 of the four activities envisaged through Output 1 will be developed in the Protected Areas: Activity 1.1. Assess and restore coastal wetland functions in target sites by re-establishing hydrological processes; Activity 1.2. Mangrove and swamp forest rehabilitation in target sites through natural and assisted regeneration for enhanced coastal protection and Activity 1.3. Record and assess coastal and marine ecosystems' natural regeneration and their protective functions based on conditions provided as a result of restored coastal wetlands.

SUMMARY OF ACTIVITIES BY PROTECTED AREAS / PROJECT INTERVENTION SITES					
Stretch	Protected Area	Intervention site	Activities		
			1.1.	1.2.	1.3.
Stretch I	Parque Nacional Cayos de San Felipe	La Coloma	-	-	X
	Refugio de Fauna - Golfo de Batabanó	Surgidero de Batabanó	X	X	X
Stretch II	Parque Nacional Jardines de la Reina	Júcaro	-	-	X
	Refugio de Fauna Cayos de Ana María		X	X	X
	Refugio de Fauna Delta del Cauto	Manzanillo	X	X	X
	Refugio de Fauna Ensenada del Gua y Cayos de Manzanillo		X	X	X
	Refugio de Fauna Macurije - Santa María	Playa Florida	X	X	X

Table 3. Summary on activities by Protected and intervention sites of the project

4 SOCIO-ECONOMIC BASELINE CONDITIONS

4.1 POPULATION

210. The population of Cuba is 11,238,317 people of which 42% live in coastal municipalities. This spans 38 municipalities on the Southern coast and 43 municipalities on the Northern coast, for a total of 262 coastal communities.

211. By provinces, Havana has the highest population density in the country with 292.4 inhabitants per square kilometer and concentrates 19% of the total Cuban population, while Mayabeque is the least populated with 376,825. Other provinces with one and a half million inhabitants are Santiago de Cuba and Holguín with 1,049,048 and 1,035,072 respectively.²⁶

212. In the most recent survey, the number of Cuban women surpassed the number of men, corresponding to 50.2%, and 49.8% of the population respectively. For further information on the socio-economic situation of women and gender equality in the country, refer to Annex 8, the Gender Assessment and Action Plan.

213. Cuba’s demographic trends, as of 2017, can be characterized by a high degree of aging, related to a high life expectancy, and a low childbirth rate and a high rate of migration²⁷. This has yielded a negative population growth rate of -1.6% compared to 2016. The aging population and the low birth rate, which has not been able to reach replacement levels, are, according to experts, the major demographic challenges of the island, where 20.1% of the population is or exceeds 60 years of age.

214. Urbanization is an ongoing trend in Cuba. In 2012, the urban population accounted for 76.8% of the total population, slightly higher than the 2002 census. Today, the coastal capital city of Havana is home to 2 million people and this province has the highest rate of urban population, with 100% of provincial residents living in the city. On the other hand, the province of Granma has the lowest urban population rates, with 61.3%. Municipalities with a degree of urbanization above 90% are in descending order are: Guantánamo, 95.9%; Camagüey, 94.0%; Cienfuegos, 93.9%; Morón, 93.4%; Matanzas, 92.6%; Cárdenas, 92%; Calimete, 91.45% and Santa Clara, 91.2%, five of them in turn are seats of provincial capitals. Four municipalities in the province of Guantánamo have the lowest values of the degree of urbanization of the country, less than 19%, these are: Maisí, Yateras, Niceto Pérez and San Antonio del Sur.

215. There are also territorial disparities according to population density, i.e. the number of inhabitants per square kilometer of surface area. This indicator at the national level was 101.6 inhabitants per square kilometer, at the provincial and municipal levels, the values of greater and lesser density respectively are presented by Havana with 2,892.0 and Camagüey with 50.2 inhabitants per km², in the provinces and Center Havana with 41,004.1 and Ciénaga de Zapata with 2.2 hab/km², in the municipalities.

216. The total population of the 24 municipalities belonging to the 2 stretches, where project interventions will take place is summarized in the table below. As can be seen below in both stretches the majority of the population is considered urban with an estimated 70% urban 30% divide.

Stretch	Province	Municipality	Population		Total Population
			Urban	Rural	

²⁶ ONEI. (2014)

²⁷ ONEI, 2016

1	Pinar del Río	San Juan y Martínez	16 715	26 359	43 074
		San Luís	9 638	22 103	31 741
		Pinar del Río	158 105	34 671	192 776
		Consolación del Sur	59 045	29 370	88 415
		Los Palacios	28 672	9 679	38 351
	Artemisa	San Cristóbal	49 234	22 492	71 726
		Candelaria	13 426	7 775	21 201
		Artemisa	60 489	25 672	86 161
		Alquízar	15 539	17 928	33 467
		Güira de Melena	28 575	11 567	40 142
	Mayabeque	Batabanó	21 770	5 661	27 431
		Melena del Sur	13 685	6 760	20 445
		Güines	52 054	13 977	66 031
	Total Stretch 1			526 947	234 014
2	Ciego de Ávila	Venezuela *	16 846	9 327	26 173
		Baraguá	18 252	13 933	32 185
	Camagüey	Florida	57 615	12 765	70 380
		Vertientes	32 503	17 498	50 001
		Santa Cruz del Sur	23 544	18 313	41 857
	Las Tunas	Amancio	27 540	9 768	37 308
		Colombia	23 005	8 994	31 999
		Jobabo	20 771	21 237	42 008
	Granma	Río Cauto	29 384	16 994	46 378
		Yara	28 124	27 056	55 180
		Manzanillo	103 562	23 605	127 167
Total Stretch 2			381 146	179 490	560 636

Table 4. Population and estimated number of beneficiaries in the Stretches where interventions will take place. (ONEI, 2018)

217. Main economic activities per population in target areas can be seen in the below table .

PROVINCES	MUNICIPALITY	With occupation	
		TOTAL	Principle three activities (in order of importance)

Coastal Stretch I			
PINAR DEL RIO	San Juan y Martínez	18 285	Agriculture* Education Hospitality
	San Luis	14 412	Agriculture Education Hospitality
	Pinar del Río	88 904	Agriculture Fishing Hospitality
	Consolación del Sur	29 127	Agriculture Education Health and social assistance
	Los Palacios	15 567	Agriculture Education Health and social assistance
ARTEMISA	San Cristóbal	N/A	N/A
	Candelaria	N/A	N/A
	Artemisa	N/A	N/A
	Alquizar	N/A	N/A
	Guira de Melena	N/A	N/A
MAYABEQUE	Batabanó	3 311	Education Fishing Health
	Melena del Sur	2 795	Education Agriculture Health
	Guines	13 330	Administration Agriculture Sugar industry
Coastal Stretch II			
CIEGO DE AVILA	Venezuela	4 311	Agriculture Education Health and public assistance
	Baragua	5 200	Agriculture Education Health and public assistance
CAMAGUEY	Florida	N/A	N/A
	Vertientes	19 006	Agriculture Other activities Educación

	Santa Cruz del Sur	19 202	Agriculture Education Health
LAS TUNAS	Amancio	N/A	N/A
	Colombia	5 909	Education Health Manufacturing
	Jobabo	N/A	N/A
GRANMA	Río Cauto	N/A	N/A
	Yara	1 164	Agriculture Commerce Communal services
	Manzanillo	N/A	N/A

Source ONEI 2018

4.1.1 Populations with highest climate change vulnerabilities

218. Of the 262 coastal communities, CITMA has estimated that at least 122 of them will suffer the direct or indirect impacts of climate change due the sea level rise (Table 5).

BALANCE DE ASENTAMIENTOS HUMANOS COSTEROS AFECTADOS POR EL ASCENSO DEL NMM				
Resumen	Región Occidental	Región Central	Región Oriental	Total
Total de asentamientos costeros identificados inicialmente	43	30	49	122
Asentamientos costeros afectables parcialmente a 0,27 m	29	22	27	78
Asentamientos costeros afectables totalmente a 0,27 m	7	7	1	15
Asentamientos costeros afectables parcialmente a 0,85 m	34	19	48	101
Asentamientos costeros afectables totalmente a 0,85 m	2	4	0	6
Resultados de la actualización 2014				
Asentamientos costeros afectables parcialmente a 0,27 m	30	19	49	98
Asentamientos costeros afectables totalmente a 0,27 m	7	6	0	13
Asentamientos costeros afectables parcialmente a 0,85 m	30	19	50	99
Asentamientos costeros afectables totalmente a 0,85 m	2	4	0	6
Resultados de la actualización 2014				
Total de asentamientos costeros identificados inicialmente	43	30	49	122
Asentamientos con afectación parcial descortados a partir del estudio actual 2014	1	2	2	5
Asentamientos adicionales a partir del estudio actual 2014	0	0	1	1
TOTALES	42	28	48	118

Table 5. Communities projected to be adversely affected by climate change

219. The provinces of Artemisa, Mayabeque, Pinar del Río and Matanzas are expected to have the highest number of communities that will be affected by saline intrusion, coastal erosion, and other climate related impacts. Moreover, CC is likely to damage the infrastructure as well as the agricultural activities that take place in this region – highlighting important food security risks.

220. On the other hand, the provinces of Holguín, Granma, Santiago de Cuba and, to a lesser extent, Guantánamo are expected to also be affected, although to a lesser extent²⁸. The total population that is projected to be affected by climate change is found in Table 6.

Tabla 9.8 Estimados de población en asentamientos costeros afectables por los escenarios de cambio climático

Fecha	Población Escenario Tendencial			Población Escenario Optimista		
	Asent. Afectación total	Asent. afectación parcial	Total	Asent. afectación total	Asent. afectación parcial	Total
2050	6 306	21 509	27 815	6 370	21 858	28 228
2100	2 088	354 652	356 740	2 221	418 888	421 109
Totales	8 394	376 061	384 455	8 591	440 746	449 337

Fuente: Proyecto 11 – 2010

Table 6. Population estimated to be adversely affected by climate change

4.2 LAND USE AND LAND TENURE

221. As a small island state that generally meets its food needs through national production, over half of the land area is dedicated to agricultural land uses (6,226.7 ha). Available arable land is usually given through usufruct systems. In 2016, the tenure situation of cultivated land in Cuba was: 2,099.2 ha being state-owned, and 4,127.5 being non-state-owned²⁹. Coastal mangroves are considered protected forest vegetation, and so are not legally attributed to agricultural land uses.

222. The distribution of land for agricultural use according to productive destination, is as follows in the municipalities where the 7 project intervention sites are located: (ONEI, 2019).

- Pinar del Río. Total agricultural area 73,1 thousand Ha, 39,8 thousand (54%) Ha for forest use.
- Batabanó. Total agricultural area 25,2 thousand Ha, 6,1 thousand (24%) mil Ha for forest use.
- Güira de Melena. Total agricultural area 25,2 thousand Ha, 6,1 thousand (24%) Ha for forest use.
- Venezuela. Total agricultural area 82,0 thousand Ha, 3,0 thousand (0,3%) Ha for forest use.
- Manzanillo. Total agricultural area 49,9 thousand Ha, 8,8 thousand (17%) Ha for forest use.
- Florida. Total agricultural area 174,4 thousand Ha, 21,2 thousand (8,2%) Ha for forest use.
- Santa Cruz del Sur. Total agricultural area 123,8 thousand Ha, 25,0 thousand (20%) Ha for forest use.

223. The activities related to the Project intervention will be carried out in forest areas which are administered by the provinces' Agroforestry Companies and are under a socialist state property regime. The presence of informal occupants or invasions of the public space where the wetland and mangrove areas are located was not identified during the consultations carried out as part of the formulation of the project.

²⁸ Iturralde and Serrano (2015)

²⁹ ONEI. Panorama land use. Cuba 2016.

4.3 EMPLOYMENT, LABOUR AND WORKING CONDITIONS

224. Since 1959, the Cuban State has maintained an employment policy that guarantees each citizen a decent job, based on the principles of full employment and equal access. In the 1990s, economic transformations introduced foreign capital and self-employment modalities to the country, creating new jobs in the Cuban context that continue to coexist alongside state employment. In section 2.1.8. of the ESAR, extensive information on regulations that protect workers in their work environment was included.

225. As such, Cuba has a very high employment rate, with 98% of the economically active population being employed according to the 2012 national survey. Women account for 37% of the employed. Among this active population, 71% are employed in the state sector while 29% are working in the non-state sector, which include small independent businesses and cooperatives.

226. State-sector jobs are mostly concentrated in the agriculture, livestock and forestry sectors, together representing 17.8% of the economically active population. This is followed by education (11%) and public health and social assistance (10.7%), with women predominating in these latter two sectors (see gender assessment Annex 8).

227. In the provinces where the project intervention sites are located, employment in fishing and forestry activities are as follows: (ONEI, 2018).

Province	Total employed	Total Agriculture, livestock, hunting and forestry	Total fishing	Percentage
Pinar del Río province (La Coloma)	238 878	77 185	13 746	38%
Mayabeque province (Surgidero de Batabanó)	72 987	9 984	1 287	15%
Artemisa province (Playa Cajío)	12 672	888	-	7%
Ciego de Ávila (Júcaro)	99 931	16 608	975	17%
Granma (Manzanillo)	310 400	73 900	2 400	24%
Camaguey (Florida and Santa Cruz del Sur)	309 756	21 683	9 912	10%

Table 7. Employed by type of economic activity (Agriculture, livestock, hunting and forestry; Fishing)

4.4 HEALTH

228. Public health is highly prioritized by the State, and population indicators are comparable to those of countries with a high level of economic and social development. Cuba's National Public Health System (SNSP) is based on the principles of universality, accessibility, and equity. It is free of charge to the entire Cuban Population and prioritizes both health research and health care. It is based on three levels: primary (polyclinics and medical offices), secondary

(General Hospitals) and tertiary (Specialized Institutes), employing 492,366 workers, of whom 71.0% are women. There is a high number of doctors who serve the community, and there are 150 hospitals, 450 polyclinics, 131 maternity homes, 12 research institutes and comprehensive rehabilitation services at all levels of care.³⁰ 100% of the country's communities have family doctor coverage³¹, which facilitates access to health services. The Maternal and Child Health Programme, the Comprehensive Care for the Elderly and the Immunization Programme are prioritized in the country.

229. There is a birth rate of 10.2 live births per 1,000 inhabitants, a general fertility rate of 43.0 live births per 1,000 women aged 15 to 49, and low fertility levels of 1.61 children per 1,000 women. As such, population replacement is not guaranteed. The overall mortality rate is 9.5 deaths per 1,000 inhabitants and chronic non-communicable diseases, primarily heart diseases, are the leading cause of death³². The immunization program protects against 13 diseases, with 100% vaccination coverage, in all population groups³³.

230. Life expectancy is over 78 years, corresponding to 76.5 years for men and 80.4 years for women. The Infant Mortality Rate continues to be below five deaths a year for children under one year of age, per 1,000 live births. In 2017 this rate reached its lowest in history. Although the statistics available in Cuba today do not address these indicators at the municipal level, data is presented in each case at the provincial level, for those provinces where municipalities are included in the project's intervention stretches (Table 8).

PROVINCES	MUNICIPALITIES	CHILD MORTALITY RATE x 1000 LIVE BORN (UNDER 1 YEARS OLD)	CHILD MORTALITY RATE PER 1000 LIVE BORN (UNDER 5 YEARS OLD)
	Coastal Stretch I		
PINAR DEL RIO	San Juan y Martínez	4.6	7
	San Luis		
	Pinar del Río		
	Consolación del Sur		
	Los Palacios		
ARTEMISA	San Cristóbal	5.7	7.5
	Candelaria		
	Artemisa		
	Alquizar		
	Guira de Melena		
MAYABEQUE	Batabanó	5.5	7.3
	Melena del Sur		
	Guines		
	Coastal Stretch II		
CIEGO DE AVILA	Venezuela	6.1	7,3
	Baragua		
CAMAGUEY	Florida	3.9	6,2
	Vertientes		
	Santa Cruz del Sur		

³⁰ Anuario Estadístico de Salud, 2017; pág. 11 y 12. Versión Digital.

³¹ Anuario Estadístico de Salud, 2019, pg. 122. Versión Digital.

³² Anuario Estadístico de Salud, 2017; pg. 9. Versión Digital.

³³ Oficina Nacional de Estadística e Información, 2018.

LAS TUNAS	Amancio	4,7	6,1
	Colombia		
	Jobabo		
GRANMA	Río Cauto	4,4	5,2
	Yara		
	Manzanillo		

Table 8. Child Infant Mortality in the provinces where project interventions will take place (ONEI 2018)

231. In the case of life expectancy - according to the data published by ONEI in the document "LA ESPERANZA DE VIDA. 2011-2013 Calculos para Cuba y Provincias por sexo y edades", - one can find that, of the 7 intervention provinces, 3 are below the national indicator (78.4): Artemisa (77.94), Mayabeque (78) and Camaguey (78.3). If this indicator is analyzed by sex, in the case of men Artemisa (76.15) and Mayabeque (76.3) would be lower; Regarding women, the provinces Artemisa (79.96), Mayabeque (79.89), Ciego de Ávila (80.09) and Camaguey (79.95) reflect an indicator slightly lower than the national one (80.4). Regarding infant mortality, according to the 2019 Cuban Statistical Yearbook (ONEI) in its section "Public Health and Social Assistance", the rate per 1000 live births (under 1 year old) in the country is 5. The following provinces are above this rate: Artemisa (5.7), Mayabeque (5.5) and Ciego de Ávila (6.1).

232. Considering the tropical weather and risk of waterborne diseases, the Ministry of Health has in place specific programs for the prevention of diseases caused by water pollution, these include the Subprogram for Sanitary Control of Water, which defines joint actions between the National Institute of Hydraulic Resources (INRH) and the Ministry of Public Health and the Program for the Surveillance and Control of Wastewater.

233. Among the health indicators monitored at the national level that are relevant for this analysis is "Medical care for diarrheal diseases and acute respiratory infections." In 2019, 164,478³⁴ cases of acute diarrheal diseases were reported throughout the country, for a rate of 14.7 at the national level. This data (2019) is specified below at the municipality level³⁵, where risk of impacts to water quality due to the project's interventions are identified:

- Pinar del Río: Not reported.
- Batabanó: 641 cases,
- Güira de Melena: 492 cases,
- Venezuela: 149 cases,
- Manzanillo: 1394 cases,
- Florida: 1 154 cases, and
- Santa Cruz del Sur: 832 cases.

234. Prevention and public awareness to deal with these diseases is developed in the country through an intersectoral work system for health promotion and disease prevention. This system is designed with a national scope and has expression in the different territorial levels (provincial, municipal and community). The Councils of the Provincial and Municipal Administration participate, together with institutions belonging to Education, Culture, Tourism, Science Technology and Environment, Higher Education, Sports, Physical Education and Recreation.

235. In relation to the consumption of quality water and the prevention of water-borne diseases, the "family doctors" play a fundamental role, developing guidance and education work, which emphasizes hygiene for health and the need

³⁴ Anuario Estadístico de Salud, 2019, pg. 92. Versión Digital.

³⁵ The indicator "Incidencia por enfermedades de declaración obligatoria" was consulted in the Statistic yearbook for each municipality.

to boil the water that is consumed. Likewise, schools at all levels incorporate educational actions in their different teaching programs, providing students with knowledge about this resource, its importance and the need for proper management and consumption of it. Public service messages are also widely disseminated across media channels to ensure that communities are aware on how to reduce exposure and risk to waterborne diseases. In the event of extreme meteorological phenomena, which increases the risk of increased water-borne diseases, greater emphasis is placed on information on these measures.

236. Water quality is monitored through the Network of water quality monitoring stations (RedCal) and the Hydrogeological Network, coordinated by the INRH, which allows knowing the status of the underground basins and the water quality through a system of observation and control wells, which provides information on the physical-chemical, bacteriological and residual parameters necessary for the protection of groundwater and surface waters. This monitoring process is applicable to the project's intervention sites which is expected to be enhanced by the project.

237. In order to protect the water quality of the underground and surface basins, the INRH monitoring, control and surveillance system includes the mandatory implementation of protocols for the determination of physical-chemical, bacteriological and residual parameters, collected in the Cuban Standard for Water Quality. The implementation of these protocols guarantees the protection of the communities' health and allows to identify polluting sources that may be affecting the aquifers, reservoirs or surface currents for their control or elimination in a short period of time.

238. To this end, the INRH has laboratories in each province where bacteriological analyzes of the water are carried out, which makes it possible to detect the possible presence of pathogenic microorganisms that cause gastrointestinal diseases. When concentrations of pathogenic organisms higher than the permissible limit established by the quality standard are detected, the alert protocols established by the INRH are activated to inform the Public Health institutions at the community, municipal and provincial levels to evaluate the epidemiological situation in each of these levels and take appropriate action. Among these measures are epidemiological surveillance protocols and reports to key stakeholders on the epidemiological situation; as well as community protection measures that include boiling drinking water.

4.5 ECONOMIC ASPECTS AND LIVELIHOODS

239. The coastal zone of the Cuban Archipelago is key to the economic development of the country. Coastal communities have deep-rooted links to the marine environment, where maritime-ports, fishing, agricultural, aquaculture, tourism and food processing industries are strong. More recently, wind energy projects are being developed. With recent economic transformations in the country, non-state forms of management of services, industrial and agricultural production, and transport linked to non-state sector economic activities have been on the rise (i.e., cooperatives and self-employment). Further detail on the intervention sites are found in the sections below.

240. The local inhabitants recognize the value of the services provided by marine-coastal ecosystems (scientific and educational, coastal protection, erosion control, spiritual, cultural and recreational value, medicinal value, and biodiversity conservation and habitat, among others). In general, they recognize that interventions that improve ecosystem health represent a benefit for them, for example: by increasing the "presence of fish" and "higher quality of honey."

241. **Forest resources:** In addition to silvicultural activities (conservation and use) that are developed as part of the Agroforestry Companies' activities, local communities take advantage of forest species (invasive alien species) to produce charcoal for industrial and domestic use. It is generally an activity carried out by men, as it demands a lot of strength and intense work hours to keep the ovens on and working, using almost rustic methods. In this coal cycle, women basically work in the coal packaging or in the management, control and direction of the production and marketing processes. In addition, some settlers, mainly women, peel the mangrove in a controlled and non-massive way to build simple / rudimentary tools for artisanal fishing and to extract tannin, a dye that is found in the red mangrove's bark and is used for medicine and in the leather industry. The communities extract honey as a highly

valued non-wood product from mangroves. The activity of extraction of honey and care of the beehives are mainly carried out by women.

242. In Cuba, national law and regulations as detailed above prohibits the mangrove's felling, given its status as a Protective Coast Forest (Forestry Law # 85 of 1998), so that the wood used for charcoal production does not come from mangroves. Wood from invasive exotic species such as casuarina and almond is used, which are common in the project intervention areas. The control of compliance with these regulations is exercised by the Ranger Corps that provides the surveillance service (it is the competent authority to apply administrative measures in case of infractions). In addition, it organizes and directs the forest fire protection system. The State Forest Service also plays a role in compliance with forest regulations in relation to the control of the dynamics of the forest heritage, the approval of forest management projects and technical projects, and the granting of guidelines and authorizations.

243. **Fishing resources:** Fishing is the main activity done by these communities, both for commercial and for self-consumption, which constitutes the main economic activity in La Coloma and Júcaro. In these sites, men work mainly catching the fish and the women in the processing, cleaning, weighing and packaging the fish. This activity is developed by fishing companies in an artisanal way. In the case of the Batabanó community, women participate in cleaning and packing sponges. Oyster farms and capping houses are also work options in these communities based on benefits and opportunities for women.

244. Coral reef ecosystems have use value for subsistence fishing, sport fishing, tourism and recreation. It has been identified that women make use of the benefits of these ecosystems less than men, especially in subsistence and sport fishing. Some components of these coral ecosystems are used at the community level as natural medicine or for ornamental purposes, mainly by women.

245. No economic displacement, either temporary or permanent, is expected during the implementation of the project as interventions will be developed in government owned land and in some cases naturally protected areas. The permanent access limitations that apply to the project intervention areas, are those that are regulated in national legislation. They are considered public spaces, some of them Protected Areas, in which the inhabitants do not live permanently but they have access to providing themselves to natural resources that they commonly use (honey, fruits, etc.). The "temporality"³⁶ of the access limitation to a specific area where local inhabitants usually have access to natural resources will be defined by the duration of the works for each specific intervention activity (ditching, cleaning of canals, revegetation, restoration, etc). In other words, the project does not promote an additional access limitation to natural resources.

246. The intervention communities are identified with silvicultural activities and with the application of practices for mangrove harvesting/use, ensuring their sustainable management. However, as part of the project implementation, public communication will be supported so that local people have information on the specific interventions that are being developed in the ecosystems, specific points / areas of intervention, approximate time foreseen for an intervention and the expected benefits for the improvement of ecosystem services.

247. The project foresees through its second output the assessment of local livelihoods will to consider of the social, economic and cultural dependence on the target ecosystems and natural resources. This will ensure that management measures are taken to mitigate any possible negative impacts on resource access, quality, or availability of resources. The project will engage with the legal management authorities whose job is to monitor compliance with the law but also identify those who depend on ecosystems.

248. At the same time, the project foresees develop awareness-raising and training with local community actors (women, man, girls and boys) including experiences on environmentally sustainable production practices that reduce or avoid anthropogenic pressure on ecosystems (honey harvesting, control of invasive alien species both timber and fishing, sustainable use of mangrove resources).

³⁶ Restrictions (during specific hours) to certain areas may occur if machinery is being used or to areas that are being actively planted. (16012021).

249. Hence, once project interventions are completed, it is not expected that livelihoods would be adversely affected. Rather, it is expected that there may be a greater availability of resources and natural values that have been identified in these local communities as a means of life (honey, tourism, etc.), especially considering the enhanced ecosystem based services as a result of project interventions and capacity building that would be made available through the project. These has been the experiences of other similar projects, focused on interventions that promote an ecosystem's capacity to provide ecosystem goods and services (UNDP / AF project “Manglar Vivo”; UNDP / GCF Project “Archipelagos del Sur”).

INDIGENOUS PEOPLES AND ETHNIC MINORITIES

250. Cuba is a multiracial society with strong origins in the Iberian Peninsula and the African continent. Cuban ethnography is the result of the mixing between three main groups: European whites, indigenous and African blacks³⁷. According to the 2012 Census conducted by the Cuban Statistics and Information Office, 64.1% of the population identified themselves as being white, 26.6% as mestizo or mulatto, and 9.3% as black. It is estimated that when Christopher Columbus arrived in 1492, there were 300,000 indigenous people in Cuba, belonging to the Siboney, Guanajatabey and Taino groups. By 1510 the indigenous population had been reduced to about 112,000 people, becoming only 3,900 in 1555. These peoples are thought to have disappeared completely by the end of the eighteenth century³⁸. While there are no official recognized or self-identified indigenous communities in Cuba today, the legacy of these peoples continues through culinary traditions, crafts, language and customs, especially among those who live in the mountainous regions of the east of the country.

251. While the Cuban identity has inherited the culture of some pre-Hispanic original peoples (Taínos, Guanahatabeyes, Ciboneyes, Subtaínos, Ceramists, Preceramistas, Preagroalfareros, Agro-potters, among others)³⁹, the results of scientific investigations carried out in Cuba suggest that as a result of the Spanish colonization in Cuba, a process of “demographic ethnocide, not a cultural genocide” occurred, as a consequence of which it is considered that there is no presence of indigenous peoples in Cuba⁴⁰.

4.6 ARCHAEOLOGICAL AND CULTURAL HERITAGE

252. Among the Caribbean nations, Cuba has the most areas and cultural goods recognized by UNESCO, including World Heritage sites⁴¹. Until 2017, a total of ten sites were included in the list, among which we can mention Old Havana and its system of colonial fortifications (1982), the Valley of Viñales as Cultural Landscape (1999), the Historic Urban Center of Trinidad and the Valley of the Ingenios (1988), the Archaeological landscape of the First Coffee Plantations of the Southeast of Cuba (2000), the French Tomb La Caridad de Oriente (2003) as a Masterpiece of Oral and Intangible Heritage, among others. The country has approximately 170 national monuments, among which are the first seven villas founded by colonizer Diego Velázquez in the early sixteenth century and more than 200 monuments of local importance. It also works on the preservation of intangible heritage, of which we have a rich legacy. An example of this was the declaration in 2017 of the Cuban “Punto Guajiro” as Intangible Cultural Heritage of Humanity of UNESCO, poetic and musical expression of the Cuban guajiros.

³⁷ «[Todo mezclado: el mestizaje cubano](#)». Inter Press Service en Cuba.

³⁸ «Aborígenes de Cuba». EcuRed.

³⁹ -Las antiguas culturas del archipiélago cubano. Lillíán Moreira de Lima. Revista Estudios. Universidad de Costa Rica, 2008. <https://revistas.ucr.ac.cr/index.php/estudios/article/view/24324>

⁴⁰ El pueblo originario de Cuba: ¿un legado olvidado o ignorado? Antonio Martínez Fuentes y Julia Leigh Radomski. Revista Espacio Laical No. 3 del 2013. <http://www.espaciolaical.org/contens/35/7177.pdf>

⁴¹ Consejo Nacional de Patrimonio Cultural <http://www.cubarte.cult.cu/patrim/index.html>

253. The conservation of the nation's cultural heritage is a fundamental concern of the Cuban government. Thus, the following articles are endorsed in the new Constitution of the Republic of Cuba (2019):

- ARTICLE 13, establishes as one of the essential purposes of the State that of “protecting the natural, historical and cultural heritage of the nation.”
- ARTICLE 32, establishes that the State guides, fosters and promotes education, science and culture in all its manifestations. Within the postulates of educational, scientific and cultural policy, subsection j) states that it defends the identity and Cuban culture, safeguarding the artistic, patrimonial and historical wealth of the nation.
- ARTICLE 90, subsection k) establishes that within the duties of the rights of Cuban citizens, in addition to the others established in this Constitution and the laws, is the following: protect the cultural and historical heritage from the country.

254. Moreover, Article 32, subsection k) states “It protects national monuments and places notable for their natural beauty or for their recognized artistic or historical value.” This is supported by a set of articles, laws and decrees such as Law No. 1 on the Protection of Cultural Heritage and Law No. 2 on National and Local Monuments, both of 1977.

255. The National Council of Cultural Heritage of the Ministry of Culture of the Republic of Cuba, is the instance in charge of specifying and declaring the goods that must be part of the Cultural Heritage of the Nation⁴²; although other institutions also watch over the conservation of Cuban heritage such as the Office of the Historian of the City of Havana.

256. In Stretch II, specifically in Ciego de Ávila province, the presence of a site declared a National Monument known as “Restos de la Trocha Militar de Júcaro a Morón” is identified, dating from the second half of the 19th century. The “Trocha de Júcaro a Morón” is a military work built by the Spanish colonizers during the Ten Years War, with the aim of: isolating the independence struggle in the eastern departments, wearing down and depriving the “mambises” of receiving aid such as supplies, weapons and military supplies, and prevent the war from affecting their support bases and the positions of Western farmers, landowners and merchants. The remains of this site are found across the Island of Cuba from the northern coast to the southern coast. At the intervention site in Júcaro there are some vestiges of this national monument.

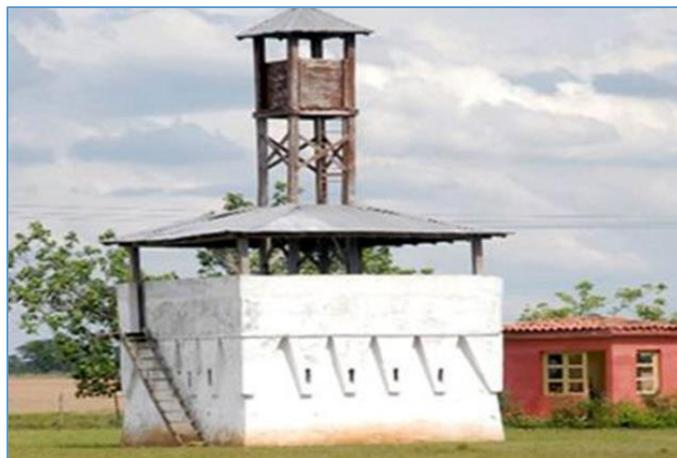


Figure 25. Picture of a tower belonging to the “Trocha de Júcaro a Morón”

257. They are delimited in such a way that their identification is easy, so it is not considered that by mistake, activities would be carried out in the area occupied by these buildings. This National Monument is located within the limits of

⁴² Consejo Nacional de Patrimonio Cultural <http://www.cubarte.cult.cu/patrim/index.html>

the Júcaro settlement, and does not occupy mangrove ecosystem areas (Figure 26). The project's interventions are not expected to affect these sites since the planned activities do not imply the development of actions in the specific area where the trail remains. However, if appropriate measures are not adopted, the project may result in interventions that could potentially adversely impact sites, structures, or objects with historical value. Therefore, a chance finds procedure has been defined.

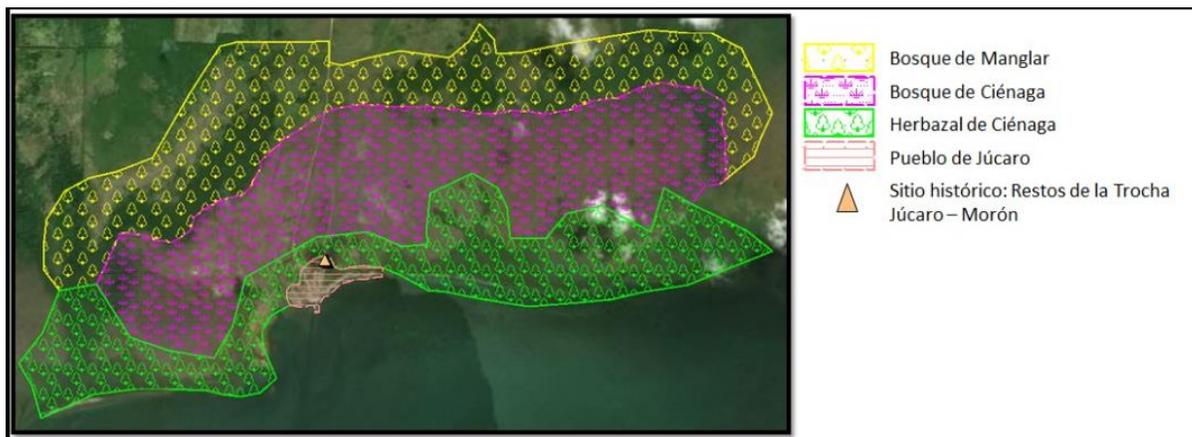


Figure 26. Location of the National Monument “Troca de Júcaro a Morón”

4.7 SOCIO-DEMOGRAPHIC OVERVIEW OF INTERVENTION SITES

258. Based on a prioritization of climate change vulnerability of coastal communities and ecosystems, the project will focus specifically on two coastal “stretches”⁴³, encompassing the project’s 7 target sites:

- a. La Coloma to Surgidero de Batabanó (Southwestern coast)
- b. Júcaro to Manzanillo (Southeastern coast)

4.7.1 Stretch I: La Coloma to Surgidero de Batabanó (Southwestern coast)

259. This stretch covers three provinces, Pinar del Río, Artemisa and Mayabeque and 3 municipalities, Pinar del Río, Guira de Melena and Batabanó. Within this stretch, 3 communities were selected as worksites which are: La Coloma; Cajío beach, and Surgidero of Batabanó.

260. The livelihoods of these communities are primarily based on small-scale fishing, basic services and national tourism. The decline of the fisheries sector and the degradation of productive infrastructure by the weather and extreme climatic events, however, has affected these coastal livelihoods. The greatest impact occurs during the passage of tropical cyclones and hurricanes. As such, many people are also involved in agriculture in neighboring areas, producing mostly meats and vegetables. Other products include coffee, citrus fruits, beans and other grains, milk, beef, goat and buffalo meat, and timber production constitutes the economic base of the area. There are no sewer systems to facilitate drainage in these communities.

261. **La Coloma (municipality of Pinar del Río, province of Pinar del Río):** This coastal town has 1,929 houses, a total population of 5,433 inhabitants, where 99.6% has access to electricity and 98.5% to the water supply system. It also has 6 medical offices, 1 preschool, 1 primary school, 1 mixed center (combining several teachings in the same center), 1 special education center, 1 cemetery, 1 pharmacy, 1 post office, 24 public telephone stations, 252 fixed residential

⁴³ Nomenclador nacional de asentamientos humanos. Censo de Población y Viviendas. 2012. Oficina Nacional de Estadísticas e Información de la República de Cuba, ONEI, 2017

telephone lines. In addition, 40% of the streets are paved, 30% with gravel and the remaining 30% being rustic. The main economic activity is fishing, with the Combinado Pesquero Industrial La Coloma, which is dedicated to the export of different species (mainly finfish, lobster and shrimp) that are caught and processed in the center.

262. Cajío Beach (Güira de Melena municipality, Artemisa province): This coastal village which has 196 houses, and a total population of 524 inhabitants, where 100% of houses have access to electricity and 62% with access to the water supply system. It has 5 medical offices, 1 primary school and 1 pharmacy. The prominent economic activity in this municipality is forestry for wood and charcoal production, with the municipality of Guira de Melena being the most important for the industry. The waters and mud along the coast are also of interest for therapeutic, medicinal and touristic purposes, given their unique compositions. This area is also important for finfish and lobster fisheries.

263. Surgidero de Batabanó (Batabanó municipality, Mayabeque province): This coastal town has 1,614 houses, a total population of 4,697 inhabitants, where 99.7% of households have access to electricity and 98.8% have access to the water supply system. It has 5 medical offices, 1 preschool, 1 mixed center (combining several teachings in the same center), 1 pharmacy, 18 public telephone stations, 272 fixed residential telephone lines. In addition, 27% of the streets are paved, 9% with gravel and the remaining 64% being rustic.

264. The main coastal and fishing port of the southern coast is located in this province. The economy is sustained by the Fishing and Seafood Factory, which processes and exports fresh products, particularly important species such as chelonians and crustaceans (lobsters and shrimp). It also has 1 shipping company, 1 travel agency, and 1 shipyard.

265. The Gulf of Batabanó is characterized for being an ecosystem where important socio-economic and productive activities are managed. The main sources of power in the provinces of Havana (capital of Cuba), Artemisa, Mayabeque and Matanzas are developed in the South Plain Havana / Matanzas. The aquifer in the South Basin provides water to the capital as well as to crop areas of crops in the provinces of Artemisa and Mayabeque. Moreover, it constitutes one of the country's main fishing areas of the country.

4.7.2 Stretch II: Júcaro to Manzanillo (Southeastern coast)

266. This area covers four provinces (Ciego de Ávila, Camagüey, Las Tunas and Granma) and three municipalities (Venezuela in Ciego de Ávila, Santa Cruz del Sur in Camagüey and Manzanillo in Granma). The marine part of this area includes the Gulfs of Ana María and Guacanayabo, which is one of the most important fisheries zones of the country, accounting for around 39% of the total national catch. In terms of agriculture, the region is amongst the most important rice producers in the country. Climate change poses a threat to these sectors by virtue of the effects of increasing temperature and sea levels, which affect coral reefs that are vital to fisheries; temperature stresses on rice crops; and damage to infrastructure caused by storms.

267. Júcaro (municipality of Venezuela, province of Ciego de Ávila): This coastal village has 566 houses, a total population of 1,581 inhabitants, where 98.9% of households have access to electricity and 95.4% have access to the water supply system. It also has 3 medical offices, 1 primary school, 1 pharmacy and 1 post office. It is located in the buffer zone of the Cayos de Ana María Wildlife Refuge and the Jardines de la Reina National Park. It is the closest human settlement to these protected natural areas according to national regulations. Economic development is based on fishing and on ecological tourism that takes place in the waters of Los Jardines de la Reina.

268. Santa Cruz del Sur (Santa Cruz municipality, Camagüey province): This coastal town has 5,731 houses, a total population of 16,569 inhabitants, where 99.5% of households have access to electricity and 98.5% have access to the water supply system. It also has 1 hospital, 1 polyclinic, 12 medical offices, 1 maternity home, 1 retirement home, 1 preschool, 5 primary schools, 1 secondary school, 1 technical and professional school, 1 pre-university institute, 1 special education center, 1 university headquarters (belonging to the University of Camagüey), 1 cemetery, 3 pharmacies, 1 post office, 108 public telephone stations, 2,685 fixed residential telephone lines, 2 Internet surfing rooms. In addition, 95% of the streets are paved and 5% remain with gravel. Industrial activities are the distinctive feature of the economy, based on three primary activities: sugar production, fisheries and agriculture.

269. **Playa Florida (Florida municipality, Camagüey province):** This is a typically urban human settlement which has 329 homes and a total population of 467 inhabitants. It has electric services for approximately 100% of the population and the water supply system reaches approximately 94.4% of its population. Health and educational services include 1 medical office, 1 pharmacy, 1 primary school. Community counts with 1 post office, 3 public telephone stations. In addition, 100% of its streets are paved.

270. **Manzanillo (Manzanillo municipality, Granma province):** This small coastal city has 32,618 houses, a total population of 98,904, with 97.1% of households having access to electricity and 95.7% having access to the water supply system. It also has 4 hospitals, 4 polyclinics, 87 medical offices, 1 maternity home, 1 nursing home, 2 retirement homes, 9 preschools, 24 primary schools, 9 secondary schools, 4 technical and professional schools, 4 pre-university institutes, 6 special education centers, 1 cemetery, 17 pharmacies, 3 post offices, 1 public telephone station, and 7,306 fixed residential telephone lines. In addition, 75% of the streets are paved, 15% with gravel and 10% remain rustic. The economy is based on small industries, textile garment workshops and a shipyard. Among the main products are shrimp, fish, preserves, accumulators, footwear, clothing and sugar.

5 ENVIRONMENTAL AND SOCIAL RISK ASSESSMENT

5.1 UNDP SOCIAL AND ENVIRONMENTAL STANDARDS

271. UNDP implements the Social and Environmental Standards in all its operations. The specific objectives of these safeguards are: (i) strengthen the social and environmental effects of programmes and projects, (ii) avoid adverse impacts on people and the environment, (iii) minimize, mitigate and manage adverse impacts where they cannot be avoided, (iv) strengthen the social and environmental risk management capacities of UNDP and its partners, and (v) ensure the full and effective participation of key stakeholders, for example, through a mechanism to respond to complaints from people affected by a project. (UNDP, 2016:5).

272. The requirements set out in the UNDP Social and Environmental Standards apply to all operations financed by the Green Climate Fund (GFC) within member countries and involving environmental and social impacts. In the case of this project, the operations financed constitute interventions aimed at improving adaptation and adaptive capacity in the Cuban coastal zone to the impacts of climate change. The requirements established by the Green Climate Fund will apply to all the different stages that make up an operation, namely: (i) design, (ii) construction, (iii) operation, (iv) extensions and/or modifications and, eventually (v) closure.

5.2 SOCIAL AND ENVIRONMENTAL SCREENING POLICY REQUIREMENTS

273. As this project is supported by UNDP in its role as a GCF Accredited Entity, the project has been screened against UNDP's Social and Environmental Standards Procedure. The Social and Environmental Screening Template was prepared and the project deemed to be a moderate risk (Category B) project. Discussions on the impact assessment are provided in the Social and Environmental Screening Template, which provided the rationale for the project being classified as a moderate risk. This ESAR provides further discussion below.

5.3 IMPACT ASSESSMENT METHODOLOGY

274. An impact risk assessment was undertaken using the UNDP Social and Environmental Screening Procedure to assess the probability (expected, highly likely, moderately likely, not likely) and the impact of the risk (critical, severe, moderate, minor, negligible). From this, a significance value was attributed to the potential impact (negligible, low, medium, high and extreme).

Score	Rating
5	Expected
4	Highly Likely
3	Moderately likely
2	Not Likely
1	Slight

Table 9. Rating of Probability of Risk

Score	Rating	Definition
5	Critical	Significant adverse impacts on human populations and/or environment. Adverse impacts high in magnitude and/or spatial extent (e.g. large geographic area, large number of people, transboundary impacts, cumulative impacts) and duration (e.g. long-term, permanent and/or irreversible); areas impacted include areas of high value and sensitivity (e.g. valuable ecosystems, critical habitats); adverse impacts to rights, lands, resources and territories of indigenous peoples; involve significant displacement or resettlement; generates significant quantities of greenhouse gas emissions; impacts may give rise to significant social conflict
4	Severe	Adverse impacts on people and/or environment of medium to large magnitude, spatial extent and duration more limited than critical (e.g. predictable, mostly temporary, reversible). The potential risk impacts of projects that may affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples are to be considered at a minimum potentially severe.
3	Moderate	Impacts of low magnitude, limited in scale (site-specific) and duration (temporary), can be avoided, managed and/or mitigated with relatively uncomplicated accepted measures
2	Minor	Very limited impacts in terms of magnitude (e.g. small affected area, very low number of people affected) and duration (short), may be easily avoided, managed, mitigated
1	Negligible	Negligible or no adverse impacts on communities, individuals, and/or environment

Table 10. Rating of Impact of Risk

Impact	5					
	4					
	3					
	2					
	1					
			1	2	3	4
Probability						
Green = Low, Yellow = Moderate, Red = High						

Table 11. UNDP Risk matrix

5.4 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT AND MITIGATION MEASURES

Table 12. Summary on Environmental and Social Risk at the Stretch level

Project Activities with Adverse Impacts	Unmitigated Impacts	Unmitigated Risks	Avoidance and Mitigation Measures	Post mitigation Risk
<p>Output 1: Rehabilitated coastal ecosystems for enhanced coping capacity to manage climate impacts</p> <p>Activity 1.1. Assess and restore coastal wetland functions in target sites by re-establishing hydrological processes</p> <p>Activity 1.2. Mangrove and swamp forest rehabilitation in target sites through natural and assisted regeneration for enhanced coastal protection</p> <p>Activity 1.3. Record and asses coastal and marine ecosystems’ natural regeneration and their protective functions based on conditions provided as a result of restored coastal wetlands</p> <p>Activity 1.4. Enhance water conduction systems along targeted watersheds to restore freshwater drainage in coastal ecosystems and aquifers to reduce and monitor saline intrusion in target sites</p>				
<p>The rehabilitation of mangrove forests and coastal wetlands will rely on a combination of natural and artificial regeneration (enrichment planting) as well the restoration of hydrological flows to mangroves and coastal wetlands, and removal of existing hard infrastructure to achieve the recovery of structure, function and EBA services.</p>	<p>Plant nurseries and replanting activities could lead to contamination of water (through fertilizers) or physical disturbances (movement of sediment or erosion associated with planting) that could affect sensitive environments including threatened species and their habitats, some of them are Protected Areas. Similarly, the restoration of hydrological flows through the clearing of existing canals and the creation of new canals (zanjeos), as well as the removal of existing hard infrastructure to restore fresh water flows to rehabilitated ecosystems may generate waste and lead to local erosion, affecting critical habitats and the quality of the water consumed by the local population.</p>	<p>Moderate</p>	<p>Management measures will be put in place to ensure that all activities mitigate harm to ecosystems and to human communities. In Protected areas, activities will be developed under its approved Management Plan. In the intervention site where there is a National Monument in its surrounding areas, measures will be adopted to avoid damage and ensure that the cultural heritage local authority is kept informed about the project intervention.</p> <p>This will include guidelines for the use of machines to transport materials and remove grey infrastructure. Emergency protocols will be included for dealing with possible spills or accidents that could impact soils, waters, and native species</p>	<p>Low</p>

	<p>During these activities, invasive species (either planted or already existent in the ecosystem) may proliferate and colonize areas more quickly than native species, especially during the initial stages of rehabilitation activities or in areas frequently disturbed by climate change or anthropogenic activities.</p> <p>In 5 of the 7 intervention sites, mangrove and wetland restoration activities and the hydrological cycle's recovery will take place within Protected areas and in accordance with the actions defined in the Management Plans in each case. This implies a risk of negatively impacting conservation values if appropriate measures are not taken.</p> <p>A National Monument was identified in the surrounding area to the mangrove ecosystem of an intervention site. This implies a risk of negatively impacting cultural values if appropriate measures are not taken.</p> <p>These activities may also temporarily affect local communities and households near/living on intervention sites. Primarily, this could involve the perception of temporary restriction of the availability, quality of and access to natural resources the rehabilitation areas during enrichment planting and natural regeneration management activities (although the use of mangroves is already regulated, and the right to access enshrined in the legal Cuban legal framework).</p>		<p>as well as the health and safety of workers and local communities. In all cases, it will be ensured that the interventions within the Protected Areas correspond to the actions defined in the respective Management Plans for these Areas.</p> <p>Protocols will be applied to protect the underground and surface basins' water quality through the monitoring, control and surveillance system established in the country (Network of water quality monitoring stations - RedCal).</p> <p>Management plans for nurseries and the use of any chemicals to grow seedlings for rehabilitation will be developed. Likewise, procedures for managing the impact of replanting activities on natural habitats will be taken. Management plans to monitor and control recruitment of invasive species will be developed. The selected control mechanisms (manual or biological) will be designed to mitigate adverse effects on the ecosystem or human health. Pesticide use will be prohibited.</p> <p>These methodologies and measures will be tailored to each ecosystem component and for each of the intervention sites. Consideration will be given to the topographic, hydrogeological, and climate conditions for each site. Existing infrastructure will be surveyed to assess its state of degradation, the types of materials used, etc. so as to take adequate measures to avoid contamination and disturbance of the ecosystem (e.g., leaching of metals in salt water conditions) that could harm sensitive aquatic biota or harm people.</p> <p>Local livelihoods will be assessed to consider of the social, economic and cultural dependence on the target ecosystems and natural resources for food,</p>	
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	<p>Additionally, activities associated with grey infrastructure removal may generate noise, dust, and other disturbances could impact the health and wellbeing of local communities or workers. Similarly, chemicals used in nurseries or planting (fertilizers,) could impact community health.</p> <p>Finally, workers diving will be required for coral reef monitoring, which poses an occupational hazard.</p>		<p>income and employment (including ecotourism and other practices). This will ensure that management measures are taken to mitigate any possible negative impacts on resource access, quality, or availability of resources. The project will develop awareness-raising and training with local community actors (women, man, girls and boys) including experiences on environmentally sustainable production practices that reduce or avoid anthropogenic pressure on ecosystems (honey harvesting, control of invasive alien species).</p> <p>All management measures will be carried out with the participation of relevant state actors (e.g., Forestry Agency) and/or with projects and organizations already working with these issues (e.g., The Sabana Camagüey Project).</p>	
<p>Output 2: Increased technical and institutional capacity to climate change adaptation in Coastal Communities, Governments and Economic Sectors.</p> <p>Activity 2.1. Develop a climate adaptation technical capacity building program for coastal communities and local stakeholders (government & economic sectors) to enable adaptation actions and capacities</p> <p>Activity 2.2. Integrate project (technical and community based) derived information, from early warning systems and national datasets into a Knowledge Management Platform, to provide climate information products to monitor, evaluate and inform coastal communities on local capacity to manage climate change impacts.</p> <p>Activity 2.3. Mainstream EBA approaches into regulatory and planning frameworks at the territorial and national levels for long term sustainability of EBA conditions and investments for coastal protection</p>				

<p>Training and education programs will be carried out for communities, governments and sectors, and annexed classrooms will be built.</p> <p>Development and update of climate local information products</p> <p>Implementation of community monitoring systems</p> <p>A knowledge management platform for coastal Adaptation will be updated to integrate and manage local and national climate information and products.</p> <p>Regulatory and planning frameworks for land use and natural resource management at different governance levels will be strengthened in response to EBA.</p>	<p>Given Cuba’s high rates of gender equality and low rates of social inequality, it is unlikely that planning and implementation of these activities will exclude relevant actors, including women. It is nonetheless included here as due diligence.</p>	<p>Low</p>	<p>Measures will be taken to ensure that all activities will be inclusive to stakeholders, including both men and women as well as groups with special accessibility requirements (elderly, remote, etc).</p> <p>A gender assessment has been carried out and an action plan has been developed to ensure that all capacity building activities are gender-sensitive and gender-inclusive (Annex 8). Similarly, A stakeholder engagement plan (Annex 8) has been developed to ensure full, effective, and inclusive participation of relevant parties.</p> <p>Community monitoring systems and information products will be developed in collaboration with local communities, such that they will respond to their priorities and needs. This ensures the products and systems are respectful and inclusive of local ecological knowledge, as well as accessible and locally relevant. Consideration will be given to gender and groups with special accessibility requirements (elderly, remote, etc), thereby mitigating risks of exclusion and inequity.</p> <p>In addition, a gender assessment has been carried out and an action plan has been developed to ensure that activities are gender-sensitive and gender-inclusive (Annex 8). Similarly, a stakeholder engagement plan (Annex 7) has been developed to ensure full, effective, and inclusive participation of relevant parties.</p>	<p>Low</p>
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5.5 SUMMARY OF ACTIVITIES WITH ENVIRONMENTAL AND SOCIAL RISKS BY PROJECT INTERVENTION SITES

This summary of activities which generate environmental and social risks at the intervention site level is considered indicative for the purposes of preparing the Management Plan for each site. It does not exclude the possibility of including other risks and their respective mitigation measures that are subsequently identified in the Management Plan.

As a result of this analysis, it was first concluded that activities that generate environmental and social risks are carried out in all of the project intervention sites. Additionally, in 5 of the 7 areas, risks related to management categories which obey criteria for natural and cultural heritage conservation are identified (5 sites with the presence of Protected Areas, one of them with the presence of a Natural Monument).

Subsequently, based on the risks defined in **Table 14**, the environmental and social risks by intervention sites were clarified, according to the type of activity carried out or the site characteristics.

SUMMARY OF ACTIVITIES BY PROJECT INTERVENTION SITES								
Stretch	Intervention Site	Activities Output 1				Activities Output 2		
		1.1	1.2	1.3	1.4	2.1	2.2	2.3
Stretch I	La Coloma	X	X	X	X	X	X	X
	Cajío beach	X	X	X	X	X	X	X
	Surgidero de Batabanó	X	X	X	X	X	X	X
Stretch II	Júcaro	X	X	X	X*	X	X	X

	Santa Cruz del Sur	X	X	X	X	X	X	X
	Manzanillo	X	X	X	X	X	X	X
	Playa Florida	X	X	X	X	X	X	X

Table 13. Summary on Activities at intervention sites level

Note: * In the case of Júcaro, it should be taken into account that the project intervention includes both aquifer recharge and water monitoring. In the other intervention sites, only water monitoring is included.

Output 1: Rehabilitated coastal ecosystems for enhanced coping capacity to manage climate impacts						
Risk	Project Activities with Potential Adverse Impacts / Risk				Intervention sites	Avoidance and Mitigation Measures
	1.1. ⁴⁴	1.2. ⁴⁵	1.3. ⁴⁶	1.4. ⁴⁷		
Risk: Rehabilitation of ecosystems may introduce non-native	X	X	X	-	La Coloma, El Cajío, Surgidero de Batabanó, Júcaro, Playa Florida, Santa Cruz del Sur and Manzanillo	Please, see ESAR Table 9 and Section 6.8 Key Environmental and Social Indicators

⁴⁴ Activity 1.1. Assess and restore coastal wetland functions in target sites by re-establishing hydrological processes.

⁴⁵ Activity 1.2. Mangrove and swamp forest rehabilitation in target sites through natural and assisted regeneration for enhanced coastal protection.

⁴⁶ Activity 1.3. Record and assess coastal and marine ecosystems' natural regeneration and their protective functions based on conditions provided as a result of restored coastal wetlands.

⁴⁷ Activity 1.4. Enhance water conduction systems along targeted watersheds to restore freshwater drainage in coastal ecosystems and aquifers to reduce and monitor saline intrusion in target sites.



organisms/invasive species						
<p>Risk: Project activities, including restoring hydrological flows to mangroves and coastal wetlands may cause adverse impacts to habitats (including critical habitats and Protected Areas) and project activities are proposed within or adjacent to critical habitats and/or environmentally sensitive areas.</p>	X	X	X	X	<p>La Coloma, El Cajío, Surgidero de Batabanó, Júcaro, Playa Florida, Santa Cruz del Sur and Manzanillo</p> <p>Note: Wetlands and mangroves are both environmentally sensitive areas /ecosystems which are present in all of intervention site. However, Protected area are presents just in five of the seven intervention site. Please, see Table 3, ESAR.</p>	Please, see ESAR Table 9 and Section 6.8 Key Environmental and Social Indicators
<p>Risk: Risk that climate change will impact rehabilitation interventions and environmental monitoring systems.</p>	X	X	X	X	<p>La Coloma, El Cajío, Surgidero de Batabanó, Júcaro, Playa Florida, Santa Cruz del Sur and Manzanillo</p>	Please, see ESAR Table 9 and Section 6.8 Key Environmental and Social Indicators
<p>Risk: Risk that project activities, including mangrove and wetland rehabilitation, infrastructure removal activities, as well as monitoring of coral reefs may have an adverse effect on community or</p>	X	X	X	X	<p>La Coloma, El Cajío, Surgidero de Batabanó, Júcaro, Playa Florida, Santa Cruz del Sur and Manzanillo</p>	Please, see ESAR Table 9 and Section 6.8 Key Environmental and Social Indicators

workers health and safety (noise, dust, and other disturbances / occupational hazard).						
Risk: Risk that project activities, including restoration of hydrological flows to mangroves and coastal wetlands, and removal of existing hard infrastructure to achieve the recovery of structure, function and EBA services, may have an adverse effect on community or workers health and safety and in water quality.	X	X	X	X	La Coloma, El Cajío, Surgidero de Batabanó, Júcaro, Playa Florida, Santa Cruz del Sur and Manzanillo	Please, see ESAR Table 9 and Section 6.8 Key Environmental and Social Indicators
Risk: In one of the project interventions sites, the presence of a national monument was identified. This monument is not located in the specific areas in which the project's interventions will take place, but it is estimated that remains or historical pieces associated with this historical site could be found, so it is required to	X	X	X	X	Júcaro Note: However, a chance finds procedure will be applied in all of the intervention sites of the project.	Please, see ESAR Table 9 and Section 6.8 Key Environmental and Social Indicators

take measures to guarantee its conservation.						
Risk: These activities may also temporarily affect local communities and households near/living on intervention sites.	X	X	X	-		
Output 2: Increased technical and institutional capacity to climate change adaptation in Coastal Communities, Governments and Economic Sectors						
Risk	Project Activities with Potential Adverse Impacts			Intervention sites	Avoidance and Mitigation Measures	
	2.1. ⁴⁸	2.2. ⁴⁹	2.3. ⁵⁰			

⁴⁸ Activity 2.1. Develop a climate adaptation technical capacity building program for coastal communities and local stakeholders (government & economic sectors) to enable adaptation actions and capacities.

⁴⁹ Activity 2.2. Integrate project (technical and community based) derived information, from early warning systems and national datasets into a Knowledge Management Platform, to provide climate information products to monitor, evaluate and inform coastal communities on local capacity to manage climate change impacts.

⁵⁰ Activity 2.3. Mainstream EBA approaches into regulatory and planning frameworks at the territorial and national levels for long term sustainability of EBA conditions and investments for coastal protection.



<p>Risk: Failure to involve key stakeholders in the implementation of the project would limit the sustainability of the project's results, so it must be ensured that all beneficiaries have ample possibility of participation in project activities.</p>	X	X	X	<p>La Coloma, El Cajío, Surgidero de Batabanó, Júcaro, Playa Florida, Santa Cruz del Sur and Manzanillo</p>	<p>Please, see ESAR Table 9 and Section 6.8 Key Environmental and Social Indicators</p>
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Table 14. Summary on Activities / Environmental and Social Risk at intervention sites level

5.6 ASSUMPTIONS UNDERPINNING THE DEVELOPMENT OF THE ENVIRONMENTAL AND SOCIAL ASSESSMENT REPORT

275. The following assumptions have been made in the preparation of this assessment:

- a. None of the interventions will require the displacement or resettlement of people;
- b. Appropriate erosion and sediment control will be undertaken during all stages of the projects;

6 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

6.1 OVERVIEW AND OBJECTIVES OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

276. An ESMP is a management tool used to assist in minimizing the impact to the environment and socially; and establish a set of environmental and social objectives. To ensure the environmental and social objectives of the projects are met, the project implementers will use the ESMP. To structure and control the environmental and social management safeguards that are required to avoid or mitigate adverse effects on the environment and communities

277. The environmental and social obligations of the projects are to:

- a. Encourage good management practices through planning, commitment and continuous improvement of environmental practices;
- b. Minimize or prevent the pollution of land, air and water pollution;
- c. Protect native flora, fauna and important ecosystems;
- d. Comply with applicable laws, regulations and standards for the protection of the environment;
- e. Adopt the best practicable means available to prevent or minimize environmental impact;
- f. Describe monitoring procedures required to identify impacts on the environment; and
- g. Provide an overview of the obligations of AMA and UNDP staff and contractors in regard to environmental obligations.

278. The ESAR will be updated from time to time by the implementing Project Management Unit (PMU)/contractor in consultation with the UNDP staff and AMA to incorporate changes in the detailed design phase of the projects.

6.2 INSTITUTIONAL ARRANGEMENTS FOR THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

279. The AMA will be responsible for the supervision of the ESMP. UNDP will gain the endorsement of the AMA and will ensure the ESMP is adequate and followed. The PMU will ensure timely remedial actions are taken by the contractor where necessary.

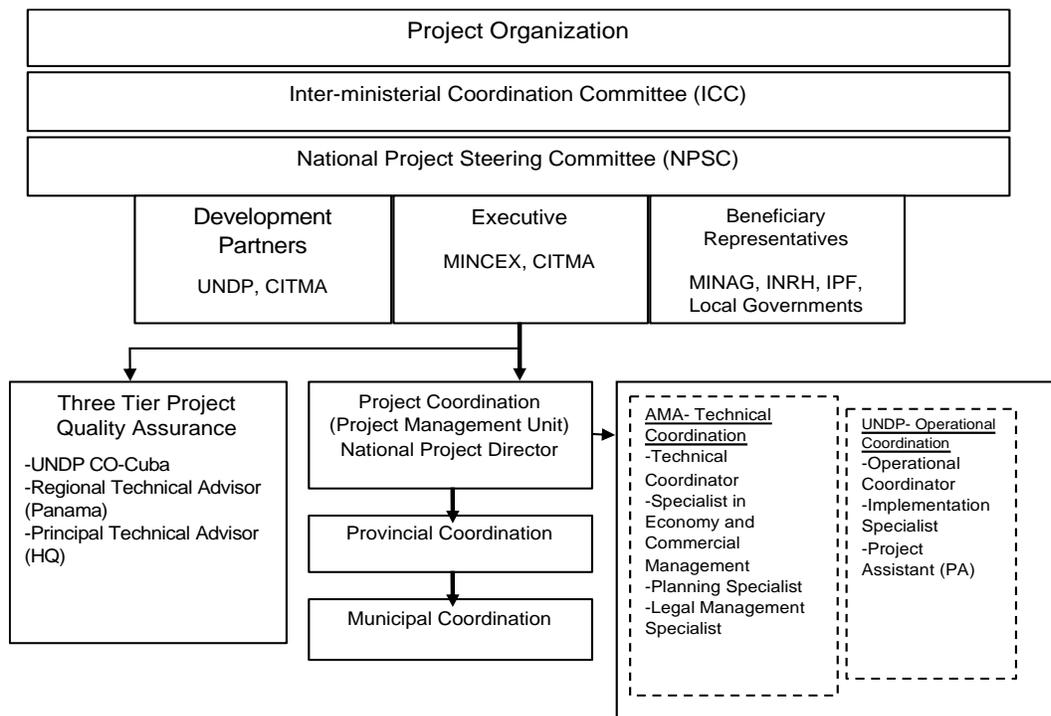
280. The AMA will be responsible for the revision or updates of this document throughout the work. It is the responsibility of the person to whom the document is issued to ensure it is updated.

281. The ESAR will be assessed for each sub-project by the AMA and UNDP prior to any works being undertaken. The ESAR identifies potential risks to the environment and social matters from the projects and outlines strategies for managing those risks and minimizing undesirable environmental and social impacts. Further, the ESMP provides a Grievance Redress Mechanism for those that may be impacted by the projects that do not consider their views have been heard.

6.3 PROJECT DELIVERY AND ADMINISTRATION

6.3.1 Project Delivery

282. A high level project management structure is shown below



283. The (national) Implementing Partner for this project is the Environmental Agency (AMA) belonging to the Ministry of Science, Technology and Environment (CITMA) of Cuba. The project will be delivered on the ground via the AMA, who will be responsible for overseeing project delivery, while FLACSO who will be hired by AMA will be as a technical adviser on aspects of the projects regarding to the social and environmental risks management. The project will also have the support of a gender and environmental safeguard specialists that will provide support to the project management unit. In addition, collaboration with local authorities and local communities is expected.

284. AMA will be accountable to UNDP for managing the project, including monitoring and evaluation of project interventions achieving project outcomes, and for the effective use of UNDP resources. AMA will designate a National Project Director to carry out the strategic direction of the project and oversee its operational and technical execution. AMA will act with the support of its ascribed research and environmental management centers.

285. National Project Director: The National Project Director has the authority to execute the project daily activities on behalf of the NPSC within the constraints laid down by the NPSC. The National Project Director oversees managing and making project decisions daily. His/Her main responsibility is to ensure that the project generates the results specified in the project document, with the required level of quality and within the specified time and cost limitations. The Implementing Partner (AMA) appoints the National Project Director, who must be a different person from the Implementing Partner representative in the NPSC. The National Director will have the support of two separate

Coordinations (Technical Coordination and an Operational Coordination) each headed by a Coordinator. The Technical Coordination Team will be located at AMA and will be financed through GoC co-financing. The Operational Coordination Team will be comprised of local staff that will be contracted by UNDP through GCF funds.

286. The Technical Coordination will be headed by a Technical Coordinator for the support of the project's technical components and will be integrated by: i) 1 Specialist in Economy and Commercial Management that will work with the economic sectors and local government to integrate EBA strategies and find financial mechanisms ii) 1 Planning Specialist that will provide support to Output 1 and integration of the ecosystem restoration within territorial planning processes; iii) 1 Legal Management Specialist that will work with local and national governments to integrate EBA mechanisms within development plans. The Operational Coordination will be based in UNDP and will be headed by an Operational Coordinator who will be in charge the project' reporting mechanisms and oversight including the project's ME. She/he will be supported by 1 implementation specialist that will be in charge of providing support to the technical coordination in establishing and integrating long term OM strategies for the project outputs (as foreseen in the OM plan) and integrating them within national structures. A Project Assistant will be hired the Operational Coordination and will be in charge of the project's administrative and financial management.

287. The Project Management Unit will also be supported through Provincial and Municipal Coordination Teams comprised of provincial and municipal representatives from CITMA, MINAG and INRH at each provincial/municipal level . The provincial and municipal coordination teams will be responsible for the proper running of the execution plans and schedules developed by National Project Director and will ensure a successful sectoral interaction at these levels. Provincial and Municipal Coordination Teams will provide monthly reports on local project actions to the National Project Director.

6.3.2 Administration of Environmental and Social Management Plan

288. As the implementing agency, AMA will be responsible for the implementation with the ESMP via the delivery organizations.

289. The ESMP will be part of any tender documentation provided for the hiring of services through project financing . The AMA will be responsible for the day-to-day compliance of the ESMP and will be responsible for the revision and update of this document during the course of work. It is the responsibility of the person to whom the document is issued to ensure it is the most up to date version.

290. UNDP and AMA are accountable for the provision of specialist advice on environmental and social issues to the delivery organisations (eg contractors) and for environmental and social monitoring and reporting. The AMA or its delegate will assess the environmental and social performance of the delivery organisations (eg contractors) in charge of delivering each component throughout the project and ensure compliance with the EMSF. During operations the delivery organisations will be accountable for implementation of the EMSF. Personnel working on the projects have accountability for preventing or minimising environmental and social impacts.

291. Safeguards Manager will be nominated at the National and State level PMUs. These roles may be in addition to other roles that members of the PMUs have. The safeguard advisor in the PMU will be designated as the key officer in charge of the Grievance Redress Mechanism.

292. The Field Officer will be responsible for daily environmental inspections of the project/construction site. The Field Officer will provide advice on effective environmental management of the project to all project site personnel. Field Officers are also to ensure the environmental awareness of project personnel is maintained through appropriate training. Compliance reports on mitigation measures will be submitted by the Field Officers. An independent review of the compliance may be undertaken during delivery/construction and post-construction where deemed necessary.

293. The delivery organization e.g. contractor will maintain and keep all administrative and environmental records, which would include a log of complaints together with records of any measures taken to mitigate the cause of the complaints.

294. The delivery organization will be responsible for the day to day compliance of the ESMP.

6.3.3 General Environmental Contract Performance Clauses

295. Generic contract clauses are provided in Appendix A to assist with environmental and social management works expected to have minor impacts. The mitigation measures described in the appendix reflect measures described in this ESAR and are the core of a generic, standardized Environmental Management Plan (EMP) and the associated minor impacts typical of small works that can be routinely addressed with best industry practice.

296. These clauses are general and may be modified to conform to applicable national laws, contract procedures and actual scope and nature of the works anticipated. These clauses are intended to be included as requirements in the works contract and shall remain in force throughout the contract period.

6.3.4 Environmental procedures, site and activity-specific work plans/instructions

297. Environmental procedures provide a written method describing how the management objectives for a particular environmental element are to be obtained. They contain the necessary detail to be site- or activity-specific and are required to be followed for all construction works. Site and activity-specific work plans and instructions are to be issued and will follow the previously successful work undertaking similar projects by the UNDP and AMA.

298. Environmental Plans for each intervention sites will be developed based on Section 5.5 “Summary of activities with environmental and social risks by project intervention sites” and Section 5.4 “Environmental and Social Impact Assessment and Mitigation Measures”, both described above.

6.3.5 Environmental incident reporting

299. Any incidents, including non-conformances to the procedures of the ESMP are to be recorded using an Incident Record and the details entered into a register. For any incident that causes or has the potential to cause material or serious environmental harm, the camp officer shall notify the Project Manager as soon as possible. The delivery organization/contractor must cease work until remediation has been completed as per the approval of AMA.

6.3.6 Daily and weekly environmental inspection checklists

300. A daily environmental checklist is to be completed at each work site by the relevant camp officer and maintained within a register. A weekly environmental checklist is to be completed and will include reference to any issues identified in the daily checklists completed by the field officers. The completed checklist is to be forwarded to AMA for review and follow-up if any issues are identified.

6.3.7 Corrective Actions

301. Any non-conformances to the ESMP are to be noted in weekly environmental inspections and logged into the register. Depending on the severity of the non-conformance, the camp officer may specify a corrective action on the weekly site inspection report. The progress of all corrective actions will be tracked using the register. Any non-conformances and the issue of corrective actions are to be advised to AMA.

6.3.8 Review and auditing

302. The ESMP and its procedures are to be reviewed at least every two months by UNDP staff and AMA. The objective of the review is to update the document to reflect knowledge gained during the course of project delivery/construction and to reflect new knowledge and changed community standards (values).

303. The ESMP will be reviewed and amendments made if:

- a. There are relevant changes to environmental conditions or generally accepted environmental practices; or
- b. New or previously unidentified environmental risks are identified; or
- c. Information from the project monitoring and surveillance methods indicate that current control measures require amendment to be effective; or
- d. There are changes to environmental legislation that are relevant to the project; or

- e. There is a request made by a relevant regulatory authority; or
- f. Any changes are to be developed and implemented in consultation with UNDP Staff and AMA. When an update is made, all site personnel are to be made aware of the revision as soon as possible e.g. through a toolbox meeting or written notification.

6.4 TRAINING

304. Delivery organizations have the responsibility for ensuring systems are in place so that relevant employees, contractors and other workers are aware of the environmental and social requirements for construction, including the ESMP.

305. All project personnel will attend an induction that covers health, safety, environment and cultural requirements.

306. All workers engaged in any activity with the potential to cause serious environmental harm (e.g. handling of hazardous materials) will receive task specific environmental training.

6.5 STAKEHOLDER ENGAGEMENT AND PUBLIC CONSULTATIONS

308. The preparation of the ESAR included public consultation to inform the design of the project and to scope risks and management measures. A wide range of stakeholders were consulted, including those involved in climate change and disaster risk management, different population groups from locally affected communities, Institutional actors in the health and education sector, actors from economic and service sectors related to the project such as tourism, fishing, agriculture and forestry, etc. These extensive on-the-ground consultations undertaken during the design of the project closely informed overall project design and the ESAR, and it is expected that consultations with affected communities and beneficiaries will continue.

309. To these ends, a full Stakeholder Engagement Plan is appended as part of the proposal in Annex 7. It includes the full list of stakeholders consulted, and a summary of these consultations, as well as comprehensive action plan for stakeholder engagement throughout the project cycle.

6.5.1 Environmental and Social Information Disclosure

310. Stakeholders shall have access to relevant project information in order to understand potential project-related opportunities and risks and to engage in project design and implementation. Therefore, as part of the stakeholder engagement process, information will be disclosed to ensure that project stakeholders have access to relevant information.

311. Specifically, the following information will be made available:

- a. Stakeholder engagement plans and summary reports of stakeholder consultations,
- b. Social and environmental screening reports with project documentation (30 days prior to approval),
- c. Social and environmental assessments, including any management plans (30 days prior to finalization),
- d. Any required social and environmental monitoring reports,
- e. Grievance Redress Mechanism and procedure for making a complaint and/or grievance.

312. This information is to be disclosed in a timely manner, in an accessible place, and in a form and language understandable to the people affected and other stakeholders. These elements of effective disclosure are briefly elaborated below:

- a. Timely disclosure: information on potential project-related social and environmental impacts and mitigation/management measures will be provided in advance of decision-making whenever possible. In all cases, draft and final screenings, assessments and management plans must be disclosed and consulted on prior to implementation of activities that may give rise to potential adverse social and environmental impacts.
- b. Accessible information: Appropriate means of dissemination will need to be considered in consultation with stakeholders. This could include posting on websites, public meetings, local councils or organizations, newsprint, and radio reporting, flyers, or direct mail.
- c. Appropriate form and language: Information needs to be in a form and language that is readily understandable and tailored to the target stakeholder group.

313. UNDP and AMA and FLASCO will develop and release updates on the project on a regular basis to provide interested stakeholders with information regarding project status. Updates may be via a range of media e.g. print, radio, social media or formal reports. A publicized telephone number will be maintained throughout the project to serve as a point of contact for enquiries, concerns, complaints and/or grievances. All enquiries, concerns, complaints and/or grievances will be recorded on a register and the appropriate manager will be informed. All material must be published in Spanish as appropriate.

6.6 GRIEVANCE REDRESS MECHANISM

314. During the design and implementation phases of any project, a person or group of people can be adversely affected, directly or indirectly due to the project activities. Should such a situation arise, there must be a mechanism through which affected parties can resolve such issues in a cordial manner with the project personnel in an efficient, unbiased, transparent, timely and cost-effective manner. To achieve this objective, a grievance redress mechanism has been included in ESAR for this project. While recognizing that many complaints may be resolved immediately, the Mechanism encourages mutually acceptable resolution of issues as they arise.

315. The project allows those that have a complaint or that feel aggrieved by the project to be able to communicate their concern, complaints and/or grievances through an appropriate process. The Grievance Redress Mechanism set out in this ESAR are to be used as part of the project and will provide an accessible, rapid, fair and effective response to concerned stakeholders, especially any vulnerable group who often lack access to formal legal regimes.

316. The Grievance Redress Mechanism set out in this ESAR has been designed to:

- a. Be a legitimate process that allows for trust to be built between stakeholder groups and assures stakeholders that their concerns will be assessed in a fair and transparent manner;
- b. Allow simple and streamlined access to the Complaints Register and Grievance Redress Mechanism for all stakeholders and provide adequate assistance for those that may have faced barriers in the past to be able to raise their concerns;
- c. Provide clear and known procedures for each stage of the Grievance Redress Mechanism process, and provides clarity on the types of outcomes available to individuals and groups;
- d. Ensure equitable treatment to all concerned and aggrieved individuals and groups through a consistent, formal approach that, is fair, informed and respectful to a concern, complaints and/or grievances;
- e. To provide a transparent approach, by keeping any aggrieved individual/group informed of the progress of their complaint, the information that was used when assessing their complaint and information about the mechanisms that will be used to address it; and
- f. Enable continuous learning and improvements to the Grievance Redress Mechanism. Through continued assessment, the findings may reduce potential complaints and grievances.

317. The GRM shall be gender- and age-inclusive and responsive and address potential access barriers to women, the elderly, the disabled, youth and other groups with unique accessibility needs, as appropriate to the Project. The GRM will not impede access to judicial or administrative remedies as may be relevant or applicable and will be readily accessible to all stakeholders at no cost and without retribution.

318. Information about the GRM and how to make a complaint and/or grievance must be communicated during the stakeholder engagement process and placed at prominent places for the information of the key stakeholders.

319. Eligibility criteria for the Grievance Redress Mechanism include:

- a. Perceived negative economic, social or environmental impact on an individual and/or group, or concern about the potential to cause an impact;
- b. Clearly specified kind of impact that has occurred or has the potential to occur; and explanation of how the project caused or may cause such impact; and
- c. Individual and/or group filing of a complaint and/or grievance is impacted, or at risk of being impacted; or the individual and/or group filing a complaint and/or grievance demonstrates that it has authority from an individual and or group that have been or may potentially be impacted on to represent their interest.

320. Local communities and other interested stakeholders may raise a grievance/complaint regarding social and environmental issues at all times. Affected local communities should be informed about the ESAR provisions, as well as those refined in the full ESMP, including its grievance mechanism and how to make a complaint.

6.6.1 Grievance Redress Mechanism

321. This Grievance Redress Mechanism (GRM) has been designed to be a problem-solving mechanism with voluntary good-faith efforts. The Grievance Redress Mechanism is not a substitute for the legal process. The Grievance Redress Mechanism will as far as practicable, try to resolve complaints and/or grievances on terms that are mutually acceptable to all parties. When making a complaint and/or grievance, all parties must act in good faith at all times, and should not attempt to delay and or hinder any mutually acceptable resolution.

322. A three-tier structure has been developed to address all complaints and/or grievances. The first-tier mechanism involves the receipt of a complaint and/or grievance at the project-level, with the PMU (based in AMA) being responsible for coordinating with the concerned people to redress the grievances. There may be certain problems that are more complex and cannot be solved through project-level mechanisms. In the second tier, a Grievance Redress Committee formed at the Provincial and Municipal level to addresses the complaint and/or grievance. In addition to the first and second-tier redress mechanisms, complainants have the option to access a third tier, either through existing nationally legislated frameworks or through UNDP's Accountability Mechanism, which includes: (i) Stakeholder Response Mechanism (SRM) and (ii) Social and Environmental Compliance Unit (SECU).

323. All complainants shall be treated respectfully, politely and with sensitivity. Some enquiries, concern, complaints and/or grievances may require an extended period to address. The complainant(s) will be kept informed of progress towards rectifying the concern. All enquiries, concerns, complaints and/or grievances will be investigated, and a response given to the complainant in a timely manner.

6.6.1.1 Project-level mechanism (first tier)

324. The first tier redress mechanism involves the receipt of a complaint and/or grievance at the project level. The PMU is responsible for collecting the complaints and/or grievances from focal points on a regular basis and recording them. The Safeguards officer in the PMU will be designated as the key officer in charge of the Grievance Redress Mechanism.

325. The Terms of Reference for the Safeguards officer in the PMU (as amended from time to time) will have the following key responsibilities:

- a. Coordinate formation of Grievance Redress Committees before the commencement of constructions to resolve issues;
- b. Act as the focal point at the PMU on Grievance Redress issues and facilitate the resolution of issues within the PMU;
- c. Create awareness of the Grievance Redress Mechanism amongst all the stakeholders through public awareness campaigns;
- d. Assist in redress of all grievances by coordinating with the concerned parties;
- e. Maintain information on grievances and redress;
- f. Monitor the activities of AMA through the PMU and contractors on grievances issues; and
- g. Prepare the progress for monthly/quarterly reports.

326. A key part of the grievance redress mechanism is the requirement for the AMA through the PMU and contractors to maintain a register of complaints and/or grievances received at the respective project site offices. All complaints and/or grievances regarding social and environmental issues can be received either orally (to the field staff), by phone, in complaints box or in writing to the UNDP, AMA or the Contractor. When a Safeguards Officer receives a complaint and/or grievance, they will immediately inform the Safeguards Officer in the PMU.

327. The grievance can be made orally (to the field staff), by phone, in complaints box or in writing to the UNDP, AMA or the implementing Contractor.

328. All enquiries, concerns, complaints and/or grievances that arise during the project must be recorded in a register. Keeping records collected from relevant bodies is the responsibility of the PMU. The registry should include the following information:

- a. Time, date and nature of enquiry, concern, complaints and/or grievances;
- b. Type of communication (e.g. telephone, letter, personal contact);
- c. Name, contact address and contact number or other appropriate means of communication;
- d. Response and investigation undertaken as a result of the enquiry, concern, complaints and/or grievances; and
- e. Actions taken and name of the person taking action.

329. Complainants may specifically contact the Safeguards Officer and request confidentiality if they have concerns about retaliation. In cases where confidentiality is requested (i.e. not revealing the complainant's identity to UNDP, AMA and/or the Contractor), the Safeguards Officer will review the complaint and/or grievance, discuss it with the complainant, and determine how best to engage project executing entities while preserving confidentiality for the complainant.

330. As soon as a complaint and/or grievance is received, the Safeguards Officer would issue an acknowledgement. The Safeguards Officer will then study the complaint and/or grievance made in detail and forward the complaint and/or grievance to the concerned officer with specific dates for replying and redressing the same.

331. The Safeguards Officer will hold meetings with the affected persons / complainant and then attempt to find a solution to the complaint and/or grievance received. If necessary, meetings will be held with the concerned affected persons / complainant and the concerned officer to find a solution to the problem and develop plans to redress the grievance. The deliberations of the meetings and decisions taken are recorded. All meetings in connection with the Grievance Redress Mechanism, including the meetings of the Grievance Redress Committee, must be recorded. The Safeguards Officer for the Grievances Redress Mechanism will be actively involved in all activities.

332. The resolution process should comply with the requirements of the Grievance Redress Mechanism in that it should, as far as practicable, be informal with all parties acting in good faith. Further, the Grievance Redress Mechanism should, as far as practicable, achieve mutually acceptable outcomes for all parties.

333. To oversee the first tier of the Grievance Redress Mechanism, a Community Project Implementation Committee will be formed, which would take on a slightly different structure in each community based on the most relevant actors (directors of companies and institutions involved in the project implementation), but will always include

- a. The president of the popular council in the community.
- b. Community representative.
- c. Safeguards Officer from the PMU (at municipal level).

334. The resolution at the first tier will normally be completed within 30 working days, as per Cuban legislation, and the complaint and/or grievance will be notified of the proposed response through a disclosure form. Where the issue is not addressed within 30 working days, the matter is referred to the next level.

335. If the Safeguard Officer feels that adequate solutions can be established, the officer can decide on retaining the issue at the first level by informing the complainant accordingly.

336. However, if the complainant requests for an immediate transfer to the next level, the matter must be referred to the next tier.

337. Should the grievance be not resolved within this period to the satisfaction of the complainant, the grievance will be referred to the next level of Grievance Redress Mechanism.

338. Any grievance related to corruption or any unethical practice should be referred immediately to the Office of the Attorney General in La Habana and the Office of Audit and Investigation within the UNDP in New York.

6.6.1.2 Grievance committee at the provincial level (second tier)

339. Every possible effort should be made by the AMA through the PMU and contractor to resolve the issues referred to in the complaint and/or grievance within their purview. However, there may be certain problems that are more complex and cannot be solved through project-level mechanisms.

340. Such grievances will be referred to the Grievance Redress Committee, in the second tier of the GRM. A committee will be constituted at every provincial and municipal level by the circulars issued by the Commissioner of Local Government, who would also be the Chairman of the Committee.

341. The Structure of the committee would be:

- a. President of the Popular Council at the Provincial and Municipal level;
- b. Safeguards Officer.

342. The Safeguard Officer from the PMU will coordinate with the respective Commissioner of Local Government in getting these Committees constituted for each province and get the necessary circulars issued in this regard so that they can be convened whenever required.

343. The Terms of Reference for the Grievance Redress Committee are:

- a. Providing support to the affected persons in solving their problems;
- b. Prioritize grievances and resolve them at the earliest;
- c. Provide information to the PMU and AMA on serious cases at the earliest opportunity;
- d. Coordinate with the aggrieved person/group and obtain proper and timely information on the solution worked out for his/her grievance; and
- e. Study the normally occurring grievances and advise PMU, National and District Steering Committee on remedial actions to avoid further occurrences.

344. The Grievance Redress Committee will hold the necessary meetings with the aggrieved party/complainant and the concerned officer and attempt to find a solution acceptable at all levels. The Grievance Redress Committee would record the minutes of the meeting.

345. Grievance Redress Committee will communicate proposed responses to the complainant formally. If the proposed response satisfies the complainant, the response will be implemented, and the complaint and/or grievance closed.

346. In cases where a proposed response is unsatisfactory to the complainant, the Grievance Redress Committee may choose to revise the proposed response to meet the complainant's remaining concerns, or to indicate to the complainant that no other response appears feasible to the Grievance Redress Committee. The complainant may decide to take a legal or any other recourse if he/she is not satisfied with the resolutions due to the deliberations of the three tiers of the grievance redress mechanism.

6.6.1.3 Third tier

347. All stakeholders and local communities should also be informed about options to access mechanisms beyond the project and at Provincial and Municipal levels. At the third tier, complaints may go through existing nationally legislated frameworks and/or through UNDP's Accountability Mechanism.

6.6.1.4 National mechanism

348. All stakeholders and local communities should also be informed about national frameworks for grievances, should they decide to redress their complaints at this level.

349. The Constitution of the Republic of Cuba establishes in its Article 63 that: "Every citizen has the right to direct complaints and petitions to the authorities and to receive relevant and timely attention or responses, in accordance with the law."

350. Based on this constitutional precept, Cuban citizens can direct their complaints to:

- a. *Public Administration: Municipal or Provincial Councils, Council of Ministers and Agencies of the Central Administration of the State with their respective subsidiaries.*
- b. *National, Provincial and Municipal Assemblies of People's Power.*
- c. *Directly or through the District Delegate or the President of Popular Council.*
- d. *Communist Party of Cuba.*
- e. *Office of the Attorney General of the Republic (directly to the national authority or through*
- f. *Its subsidiaries at municipal and provincial levels).*

351. In accordance with what is defined in Article 40 of Decree-Law 272 "Of the Organization and Functioning of the Council of Ministers of the Republic of Cuba", the Council of Ministers as well as the Organisms of the Central Administration of the State and the Councils of the Administrations and Local Assemblies of the Popular Power, at the municipal and provincial levels, "implement due attention to the submissions of the people, giving them timely and effective response". This has led to the creation of an Ombudsman Office in each administrative unit.

352. Law 83 "On the Attorney General's Office of the Republic" establishes in its Chapter III "Protection of Citizens' Rights", Article 24, paragraph 1, that the "Public Prosecutor's Office General of the Republic through the designated Prosecutor, shall receive, investigate and answer, within sixty days, to the complaints, grievances and claims of citizens in the order of their legal filing".

353. In addition, the exercise of this right in Cuba is guaranteed by Law 62 in the "Penal Code" which, in its Chapter V entitled "Crimes against the Rights of assembly, protest, association, complaint and petition" regulates in Article 292 offences such as preventing or impeding a person from addressing complaints and petitions to the authorities. Such conduct is more severely punished if committed by a public official, as it constitutes abuse of office.

354. In this regard, the Constitutional Reform Project guarantees the exercising of the right to complaint in Article 64 where it establishes: "People have the right to address complaints and petitions to the authorities, who are obliged to process them in an appropriate time frame, giving appropriate and relevant answers, in accordance with the law."

355. However, the text of the draft constitutional reform itself reinforces the exercise of this right in the local sphere. Within Title VIII: "Local Organs of People's Power", Chapter II "Municipal Organs of People's Power", Article 195 establishes that the "Municipal Assembly of People's Power, for the purpose of guaranteeing the rights of petition" exercises the following functions: "monitors to ensure the proper attention to the requests, proposals, complaints and denunciations received from the public" and "analyses, at the request of the citizens, agreements and relevant regulations or subordinate municipal authorities; to identifies any that harm citizen interests, both individually and collectively; and adopts the corresponding measures".

6.6.1.5 UNDP Accountability mechanism

356. In addition to the project-level, provincial-level and national grievance modalities as outlined above, complainants also have the option to access UNDP's Accountability Mechanism, with both compliance and grievance functions. This Accountability Mechanism includes: (i) Stakeholder Response Mechanism (SRM) and (ii) Social and Environmental Compliance Unit (SECU).

357. The SECU investigates allegations that UNDP's Standards, screening procedure or other UNDP social and environmental commitments are not being implemented adequately, and that harm may result to people or the environment. The Social and Environmental Compliance Unit is housed in the Office of Audit and Investigations and managed by a Lead Compliance Officer. A compliance review is available to any community or individual with concerns about the impacts of a UNDP programme or project. The Social and Environmental Compliance Unit is mandated to independently and impartially investigate valid requests from locally impacted people, and to report its findings and recommendations publicly.

358. The SRM, provides an additional, formal avenue for stakeholders to engage with UNDP when they believe that a UNDP project may have adverse social or environmental impacts on them; they have raised their concerns with Implementing Partners (including applicable project, national or other GRMs) and/or with UNDP through standard channels for stakeholder consultation and engagement; and they have not been satisfied with the response. The Stakeholder Response Mechanism offers locally affected people an opportunity to work with other stakeholders to resolve concerns, complaints and/or grievances about the social and environmental impacts of a UNDP project. Stakeholder Response Mechanism is intended to supplement the proactive stakeholder engagement that is required of UNDP and its Implementing Partners throughout the project cycle.

359. Communities and individuals may request a Stakeholder Response Mechanism process when they have used standard channels for project management and quality assurance and are not satisfied with the response (in this case the project level grievance redress mechanism). When a valid Stakeholder Response Mechanism request is submitted, UNDP focal points at country, regional and headquarters levels will work with concerned stakeholders and Implementing Partners to address and resolve the concerns. Visit www.undp.org/secu-srm for more details. The relevant form is attached at the end of the ESAR (Annex B).

6.7 BUDGET

360. A budget has been prepared for the implementation of the ESMP as follows:

Item	Cost
ESAR Updating and Auditing	\$10,000
General ESMP Expenses	\$20,000
Fauna and Flora Monitoring	\$120,000
Water Quality Monitoring	\$220,000
Erosion, Drainage and Sediment Control	\$75,000
Archaeological Management	\$25,000
Stakeholder Engagement Workshops	\$140,000
Grievance Redress Mechanism	\$50,000
Total	\$660,000

6.8 KEY ENVIRONMENTAL AND SOCIAL INDICATORS

6.8.1 GEOLOGY AND SOILS/SEDIMENTS

6.8.1.1 Performance Criteria

361. To mitigate impacts on the geology and soils/sediments of the intervention sites, the following performance criteria are set for project activities involving infrastructure removal, enrichment planting and regeneration of natural vegetation:

- a. Best practice erosion, drainage and sediment controls will be applied;
- b. No build-up of sediment and no degradation of water quality in the aquatic environments and/or surface and/or groundwater; including additional saltwater intrusion
- c. Effective implementation of site-specific Erosion Drainage and Sediment Control Plan (EDSCP).
- d. By following the management measures set out in the ESMP activities will not have a significant impact across the broader area.

6.8.1.2 Monitoring

362. A standardized sediment control monitoring program has been developed for the projects (Table 15). The program is subject to review and update at least every two months from the date of issue. The camp officer will be required to:

- a. Conduct site inspections on a weekly basis or after rainfall events exceeding 20mm in a 24-hour period;
- b. Develop a site-specific checklist to document non-conformances to this ESMP or any applicable EDSCPs; and
- c. Communicate the results of inspections and/or water quality testing and ensure that any issues associated with control failures are rapidly rectified and processes are put in place to ensure that similar failures are not repeated.

6.8.1.3 Reporting

363. All sediment and erosion control monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The AMA must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to erosion and sediment control is exceeded.

Table 15. Erosion, Drainage and Sediment Control Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E1: Loss of soil material and sedimentation to the surface and/or groundwater systems from site due to earthwork activities	E1.1: Develop and implement an EDSCP for any surface works, excavation work, water crossings and storm water pathways.	Construction phase	All Personnel	Maintain records
	E1.2: Ensure that erosion and sediment control devices are installed, inspected and maintained as required.	Construction phase	All Personnel	Maintain records
	E1.3: Schedule/stage works to minimize cleared areas and exposed soils at all times.	Pre and during construction	Camp officer	Maintain records
	E1.4: Incorporate the design and location of temporary and permanent EDSC measures for all exposed areas and drainage lines. These shall be implemented prior to pre-construction activities and shall remain onsite during work	Pre and during construction	Camp officer	Maintain records
	E1.5: Schedule/stage proposed works to ensure that major vegetation disturbance and earthworks are carried out during periods of lower rainfall and wind speeds.	Pre and during construction	Camp officer	Maintain records
	E1.6: Strip and stockpile topsoil for use during revegetation and/or place removed soils back on to agricultural lands.	Pre and during construction	Camp officer	Maintain records
	E1.7: Schedule/stage works to minimize the duration of stockpiling topsoil material. Vegetate stockpiles if storage required for long periods.	During construction	All Personnel	Maintain records
	E1.8: Locate stockpile areas away from drainage pathways, waterways and sensitive locations.	Pre and during construction	Camp officer	Maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E1: Loss of soil material and sedimentation to the surface and/or groundwater systems from site due to earthwork activities	E1.9: Mulching shall be used as a form of erosion and sediment control and where used on any slopes (dependent on-site selection), include extra sediment fencing during high rainfall.	During construction	All Personnel	Maintain records
	E1.10: Bunding shall be used either within watercourses or around sensitive/dangerous goods as necessary.	During construction	All Personnel	Maintain records
	E1.11: Grassed buffer strips shall be incorporated where necessary during construction to reduce water velocity.	During construction	Camp officer	Maintain records
	E1.12: Silt fences or similar structures to be installed to protect from increased sediment loads.	During construction	Contractors	Maintain records
	E1.13: Excess sediment in all erosion and sediment control structures (eg. sediment basins, check dams) shall be removed when necessary to allow for adequate holding capacity.	During construction	Contractors	Maintain records
E2: Soil Contamination	E2.1: If contamination is uncovered or suspected (outside of the project footprints), undertake a Stage 1 preliminary site contamination investigation. The contractor should cease work if previously unidentified contamination is encountered and activate management procedures and obtain advice/permits/approval (as required).	Construction phase	All Personnel	Daily and maintain records
Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E2: Contamination	Soil E2.1: Adherence to best practice for the removal and disposal of contaminated soil/ material from site (if required), including contaminated soil within the project footprints.	Construction phase	All Personnel	Daily and maintain records

Annex VI (b) – Environmental and Social Assessment Report

Green Climate Fund Funding Proposal



	<p>E2.2: Drainage control measures to ensure runoff does not contact contaminated areas (including contaminated material within the project footprints) and is directed/diverted to stable areas for release.</p>	Construction phase	All Personnel	Daily and maintain records
	<p>E2.3: Avoid importing fill that may result in site contamination and lacks accompanying certification/documentation. Where fill is not available through on site cut, it must be tested in accordance with geotechnical specifications.</p>	Construction phase	All Personnel	Daily and maintain records
<p>E3: Disposal of excess soil/silt</p>	<p>E3.4: Silt removed from dams/canals/weirs during rehabilitation / maintenance is to be beneficially reused eg. composted, returned to farmland, brick making etc. Silt should be tested to confirm suitability for proposed use.</p>	Construction and operation phases	All Personnel	Maintain records

6.8.2 NOISE, VIBRATION AND AIR QUALITY

364. Infrastructure removal activities have the potential to cause noise and vibrational nuisances. Vibration disturbance to nearby residents and sensitive habitats is likely to be caused by vibrating equipment (rollers, graders) and traffic. Blasting is not required as part of this project. The use of machinery or introduction of noise generating facilities could have an adverse effect on the environment and residents if not appropriately managed.

365. Due to the limited urban development and heavy industry, environmental noise is relatively low. However, the low topography and large expanses of water means that noise is readily transmitted across large distances. Sources of noise include: aircraft (limited flights), motor vehicles, ships and boats utilizing the lagoons, generators and power stations and general urban noise.

366. The proposed project interventions do not involve high emission of activities and so impacts on air quality would generally be low. Nonetheless, all construction activities have the potential to cause air quality nuisance. There is potential for some impacts, particularly odor impacts, to occur as a result of some of the removal activities.

367. The project intervention areas are coastal communities of different sizes, with air pollution sources in and around the project area mostly comprised of nearby industries, road dust, vehicle emissions, windblown dust from agricultural land and exposed earth, and domestic cooking emissions.

368. Contractors involved in infrastructure removal activities should be familiar with methods of controlling noisy machines and alternative construction procedures as contained within specific Cuban legislation or in its absence, the Australian Standard AS2436 – 1981, *Guide to Noise Control on Construction, Maintenance and Demolition Sites* may be used if the legislation has not been enacted.

369. The detail, typical equipment sound power levels, provides advice on project supervision and gives guidance noise reduction. Potential noise, vibration and air pollution sources during construction may include:

- a. Excavation equipment for the installation of rainwater harvesting systems;
- b. Pumps;
- c. Power tools and compressors; and
- d. Delivery vehicles;
- e. Dust and particulate matter from the demolition/removal process

6.8.2.1 Performance Criteria

370. The following performance criteria are set for project activities:

- a. Release of dust/particle matter must not cause an environmental nuisance;
- b. Undertake measures at all times to assist in minimizing the air quality impacts associated with construction and operation activities; and
- c. Corrective action to respond to complaints and/or grievances is to occur within 48 hours.
- d. Noise and vibrations from activities must not cause an environmental nuisance at any noise sensitive place;
- e. Undertake measures at all times to assist in minimizing the noise associated with construction activities;
- f. No damage to off-site property caused by vibration from construction and operation activities.

6.8.2.2 Monitoring

371. A standardized air monitoring program has been developed for the projects (). The program is subject to review and update at least every two months from the date of issue. It is important that:

- a. The requirement for dust suppression will be visually observed by site personnel daily and by AMA and UNDP staff when undertaking routine site inspections; and
- b. Vehicles and machinery emissions are visually monitored and measured when deemed excessive.

372. A standardized noise monitoring program has been developed for the projects (Table 16). The program is subject to review and update at least every two months from the date of issue. Importantly, the site supervisor will:

- a. Ensure equipment and machinery is regularly maintained and appropriately operated; and
- b. Carry out potentially noisy construction activities during 'daytime' hours only.

6.8.2.3 Reporting

373. All air quality and noise monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The AMA must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to air quality and noise is exceeded.

Table 16. Air Quality Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
A.1 Increase in dust levels at sensitive receptors	A1.1: Implement effective dust management measures in all areas during design, construction and operation.	Pre and during construction	All Personnel	Daily and maintain records
	A1.2: Restrict speeds on roads and access tracks.	During construction	Camp officer	Daily and maintain records
	A1.3: Manage dust/particulate matter generating activities to ensure that emissions do not cause an environmental nuisance at any sensitive locations	During construction	Camp officer	Daily and maintain records
	A1.4: Construction activities should minimize risks associated with climatic events (check forecasts).	During construction	Camp officer	Daily and maintain records
	A1.5: Implement scheduling/staging of proposed works to ensure major vegetation disturbance and earthworks are minimized.	Entire construction	Contractor	Daily and maintain records
	A1.6: Locate material stockpile areas as far as possible from sensitive receptors. Covered if appropriate.	During construction	Camp officer	Daily and maintain records
	A1.7: Source sufficient water of a suitable quality for dust suppression activities complying with any water restrictions.	During construction	Camp officer	Daily and maintain records
	A1.8: Schedule revegetation activities to ensure optimum survival of vegetation species.	During construction	Camp officer	Maintain records
	A1.9: Rubbish receptacles should be covered and located as far as practicable from sensitive locations	During construction	Camp officer	Maintain records



Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
A2. Increase in vehicle / machinery emissions	A2.1 Ensure vehicles/machines are switched off when not in use.	During construction	Camp officer	Daily and maintain records
	A2.2 Ensure only vehicles required to undertake works are operated onsite.	During construction	Camp officer	Daily and maintain records
	A2.3 Ensure all construction vehicles, generator and machinery are maintained and operated in accordance with design standards and specifications.	During construction	Camp officer	Daily and maintain records
	A2.4 Develop and implement an induction program for all site personnel, which includes as a minimum an outline of the minimum requirements for environmental management relating to the site.	Pre and during construction	Contractor	Daily and maintain records
	A2.5 Locate construction vehicle/generator/equipment storage areas as far as practicable from sensitive locations.	During construction	Camp officer	Daily and maintain records

Table 17. Noise and Vibration Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
N1: Increased noise levels	N1.1: Select equipment and specific design work practices to ensure that noise emissions are minimized during construction and operation including all pumping equipment.	All phases	Contractor	Maintain records
	N1.2: Specific noise reduction devices such as silencers and mufflers shall be installed as appropriate to site generator and equipment.	Pre and during construction	Contractor	Maintain records
	N1.3 Minimize the need for and limit the emissions as far as practicable if noise generating construction works are to be carried out outside of the hours: 7am-5.30pm	Construction phase	All Personnel	Daily and maintain records
	N1.4: Consultation with nearby residents in advance of construction activities particularly if noise generating construction activities are to be carried out outside of 'daytime' hours: 7am-5.30pm.	Construction phase	All Personnel	Daily and maintain records
	N1.5 The use of substitution control strategies shall be implemented, whereby excessive noise generating equipment items onsite are replaced with other alternatives.	Construction phase	All Personnel	Daily and maintain records
	N1.6 Provide temporary construction noise barriers in the form of solid barriers where there may be an impact on specific residents.	Construction phase	Camp officer	Daily and maintain records
	N1.7 All incidents complaints and non-compliances related to noise shall be reported in accordance with the site incident reporting procedures and summarized in the register.	Construction phase	Camp officer	Maintain records
	N1.8 The contractor should conduct employee and operator training to improve awareness of the need to minimize excessive noise in work practices through implementation of measures.	Pre and during construction	Contractor	Maintain records

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
N2. Vibration due to construction	N2.1: Identify properties, structures and habitat locations that will be sensitive to vibration impacts resulting from construction and operation of the project.	Pre and during construction	Contractor	Maintain records
	N2.2: Design to give due regard to temporary and permanent mitigation measures for noise and vibration from construction and operational vibration impacts.	Pre-construction	Contractor	Maintain records
	N2.3: All incidents, complaints and non-compliances related to vibration shall be reported in accordance with the site incident reporting procedures and summarized in the register.	Construction phase	Camp officer	Maintain records
	N2.4: During construction, standard measures shall be taken to locate and protect underground services from construction and operational vibration impacts.	Construction phase	Camp officer	Maintain records

6.8.3 SURFACE WATER AND GROUNDWATER

6.8.3.1 Performance Criteria

374. The following performance criteria are set for the rehabilitation activities:

- a. No significant decrease in surface water and groundwater quality as a result of construction and operational activities;
- b. Water quality shall conform to any approval conditions stipulated by UNDP, AMA and/or other government departments, or in the absence of such conditions follow a 'no worsening' methodology; and
- c. Effective implementation of site-specific EDSCPs and other measures to protect groundwater, specifically from further saltwater intrusion.
- d. By following the management measures set out in the ESMP the project will not have a significant impact on water quality across the broader area.

6.8.3.2 Monitoring

375. Table 18 outlines the monitoring required for surface water. Having water of a quality that is fit for purpose is important. Water quality can affect plant growth, livestock health, soil quality, farm equipment and domestic use. The quality of a water source is also variable depending upon weather and external inputs. Evaporation increases the concentrations of salts while a flush of water dilutes salts but may increase sediment and fertilizers, and manure or nutrient runoff. Monitoring should be done regularly and more frequently in summer or in periods of prolonged moisture stress.

376. Refer to Table 19 for the monitoring requirements for groundwater. During the project, groundwater quality should be assessed initially and then at least every two months. Initial assessment should cover a wide range of parameters (e.g. depth to water, pH, DO, conductivity, nitrates, phosphates, fecal coliforms, heavy metals, turbidity, hydrocarbons) to provide a baseline and to confirm suitability for intended use. Subsequent monitoring parameters will be determined on need. Ongoing monitoring should form part of the operation of the boreholes.

6.8.3.3 Reporting

377. All water quality monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The AMA must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to water quality is exceeded.

Table 18. Water Quality Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
W1: Elevated suspended solids and other contaminants in surface water systems.	W1.1: Develop and implement a site-specific Erosion, Drainage and Sediment Control Plan (EDSCP) to address drainage control, sediment and erosion controls and stockpiling of materials including soil during construction of all components of the projects. EDSCP measures to be inspected regularly to ensure all devices are functioning effectively.	Pre-Earthworks	Camp officer	Initial set up and then as required with reporting to AMA and UNDP
	W1.2: Designated areas for storage of fuels, oils, chemicals or other hazardous liquids should have compacted impermeable bases and be surrounded by a bund to contain any spillage. Refueling to be undertaken in areas away from water systems.	Entire construction and operation phase	All Personnel	Weekly with reporting to AMA and UNDP
	W1.3: Conduct regular surface and groundwater quality monitoring in location where the groundwater is likely to be impacted including assessing the changes to groundwater quality.	Entire construction and operation phase	Camp officer	Weekly and as required with reporting to AMA and UNDP
	W1.4: Schedule works in stages to ensure that disturbed areas are revegetated and stabilized progressively and as soon as possible after completion of the works.	Avoid undertaking bulk earthworks during wet season	Camp officer and Contractor	Maintain records
	W1.5: Construction materials will not be stockpiled in proximity to aquatic environment that may allow for release into the environment. Construction equipment in proximity to the aquatic environment will be removed at the end of each working day or if heavy rainfall is predicted	Entire construction and operation phase	Camp officer	Maintain daily records

Table 19. Groundwater management measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
GW 1: Increase of gross pollutants, hydrocarbons, metals and other chemical pollutants into the groundwater and/or surface water environment.	GW1.1: Conduct regular surface and groundwater quality monitoring in location where the groundwater is likely to be impacted, including assessing changes to groundwater quality.	Construction and operation phase	Camp officer	Weekly and as required with reporting to AMA and UNDP
	GW1.2: Prevent contaminated surface water from entering aquifers via boreholes and wells - protect from runoff and flooding and keep surrounds clean.	All phases	All Personnel	Weekly
	GW1.3: Designated areas for storage of fuels, oils, chemicals or other hazardous liquids should have compacted impermeable bases and be surrounded by a bund to contain any spillage. Refueling to be undertaken in areas away from water systems.	Entire construction and operation phase	All Personnel	Weekly with reporting to AMA and UNDP
	GW1.5: Check all vehicles, equipment and material storage areas daily for possible fuel, oil and chemical leaks. Undertake refueling at designated places away from water systems.	All phases	All Personnel	Daily and maintain records
	GW 1.6: Minimize the use of herbicides, pesticides and other chemicals and use only biodegradable herbicides that have minimal impact on water quality and fauna. Use only as per directions.	All phases	All Personnel	Weekly reporting to AMA and UNDP

6.8.4 TERRESTRIAL, AQUATIC AND MARINE FLORA AND FAUNA

6.8.4.1 Performance Criteria

378. The following performance criteria are set for the rehabilitation activities:

- a. No clearance of vegetation outside of the designated clearing boundaries;
- b. No death to native fauna as a result of clearing activities;
- c. No deleterious impacts on aquatic environments and terrestrial habitats;
- d. No introduction or further proliferation of invasive species as a result of activities;

6.8.4.2 Monitoring

379. A flora and fauna monitoring program will be implemented (Table 20).

380. Invasive species monitoring will be undertaken, and appropriate action taken in the event of alien or noxious species being identified.

381. The delivery organization will, when undertaking works, compile a weekly report to AMA outlining:

- a. Any non-conformances to this ESMP;
- b. The areas that have been rehabilitated during the preceding week; and
- c. Details of the corrective action undertaken.

6.8.4.3 Reporting

382. All flora and fauna monitoring results and/or incidents will be tabulated and reported as outlined in the ESMP. The AMA must be notified in the event of any suspected instances of death of native fauna and where vegetation is detrimentally impacted.

Table 20. Flora and Fauna Management Measures

Issue	Control Activity (and Source)	Action Timing	Responsibility	Monitoring and Reporting
FF1. Habitat loss and disturbance of fauna	FF1.1 Limit vegetation clearing and minimize habitat disturbance through adequate protection and management of retained vegetation.	During construction	Camp officer	Daily and maintain records
	FF1.2: Minimize noise levels and lighting intrusion throughout construction and operation in the vicinity of any sensitive locations.	During construction	Camp officer	Daily and maintain records
	FF1.3: Ensure that all site personnel are made aware of sensitive fauna/habitat areas and the requirements for the protection of these areas.	During construction	Contractor	Daily and maintain records
	FF1.4 Minimize disturbance to on-site fauna and recover and rescue any injured or orphaned fauna during construction and operation.	During construction	Contractor	Daily and maintain records, report
FF2. Introduced flora and weed species	FF2.1: Implement an ESCP to reduce the spread of weeds through erosion and sediment entering any waterways and therefore spreading.	Pre and during construction	Contractor	Maintain records
	FF2.2: Re-vegetate disturbed areas using native and locally endemic species that have high habitat value.	During construction	Camp officer	As required and maintain records
	FF2.3: Minimize disturbance to mature remnant vegetation, particularly canopy trees.	During construction	Camp officer	Daily and maintain records
	FF2.4: Seed is to be weed free	Operation	Camp Officer	Maintain records
	FF2.5: Environmental weeds and noxious weeds within the project footprints shall be controlled.	During and post construction	Camp officer	Weekly and maintain records

Additional guidance on Integrated Pest Management:

Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human and animal health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems encourages natural pest control mechanisms. (FAO, 2017)

The key benefits of using IPM, are: Lower risks to human health and the environment (e.g. water resources, pollinating insects); Delayed development of pesticide resistance; Money saved on plant protection and Improved public image of agricultural production.

The promotion/appropriation of IPM in Cuba has been supported by a consolidated Plant Health System based on the pest signaling system (monitoring/decisions) that had been consolidated through the Territorial Plant Protection Stations (TPS), as well as the concept of using biological means integrated to IPM programs.

Plant health in the country has evolved according to agro-ecological trends, characterized by four decisive stages (Vázquez, 1997): 1. Diversification of land ownership and use, or diversification of agriculture (since the First Agrarian Reform Act in 1959); 2. the creation of the state plant protection service in 1974 -75 (14 Provincial Laboratories, 28 Border Posts, 69 Territorial Stations and a Research Institute); 3. the implementation of the National Program of Biological Control in 1988 (222 Reproductive Centers of Entomophagous and Entomopathogens; three Bioplasticide Plants) and 4. the development of programs of Integrated Management of Pests (promoted in the nineties).

The legal framework that supports IPM in Cuba is the Decree-Law "De las Regulaciones de la Sanidad Vegetal" which has among its main objectives:

- a) to protect the national territory from the introduction and dissemination of pests that damage plants or plant by-products subject to quarantine, as well as agents that facilitate their spread, either accidentally or intentionally;
- (b) to achieve a satisfactory phytosanitary status in our country by preventing, locating, controlling and eradicating plant pests;
- (c) to establish the basic regulations concerning plant health, including, among others, those relating to the importation of plants, as well as products and raw materials of that origin;
- (d) determine the scope of application of the measures of the State Plant Protection Service;
- (e) regulate the establishment or lifting of plant quarantine, and of states of plant health alert and emergency.

In addition, Article 52 of Act No. 85, the "Forestry Act", provides that "The plant protection of forests shall be governed by the plant health legislation in force and by the provisions applicable to them established by the State Plant Protection Service".

Consequently, entities and natural persons who manage or possess forest heritage areas are obliged to comply with technical phytosanitary standards to prevent and combat pests and diseases, to carry out the pathological inventory and to take the relevant measures in the affected areas to prevent their spread.

Article 53 provides that "In forests, it shall be compulsory for trees that have been burnt, infested or diseased to be cut down by their holders, subject to authorization by the competent phytosanitary authority in appropriate cases, and for the products derived from them to be extracted".

Among the practices applied in Cuba as part of the IPM, the following are identified: floristic diversification and perimeter live fence as a component of agroecological pest management; agroecological practices for the conservation of natural enemies of pests; management of epizootics by entomopathogenic fungi; agronomic

management of weeds and soil phytopathogens; agroecological management of mollusks and rodents; use of biopesticides against soil pests and organic nutrition through the use of good phytosanitary practices.

IPM is also used for the control and eradication of Invasive Exotic Species, together with other methods such as: mechanical, chemical, biological and habitat management.

6.8.5 LAND USE AND TENURE

6.8.5.1 Performance Criteria

383. The following performance criteria are set for the project:

- a. The community has been consulted and project elements have been designed with their informed consultation and participation throughout the project;
- b. All stakeholders are appropriately represented;
- c. Avoid adverse impacts to local community during construction and operations and where not possible, minimize, restore or compensate for these impacts;
- d. Cultural heritage is not adversely impacted;
- e. Community health and safety is protected and overall well-being benefits derived from the project;
- f. Complaint and grievance mechanisms are put in place and proactively managed; and
- g. Long-term social benefits are achieved.

384. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.

385. Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.

386. AMA will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

6.8.5.2 Reporting

387. Records of all consultations are to be kept and reported on monthly basis.

388. The AMA must be notified in the event of any individual or community complaint or dissatisfaction and ensure the Grievance Redress Mechanism is complied with.

Table 21. Social Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
SM1: Restoration of ecosystems and potential loss of access	SM 1.1: Carry out community consultation on the purpose and benefits of making changes to land use	Pre-construction	FLACSO jointly with AMA	Maintain records
	SM 1.2: Get community buy-in on any change of land use	Pre-construction	FLACSO jointly with AMA	Maintain records
	SM 1.3: Ensure compliance with the Grievance Redress Mechanism process	Entire construction and operation phase	FLACSO jointly with AMA	Maintain records
	SM 1.4: Develop awareness-raising and training with local community actors, including experiences on environmentally sustainable production practices that reduce or avoid anthropogenic pressure on ecosystems, and at the same guarantee their access to natural resources (honey harvesting, control of invasive alien species).	Entire construction and operation phase	FLACSO jointly with AMA	Maintain records
SM2: Public nuisance caused by construction/operation activities (e.g. noise, dust etc.)	SM 2.1: Carry out community consultation prior to undertaking activities	Pre-construction	FLACSO jointly with AMA	Maintain records
	SM 2.2: Implement appropriate management plans (refer to Noise, Air, ESCP, and Waste sections of the ESMP)	Construction and operation	Site supervisor	Daily and maintain records
	SM 2.3: Ensure compliance with the Grievance Redress Mechanism process	All phases	FLACSO jointly with AMA	Maintain records

6.8.6 EMPLOYMENT, LABOUR AND WORKING CONDITIONS

6.8.6.1 Performance Criteria

389. The following performance criteria are set for the project:

- a. The community has been consulted and project elements have been designed with their informed consultation and participation throughout the project;
- b. All stakeholders are appropriately represented;
- c. Avoid adverse impacts to local community during construction and operations and where not possible, minimize, restore or compensate for these impacts;
- d. Cultural heritage is not adversely impacted;
- e. Community health and safety is protected, and overall well-being benefits derived from the project;
- f. Complaint and grievance mechanisms are put in place and proactively managed; and
- g. Long-term social benefits are achieved.

390. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.

391. Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.

392. AMA will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

6.8.6.2 Reporting

393. Records of all consultations are to be kept and reported on monthly basis.

394. The AMA must be notified in the event of any individual or community complaint or dissatisfaction and ensure the Grievance Redress Mechanism is complied with.

Table 22. Social Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
SM1: Community Health and Safety	SM 1.1: Carry out community consultation on the purpose and benefits of making changes to land use	Pre-construction	FLACSO jointly with AMA	Maintain records
	SM 1.2: Get community buy-in on any change of land use	Pre-construction	FLACSO jointly with AMA	Maintain records
	SM 1.3: Ensure compliance with the Grievance Redress Mechanism process	Entire construction and operation phase	AMA	Maintain records
SM2: Public nuisance caused by construction/operation activities (e.g. noise, dust etc.)	SM 2.1: Carry out community consultation prior to undertaking activities	Pre-construction	FLACSO jointly with AMA	Maintain records
	SM 2.2: Implement appropriate management plans (refer to Noise, Air, ESCP, and Waste sections of the ESMP)	Construction and operation	Site supervisor and AMA	Daily and maintain records
	SM 2.3: Ensure compliance with the Grievance Redress Mechanism process	All phases	FLACSO jointly with AMA	Maintain records
SM3: Working Condition	SM 3.1: Activities associated with grey infrastructure removal may generate noise, dust, and other disturbances which could impact the health of workers. Similarly, chemicals used in nurseries or planting (fertilizers) could impact the health of members of the community.	All phases	Contractor operators /	Maintain records

6.8.7 ARCHAEOLOGICAL AND CULTURAL HERITAGE

6.8.7.1 Performance Criteria

395. The following performance criteria are set for cultural heritage issues related to the project:

- a. There will be no impact on any important Archaeological, Indigenous and/or Cultural Heritage sites;
- b. Manage any specific sites of important Archaeological, Indigenous and/or Cultural significance (significant sites);
- c. Community engagement activities will identify areas of cultural significance and confirm options of enabling future development related to the area.

6.8.7.2 Monitoring

396. Local stakeholders and community members have a key role to play in the implementation and monitoring of the project.

397. Consultation with stakeholders will continue. This will help ensure that stakeholders continue to be aware of the project, its progress and any changes in the project. It will also assist in identifying any issues as they arise.

398. AMA will be responsible for advisory support and extensions services to local beneficiaries along with being responsible for distributing material inputs and providing technical training and backstopping in the implementation of programme activities.

6.8.7.3 Reporting

399. Records of all consultations are to be kept and reported on monthly basis.

Table 23. Archaeological and Cultural Heritage

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
CH1: Damage or disturbance to significant important Archaeological, Indigenous and/or Cultural Heritage during the earth disturbances and land clearing activities	CH1.1: Should any important Archaeological, Indigenous and/or Cultural Heritage sites, immediately cease work within the area that the site has been observed and consult with the relevant Museum/traditional owner groups, UNDP, CITMA/ICIMAR, and archaeologist available for implementation during construction.	Pre and during construction	Contractor	Daily, maintain records and immediately notify UNDP, CITMA/ICIMAR of any find
CH2: Chance Finds	CH2.1: If, during the execution of the activities, any material is discovered onsite which may be considered of historical or cultural interest, all work shall stop and the supervising contracting officer shall be notified immediately. The area in which the material was discovered shall be secured, cordoned off, marked, and the evidence preserved for examination by the local archaeological or cultural authority (Ministry of Culture / MINCULT). No item believed to be an artifact must be removed or disturbed by any of the workers. Worker are to be made aware of the above and sensitized to the potential of chance finds.	During Construction	Contractor	Maintain records

6.8.8 WASTE MANAGEMENT

6.8.8.1 Background

400. As the implementing agency, the AMA advocates good waste management practice. The preferred waste management hierarchy and principles for achieving good waste management is as follows:

- a. Waste avoidance (avoid using unnecessary material on the projects);
- b. Waste re-use (re-use material and reduce disposing);
- c. Waste recycling (recycle material such as cans, bottles, etc.); and
- d. Waste disposal (all putrescible and/or contaminated waste to be dumped at approved landfills).

401. Any waste generated during construction may include residual sediment and construction wastes such as:

- a. Wastes from construction and drilling equipment maintenance. Various heavy vehicles and construction equipment will be utilized for infrastructure removal. Liquid hazardous wastes from cleaning, repairing and maintenance of this equipment may be generated. Likewise, leakage or spillage of fuels/oils within the site needs to be managed and disposed of appropriately;
- b. Non-hazardous liquid wastes will be generated through the use of workers' facilities such as toilets; and
- c. General wastes including scrap materials and biodegradable wastes.

402. Key waste streams generated during operations are likely to include:

- a. Excavated sediment (primarily sand and coral, which can be used for concrete or spread on suitable areas);
- b. Packaging; and
- c. Used oil and machinery parts.

403. Workers involved in these activities should be familiar with methods minimizing the impacts of clearing vegetation to minimize the footprint to that essential for the works and rehabilitate disturbed areas. By doing these activities, the projects should minimize the impact of waste generated by the project.

6.8.8.2 Performance Criteria

404. The following performance criteria are set for the construction of the projects:

- a. Waste generation is minimized through the implementation of the waste hierarchy (avoidance, reduce, reuse, recycle);
- b. No litter will be observed within the project area or surroundings as a result of activities by site personnel;
- c. No complaints received regarding waste generation and management;
- d. Any waste from on-site portable sanitary facilities will be sent off site for disposal by a waste licensed contractor; and
- e. Waste oils will be collected and disposed or recycled off-site, local oil companies or shipped for recycling.

6.8.8.3 Monitoring

405. A waste management monitoring program has been developed for the projects (Table 24). The program is subject to review and update at least every two months from the date of issue.

6.8.8.4 Reporting

406. The AMA as implementing agency must be notified immediately in the event of any suspected instances of material or serious environmental harm, or if a determined level with respect to waste is exceeded.

Table 24. Waste Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
WT1: Production of wastes and excessive use of resources	WT1.1: Preference shall be given to materials that can be used to construct the project that would reduce the direct and indirect waste generated.	Pre and during construction	Contractor	Maintain records
	WT1.2: Daily waste practices shall be carried out unless these are delegated to the activities of external waste management bodies.	During construction	Camp officer	Daily and maintain records
	WT1.3: The use of construction materials shall be optimized and where possible a recycling policy adopted.	During construction	Camp officer	Weekly and maintain records
	WT1.4: Separate waste streams shall be maintained at all times i.e. general domestic waste, construction and contaminated waste. Specific areas on site shall be designated for the temporary management of the various waste streams.	During construction	Camp officer	Weekly and maintain records
	WT1.5: Any contaminated waste shall be disposed of at an approved facility.	During construction	Camp officer	Weekly and maintain records
	WT1.6: Recyclable waste (including oil and some construction waste) shall be collected separately and disposed of correctly.	During construction	Camp officer	Weekly and maintain records
	WT1.7: Waste sites shall be sufficiently covered to ensure that wildlife does not have access.	During construction	Camp officer	Daily
	WT1.8: Disposal of waste shall be carried out in accordance with the Government of Cuba requirements.	During construction	Camp officer	Weekly and maintain records
	WT1.9: Fuel and lubricant leakages from vehicles and plant shall be immediately rectified.	During construction	Camp officer	Daily and maintain records

6.8.9 EMERGENCY MANAGEMENT MEASURES

407. In the event of actions occurring, which may result in serious health, safety and environmental damage, emergency response or contingency actions will be implemented as soon as possible to limit the extent of environmental damage.

408. The delivery organization will need to incorporate emergency responses into the project complying with the requirements under the Occupational, Health and Safety Policy of the delivery organization and the relevant Cuban legislation.

6.8.9.1 Performance Criteria

409. The following performance criteria are set for the construction of the projects:

- a. No incident of fire outbreak;
- b. No failure of water retaining structures;
- c. No major chemical or fuel spills;
- d. No preventable industrial or work related accidents;
- e. Provide an immediate and effective response to incidents that represent a risk to public health, safety or the environment; and
- f. Minimize environmental harm due to unforeseen incidents.

6.8.9.2 Monitoring

410. An emergency response monitoring program has been developed for the projects (Table 25). The program is subject to review and update at least every two months from the date of issue. Importantly, visual inspections will be conducted by a camp officer daily, with reporting to AMA and UNDP staff on a weekly basis (minimum) noting any non-conformances to this ESMP.

6.8.9.3 Reporting

411. The AMA and UNDP staff must be notified immediately in the event of any emergency, including fire or health related matter including those that have resulted in serious environmental harm.

Table 25. Emergency Management Measures

Issue	Control activity (and source)	Action timing	Responsibility	Monitoring & reporting
E1. Fire and Emergency management and prevention strategies implemented	E1.1: Flammable and combustible liquids bunding/storage areas to be designed in accordance with appropriate international standards	Pre and during construction	Contractor	Daily and maintain records
	E1.2: Fire extinguishers are to be available on site	During construction	Contractor	Daily and maintain records
	E1.3: No open fires are permitted within the project area	During construction	Camp officer	Daily and maintain records
	E1.4: Communication equipment and emergency protocols to be established prior to commencement of construction activities.	Pre-construction	Contractor	
	E1.5: Train all staff in emergency preparedness and response (cover health and safety at the work site).	During construction	Camp officer	Daily and maintain records
	E1.6: Check and replenish First Aid Kits	During construction	Camp officer	Daily and maintain records
	E1.7: Use of Personal Protection Equipment	During construction	All Personnel	Daily and maintain records

APPENDIX A: STANDARD GENERAL ENVIRONMENTAL CONTRACT CLAUSES

STANDARD GENERAL ENVIRONMENTAL CONTRACT CLAUSES

Generic contract clauses are provided in this annex to assist with environmental and social management works expected to have minor impacts. These mitigation measures are the core of a generic, standardized EMP (Environmental Management Plan) and the associated minor impacts typical of small works which can be routinely addressed with best industry practice. These clauses are general and may be modified to conform to applicable national laws, contract procedures and actual scope and nature of the works anticipated. These clauses are intended to be included as requirements in the works contract and shall remain in force throughout the contract period. These clauses represent the minimum standard of execution for environmental protection and include:

- Permits and Approvals
- Site Security
- Discovery of Antiquities
- Worker Occupational Health and Safety
- Noise Control
- Use and Management of Hazardous Materials, fuels, solvents and petroleum products
- Use and Management of Pesticides
- Use of Preservatives and Paint Substances
- Use of Explosives
- Site Stabilization and Erosion Control
- Traffic Management
- Management of Standing Water
- Management of Solid Wastes -trash and construction debris
- Management of Liquid Wastes

Standard Clauses

1. Permits and Approvals

The contractor shall be responsible for ensuring that he or she has all relevant legal approvals and permits required to commence works.

2. Site Security

The contractor shall be responsible for maintaining security over the construction site including the protection of stored materials and equipment. In the event of severe weather, the contractor shall secure the construction site and associated equipment in such a manner as to protect the site and adjacent areas from consequential damages. This includes the management of onsite, construction materials, construction and sanitary wastes, additional strengthening of erosion control and soil stabilization systems and other conditions resulting from contractor activities which may increase the potential for damages.

3. Discovery of Antiquities

If, during the execution of the activities contained in this contract, any material is discovered onsite which may be considered of historical or cultural interest, such as evidence of prior settlements, native or historical activities, evidence of any existence on a site which may be of cultural significance, all work shall stop and the supervising contracting officer shall be notified immediately. The area in which the material was discovered shall be secured, cordoned off, marked, and the evidence preserved for examination by the local archaeological or cultural authority. No item believed to be an artifact must be removed or disturbed by any of the workers. Work may resume, without penalty of prejudice to the contractor upon permission from the contracting officer with any restrictions offered to protect the site.

4. Worker Occupational Health and Safety

The contractor shall ensure that all workers operate within a safe environment. Sanitation facilities shall be provided for all site workers. All sanitary wastes generated as a result of project activities shall be managed in a manner approved by the contracting officer and the local authority responsible for public health. The contractor shall ensure that there are basic medical facilities on site and that there are staff trained in basic first aid. Workers must be provided with the necessary protective gear as per their specific tasks such as hard hats, overalls, gloves, goggles, boots, etc. The contractor shall provide the contracting officer with an occupational health and safety plan for approval prior to the commencement of site activities.

The contractor must ensure that all workers operate within a safe environment. All relevant Labor and Occupational Health and Safety regulations must be adhered to ensure worker safety. Sanitary facilities must be provided for all workers on site. Appropriate posting of information within the site must be done to inform workers of key rules and regulations to follow.

5. Noise Control

The contractor shall control noise emissions generated as a result of contracting activities to the extent possible. In the case of site locations where noise disturbance will be a concern, the contractor shall ensure that the equipment is in good working order with manufacturer supplied noise suppression (mufflers etc.) systems functioning and in good repair.

Where noise management is a concern, the contractor shall make reasonable efforts to schedule activities during normal working hours (between 8 am and 5 pm). Where noise is likely to pose a risk to the surrounding community either by normal works or working outside of normal working hours or on weekends, the contractor shall inform the contracting officer and shall develop a public notification and noise management plan for approval by the contracting officer.

6. Use and Management of Hazardous Materials, fuels, solvents and petroleum products

The use of any hazardous materials including pesticides, oils, fuels and petroleum products shall conform to the proper use recommendations of the product. Waste hazardous materials and their containers shall be disposed of in a

manner approved by the contracting officer in accordance with national laws. A site management plan will be developed by the contractor if the operation involves the use of these materials to include estimated quantities to be consumed in the process, storage plans, spill control plans, and waste disposal practices to be followed. Any plans required shall be approved by the contracting officer.

Elements of the hazardous materials management shall include:

Contractor must provide temporary storage on site of all hazardous or toxic substances in safe containers labeled with details of composition, properties and handling information;

Hazardous substances shall be placed in a leak-proof container to prevent spillage and leaching

Wastes shall be transported and disposed of in a manner approved by the contracting officer compliant with national laws and policies

7. Use and Management of Pesticides

Any use of pesticides shall be approved by the contracting officer and shall conform to the manufacturers' recommendations for use and application. Any person using pesticides shall demonstrate that they have read and understood these requirements and are capable of complying with the usage recommendations to the satisfaction of the contracting officer. All pesticides to be used shall conform to the list of acceptable pesticides that are not banned by the relevant local authority.

If termite treatment is to be utilized, ensure appropriate chemical management measures are implemented to prevent contamination of surrounding areas, and use only licensed and registered pest control professionals with training and knowledge of proper application methods and techniques.

8. Use of Preservatives and Paint Substances

All paints and preservatives shall only be used with the approval of the contracting officer. Information shall be provided to the contracting officer who describes the essential components of the materials to be used so that an informed determination can be made as to the potential for environmental effects and suitability can be made.

Storage, use, and disposal of excess paints and preservatives shall be managed in conformance with the manufacturers' recommendations and as approved by the contracting officer. The contractor shall provide the contracting officer with a list of materials and estimated quantities to be used, storage, spill control and waste disposal plans to be observed during the execution of the contract. This plan is subject to the approval of the contracting officer.

9. Use of Explosives

Use of explosives shall be at the approval of the relevant local authority and shall be supervised and undertaken by a qualified explosives technician. Blasting will be limited to between the hours of 9:00 am and 4:00 pm unless specifically approved by the local authority and the contracting officer. Any use of explosives shall be permitted only after an explosives management and blasting plan has been approved by the relevant local authority and the contracting officer.

This plan shall include:

Description of the explosive agent, charge description, intended use.

Site safety plan including:

Storage of initiators, booster charges and principal blasting agents

Handling precautions to be observed

Transport to and from site

Security of stored materials

Disposal of excess or damaged explosive materials.

Analysis of risk to surrounding area and mitigation measures to be employed including:

Over-pressure event

Noise

Flying debris

Seismic transmission

Accidental detonation

Name and qualifications for all persons responsible for handling explosive agents

10. Site Stabilization and Erosion Control

The Contractor shall implement measures at the site of operations to manage soil erosion through minimization of excavated area and time of exposure of excavated areas, preservation of existing ground cover to the extent possible, provision of approved ground cover and the use of traps and filtration systems. Where excavations are made, contractor shall implement appropriate stabilizing techniques to prevent cave-in or landslide. Measures shall be approved by the contracting officer.

The contractor must ensure that appropriate erosion control measures such as silt fences are installed. Proper site drainage must be implemented. Any drain clogged by construction material or sediment must be unclogged as soon as possible to prevent overflow and flooding. The use of retaining structures and planting with deep rooted grasses to retain soil during and after works must be considered. The use of bio-engineering methods must be considered as a measure to reduce erosion and land slippage. All slopes and excavated areas must be monitored for movement.

The contractor will establish appropriate erosion and sediment control measures such as hay bales, sedimentation basins, and / or silt fences and traps to prevent sediment from moving off site and causing excessive turbidity in nearby streams, rivers, wetlands, and coastal waters.

An erosion management plan will be required where the potential exists for significant sediment accumulation e in wetlands, lakes, rivers and marine systems. This plan shall include a description of the potential threat, mitigation measures to be applied, and consideration for the effects of severe weather and an emergency response plan.

If works are along coastal marine areas or near major streams and river, water quality monitoring must be done before construction, and at regular intervals to determine turbidity levels and other quality parameters.

Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies.

11. Air Quality

When appropriate, the contractor shall provide an air quality management plan for contracting officer approval. This plan will include provisions for the management and control of dust and unnecessary emissions resulting from construction activities. The plan shall include control measures to be implemented including the management of dust generated from transportation and site construction activities as well as excess emissions from vehicles and equipment. Under no circumstances shall site or roadway dusts be managed using oil spray techniques.

12. Traffic Management

In the event that construction activities should result in the disruption of area transportation services, including temporary loss of roadways, blockages due to deliveries and site related activities, the contractor shall provide the contracting officer with a traffic management plan including a description of the anticipated service disruptions, community information plan, and traffic control strategy to be implemented so as to minimize the impact to the surrounding community. This plan shall consider time of day for planned disruptions, and shall include consideration for alternative access routes, access to essential services such as medical, disaster evacuation, and other critical services. The plan shall be approved by the contracting officer.

Elements of the traffic management plan to be developed and implemented by contractor shall include:

Alternative routes will be identified in the instance of extended road works or road blockages;

Public notification of all disturbance to their normal routes;

Signage, barriers and traffic diversions must be clearly visible and the public warned of all potential hazards;

provision for safe passages and crossings for all pedestrians where construction traffic interferes with their normal route;

Active traffic management by trained and visible staff at the site or along roadways as required to ensure safe and convenient passage for the vehicular and pedestrian public;

Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement.

13. Management of Standing Water

Under no circumstances shall the contractor permit the collection of standing water as a consequence of contractor activities without the approval of the contracting officer and consultation with the relevant local environmental health authority. Recommendations from that local authority on how to manage and treat the standing water must be implemented. The condition of the standing water must be monitored by the contractor to ensure that it does not present itself as a breeding ground for any pests such as mosquitoes.

14. Management of Solid Wastes and Construction Debris

The contractor shall provide a solid waste management plan that conforms to the national solid waste management policies and regulations for approval by the contracting officer. The site waste management plan shall include a description of waste handling procedures including collection, storage and disposal through the national waste management system. There will be no open burning of waste material and the contractor shall endeavor to recycle wastes as appropriate through the national waste management system.

Under no circumstances shall the contractor allow construction wastes to accumulate so as to cause a nuisance or health risk due to the propagation of pests and disease vectors.

15. Management of Liquid Wastes

The contractor shall provide the contracting officer with a liquid waste management plan as part of a site waste management plan that conforms to the waste management policies and regulations of the relevant Saint Vincent and the Grenadines authority. Under no circumstances shall the contractor allow construction related liquid wastes to

accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its content. The site waste management plan shall include a description of how these wastes will be stored, collected and disposed of in accordance with current law. Additionally the contractor shall provide for the regular removal and disposal of all site wastes and provide the contracting officer with a schedule for such removal.

Specific elements of the contractor’s liquid waste management plan shall include: contractor to abide by all pertinent waste management and public health laws; waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities; construction and demolition wastes will be stored in appropriate bins; liquid and chemical wastes will be stored in appropriate containers separated from the general refuse; all waste will be collected and disposed of properly in approved landfills by licensed collectors; the records of waste disposal will be maintained as proof for proper management as designed; whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos); construction related liquid wastes must not be allowed to accumulate on or off the site, or to flow over or from the site in an uncontrolled manner or to cause a nuisance or health risk due to its contents.

Appendix B: Guidance for Submitting a Request to the Social and Environmental Compliance Unit and/or the Stakeholder Response Mechanism



Empowered lives.
Resilient nations.

Guidance for Submitting a Request to the Social and Environmental Compliance Unit (SECU) and/or the Stakeholder Response Mechanism (SRM)

Purpose of this form

- If you use this form, please put your answers in bold writing to distinguish text
- The use of this form is recommended, but not required. It can also serve as a guide when drafting a request.

This form is intended to assist in:

(1) Submitting a request when you believe UNDP is not complying with its social or environmental policies or commitments and believe you are being harmed as a result. This request could initiate a ‘compliance review’, which is an independent investigation conducted by the Social and Environmental Compliance Unit (SECU), within UNDP’s Office of Audit and Investigations, to determine if UNDP policies or commitments have been violated and to identify measures to address these violations. SECU would interact with you during the compliance review to determine the facts of the situation. You would be kept informed about the results of the compliance review.

and/or

(2) Submitting a request for UNDP “Stakeholder Response” when you believe a UNDP project is having or may have an adverse social or environmental impact on you and you would like to initiate a process that brings together affected communities and other stakeholders (e.g., government representatives, UNDP, etc.) to jointly address your concerns. This Stakeholder Response process would be led by the UNDP Country Office or facilitated through UNDP headquarters. UNDP staff would communicate and interact with you as part of the response, both for fact-finding and for developing solutions. Other project stakeholders may also be involved if needed.

Please note that if you have not already made an effort to resolve your concern by communicating directly with the government representatives and UNDP staff responsible for this project, you should do so before making a request to UNDP’s Stakeholder Response Mechanism.

Confidentiality If you choose the Compliance Review process, you may keep your identity confidential (known only to the Compliance Review team). If you choose the Stakeholder Response Mechanism, you can choose to keep your identity confidential during the initial eligibility screening and assessment of your case. If your request is eligible and the assessment indicates that a response is appropriate, UNDP staff will discuss the proposed response with you, and will also discuss whether and how to maintain confidentiality of your identity.

Guidance

When submitting a request please provide as much information as possible. If you accidentally email an incomplete form, or have additional information you would like to provide, simply send a follow-up email explaining any changes.

Information about You

Are you...

1. A person affected by a UNDP-supported project?

Mark "X" next to the answer that applies to you: Yes: No:

2. An authorized representative of an affected person or group?

Mark "X" next to the answer that applies to you: Yes: No:

If you are an authorized representative, please provide the names of all the people whom you are representing, and documentation of their authorization for you to act on their behalf, by attaching one or more files to this form.

3. First name:

4. Last name:

5. Any other identifying information:

6. Mailing address:

7. Email address:

8. Telephone Number (with country code):

9. Your address/location:

10. Nearest city or town:

11. Any additional instructions on how to contact you:

12. Country:

What you are seeking from UNDP: Compliance Review and/or Stakeholder Response

You have four options:

- Submit a request for a Compliance Review;
- Submit a request for a Stakeholder Response;
- Submit a request for both a Compliance Review and a Stakeholder Response;
- State that you are unsure whether you would like Compliance Review or Stakeholder Response and that you desire both entities to review your case.

13. Are you concerned that UNDP's failure to meet a UNDP social and/or environmental policy or commitment is harming, or could harm, you or your community? Mark "X" next to the answer that applies to you: Yes: No:

14. Would you like your name(s) to remain confidential throughout the Compliance Review process?

Mark "X" next to the answer that applies to you: Yes: No:

If confidentiality is requested, please state why:

15. Would you like to work with other stakeholders, e.g., the government, UNDP, etc. to jointly resolve a concern about social or environmental impacts or risks you believe you are experiencing because of a UNDP project?

Mark "X" next to the answer that applies to you: Yes: No:

16. Would you like your name(s) to remain confidential during the initial assessment of your request for a response?

Mark "X" next to the answer that applies to you: Yes: No:

If confidentiality is requested, please state why:

17. Requests for Stakeholder Response will be handled through UNDP Country Offices unless you indicate that you would like your request to be handled through UNDP Headquarters. Would you like UNDP Headquarters to handle your request?

Mark "X" next to the answer that applies to you: Yes: No:

If you have indicated yes, please indicate why your request should be handled through UNDP Headquarters:

18. Are you seeking both Compliance Review and Stakeholder Response?

Mark "X" next to the answer that applies to you: Yes: No:

19. Are you unsure whether you would like to request a Compliance Review or a Stakeholder Response? Mark "X" next to the answer that applies to you: Yes: No:

Information about the UNDP Project you are concerned about, and the nature of your concern:

20. Which UNDP-supported project are you concerned about? (if known):

21. Project name (if known):

22. Please provide a short description of your concerns about the project. If you have concerns about UNDP's failure to comply with its social or environmental policies and commitments, and can identify these policies and commitments, please do (not required). Please describe, as well, the types of environmental and social impacts that may occur, or have occurred, as a result. If more space is required, please attach any documents. You may write in any language you choose

23. Have you discussed your concerns with the government representatives and UNDP staff responsible for this project? Non-governmental organizations?

Mark "X" next to the answer that applies to you: Yes: No:

If you answered yes, please provide the name(s) of those you have discussed your concerns with

Name of Officials You have Already Contacted Regarding this Issue:

First Name	Last Name	Title/Affiliation	Estimated Date of Contact	Response from the Individual
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24. Are there other individuals or groups that are adversely affected by the project?

Mark “X” next to the answer that applies to you: Yes: No:

25. Please provide the names and/or description of other individuals or groups that support the request:

First Name	Last Name	Title/Affiliation	Contact Information
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Please attach to your email any documents you wish to send to SECU and/or the SRM. If all your attachments do not fit in one email, please feel free to send multiple emails.

Please also note that additional considerations as well as local resources in regard to receiving sensitive complaints (such as those related to Gender-based violence), have been included in the project’s Gender Assessment.

Submission and Support

To submit your request, or if you need assistance please email: project.concerns@undp.org