## Funding Proposal

FP126: Increased climate resilience of rural households and communities through the rehabilitation of production landscapes in selected localities of the Republic of Cuba (IRES)

Cuba | Food and Agriculture Organization of the United Nations (FAO) | Decision B.25/04

15 April 2020



# Funding Proposal

Project/Programme title:	communities through the rehabilitation of production landscapes in selected localities of the Republic of Cuba (IRES)
Country:	<u>Cuba</u>
Accredited Entity:	Food and Agriculture Organization of the United Nations
Date of first submission:	[2017/09/08]
Date of current submission	[2019/11/07]
Version number	<u>V.001</u>

Increased climate resilience of rural households and





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#### Note to Accredited Entities on the use of the funding proposal template

- Accredited Entities should provide summary information in the proposal with crossreference to annexes such as feasibility studies, gender action plan, term sheet, etc.
- Accredited Entities should ensure that annexes provided are consistent with the details provided in the funding proposal. Updates to the funding proposal and/or annexes must be reflected in all relevant documents.
- The total number of pages for the funding proposal (excluding annexes) <u>should not</u> <u>exceed 60</u>. Proposals exceeding the prescribed length will not be assessed within the usual service standard time.
- The recommended font is Arial, size 11.
- Under the <u>GCF Information Disclosure Policy</u>, project and programme funding proposals will be disclosed on the GCF website, simultaneous with the submission to the Board, subject to the redaction of any information that may not be disclosed pursuant to the IDP. Accredited Entities are asked to fill out information on disclosure in section G.4.

Please submit the completed proposal to: fundingproposal@gcfund.org Please use the following name convention for the file name: "FP-[Accredited Entity Short Name]-[Country/Region]-[Dates]"



#### ACRONYMS

AMA	Executive Environmental Agency
AMA	Accreditation Master Agreement
CCS	Credit and Service Cooperatives
CEE	Co-executing Entity
CIMINAGT	Center for Research on Animal Improvement
CITMA	Ministry of Science, Technology and Environment
CTNPF	Close-to-Nature Planted Forest
CP	People's Councils
EE	Executing Entity
ESC	Commodities and Trade Division
FAA	Funded Activities Agreement
FONADEF	National Forestry Development Fund
GEF	Global Environment Facility
GoC	Government of Cuba
IAGRIC	Institute of Agricultural Engineering
INIFAT	Institute for Fundamental Research on Tropical Agriculture
INISAV	Institute of Plant Health
INRH	National Institute for Hydraulic Resources
ISTA	Agrarian Tenure Institute
LRF	Landscape Resilience Fund
M&E	Monitoring and Evaluation
MINAG	Ministry of Agriculture
MINCEX	Ministry of Foreign Trade
MPMU	Municipal Project Management Unit
MPCC	Municipal Project Coordinating Committee
MTE	Mid-Term Evaluation
NAP	National Adaptation Plan
NAMA	Nationally Appropriate Mitigation Actions
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NP <b>S</b> C	National Project Steering Committee
NPMU	National Project Management Unit
NOAA	National Oceanic and Atmospheric Administration (US)
O&M	Operations and Maintenance
OSFMU	Operational Support and Financial Management Unit
PCC	Project Coordination Committee
PPMU	Provincial Project Management Unit
SCF	Soil Conservation Fund
SPI	Standard Precipitation Index
TSC	Technical and Scientific Committee
UBPC	Base Units of Cooperative Production
UEB	Base Enterprise Unit
UEBIST	Base Enterprise Units for Integrated Technical Services





A. PROJECT/PROGRAMME SUMMARY							
A.1. Project or programme	Project A.2. Public or private Public Public						
A.3. Request for Proposals (RFP)	Not applicable Not applicable						
A.4. Result area(s)	Mitigation:       Reduced emission         □       Energy access and p         □       Low-emission transp         □       Buildings, cities, indu         ⊠       Forestry and land us         Adaptation:       Increased resilie         ⊠       Most vulnerable peo         □       Health and well-bein         □       Infrastructure and bu         ⊠       Ecosystem and ecos	ns from: power generation: port: ustries and appliances: e: nce of: ple, communities and regions: g, and food and water security uilt environment: system services:	GCF contribution:         Enter number%         Enter number%         Enter number%         32%         y:       35%         Enter number%         Enter number%         33%				
A.5. Expected mitigation impact	2,675,727 million tCO2-eq in 20 years	A.6. Expected adaptation impact	Direct beneficiaries 51,713 23,788 women <sup>1</sup>				
A.7. Total financing (GCF + co-finance)	119,914,000 USD		Medium (Upto USD 250				
A.8. Total GCF funding requested	38,206,790.80 USD	A.9. Project size	million)				
A.10. Financial instrument(s) requested for the GCF funding	<ul> <li>☑ Grant</li> <li>☑ Loan</li> <li>☑ Guarantee</li> <li>☑ Enter number</li> </ul>	er                         Equity er	Enter number sed Enter number				
A.11. Implementation period	7 years	A.12. Total lifespan	20 years				
A.13. Expected date of AE internal approval		A.14. ESS category	В				
A.15. Has this FP been submitted as a CN before?	Yes 🛛 No 🗆	A.16. Has Readiness or PPF support been used to prepare this FP?	Yes □ No ⊠				
in the entity work programme?	Yes 🗵 No 🗆	in the country programme?	Yes 🛛 No 🗆				
A.19. Complementarity and coherence	Does the project complement Please see section B.1. Yes □ No ⊠	t other climate finance funding	ı (e.g. GEF, AF, CIF, etc.)?				
A.20. Executing Entity information	<b>Co-executing Agencies</b> : Ministry of Agriculture (MINAG); Food and Agriculture Organization of the United Nations						





#### A.21. Executive summary

- According to the Vulnerability and Climate Change Adaptation Index in the Latin America and Caribbean region, Cuba is classified as a "high risk" country<sup>2</sup>. Observations show that the country's climate has been changing, and studies carried out under the Second National Communication to the UNFCCC (2015)<sup>3</sup> indicate the occurrence of: i) increases in temperature; ii) increasingly erratic seasonal rains; iii) greater frequency of long and severe droughts; iv) increased frequency and severity of cyclonic activity; and v) moderate and strong coastal flooding<sup>4</sup>.
- 2. The changes in rainfall patterns and its overall reduction, as well as expected increases in evaporation due to increased temperatures, have a significant impact on droughts. Future climate change impacts will affect agricultural production, particularly of staple crops, negatively impacting the livelihoods of farm households and the general availability of agricultural and food products, ultimately putting food security at risk. Projected climate scenarios show that for 65% of 29 crops studied, the potential yields will suffer a reduction of 12% (beans and rice), 16% for manioc and as much as 48% for potatoes (see Annex 2, Table 4).<sup>5,6</sup> Seventy-eight municipalities, representing an area of 50,907 km<sup>2</sup> and about 46% of the national territory, are the most affected in terms of intensity of agricultural drought during more than 50 days a year<sup>7</sup>. Among these are Corralillo, Quemado de Güines and Santo Domingo in Las Villas province; Los Arabos in Matanzas province (Central Region); and Amancio Rodríguez, Colombia and Jobabo in Las Tunas province (Eastern Region). These are the target municipalities for this project.
- 3. With the analysis of trends towards increasing vulnerability to climate change based on historic records and climate models, the Government of Cuba has concluded that the entire archipelago is at risk<sup>8</sup>. In 2017, the Council of Ministers approved *"Tarea Vida"*, the Cuban State Plan to address climate change. The Plan proposes five Strategic Actions with eleven immediate Tasks, chosen based on a multidisciplinary analysis of vulnerability and other factors, with highest priority given to 73 of Cuba's 168 municipalities (63 in coastal areas and 10 inland). If the 73 highest priority, seven have been selected as target areas for this project.

4. Of the five Strategic Actions defined in the "Tarea Vida", two directly address the agricultural sector:

A) adaptation of agricultural activities, particularly those with the greatest impact on the country's food security, to changes in land use as a consequence of drought and other climate change impacts.
 B) diversification of crops, improvement in soil conditions, introduction and development of varieties resistant to new

temperature scenarios.
5. This Project is fully aligned with the Government's strategic actions defined to address the adverse effects of climate change in the agricultural sector and its objective is to *increase the climate resilience of agricultural production and ensure food security through improved ecosystem services from landscape management using agroforestry, silvopastoral systems, reforestation and assisted natural forest regeneration in seven highly vulnerable municipalities to the impacts of climate change.* Through this project, critical ecosystem services will become more CC-resilient, especially regulation of the hydrological cycle, through landscape rehabilitation and management that enhances agro-ecosystem productivity and sustainability by improving water infiltration rates and reducing or preventing run-off and soil erosion. At the same time, significant mitigation benefits (e.g. from increased carbon in soils and biomass) will result from the integration of trees and bushes in agroforestry and silvopastoral systems, as well as through reforestation with close-to-nature planted forests and assisted natural regeneration. Furthermore, improved ecosystem services and productive agricultural systems will help to increase communities' resilience to climate change, improving their food and water security.

6. This project constitutes the second phase of a three-phase program to enhance climate resilience of Cuba's agricultural sector countrywide. A first phase of research, testing and analysis of potential resilience-enhancing land use systems identified agroforestry, silvopastoral and forestry modules that are both productive and sustainable has been concluded. The second phase consists of this proposed GCF project, which will implement these proven modules on a mesoscale to build on the knowledge of these modules' performance in the field and at scale, enhance institutional capacities for extension and adaptation of the modules, and establish and operationalize a financial mechanism to support farmers in applying resilience-enhancing technologies and practices to their agro-ecosystems. A third phase will, in future, take the lessons learned from this project and extend this knowledge through more robust institutional capacities to farmers nationwide, who will be supported by the financial mechanism established under this proposed GCF project.

<sup>&</sup>lt;sup>1</sup> An average of 46% women has been taken into consideration for the Project Intervention Area, according to Annex 8- Gender assessment and projectlevel action plan.

<sup>&</sup>lt;sup>2</sup> Corporación Andina de Fomento, 2014. Índice de vulnerabilidad y adaptación al cambio climático en la región de América Latina y el Caribe

<sup>&</sup>lt;sup>3</sup> Second National Communication to the UNFCCC. 2015. Havana: Republic of Cuba <u>https://unfccc.int/sites/default/files/resource/cubnc2.pdf</u>

<sup>&</sup>lt;sup>4</sup> Further information on observed climate changes in Cuba are provided in Appendix 4 of this document: Somoza J., De la Colina A.: Estudio de Linea Base de Adaptación y Vulnerabilidad para el Proyecto IRES FAO. La Habana, Cuba, 2018. (Appendix 4)

<sup>&</sup>lt;sup>5</sup> Rivero R., et al (2010) in SNC Cuba (2015). In Somoza J., De la Colina A., 2018

<sup>&</sup>lt;sup>6</sup> Municipal Statistical Data. Centella Artola et al (2006). In Somoza J., De la Colina A., 2018

<sup>7</sup> Centella A, B. Lapinel, O. Solano, R. Vázquez, C. Fonseca, V. Cutié, R. Baéz, S. González, J. Sille, P. Rosario y L. Duarte (2006). La sequía meteorológica y agrícola en la República de Cuba y la República Dominicana. Tomo I, 172 pp,

<sup>&</sup>lt;sup>8</sup> Second National Communication to the UNFCCC. 2015. Havana: Republic of Cuba <u>https://unfccc.int/sites/default/files/resource/cubnc2.pdf</u>





- 7. The Project is structured in three mutually reinforcing and interdependent Outputs: Output 1 will utilize investment in resilience-enhancing technologies to rehabilitate production landscapes through agroforestry, silvopastoral systems, reforestation and assisted natural regeneration modules tested and evaluated in the completed earlier Phase 1 of the project. Rehabilitation of these landscapes will involve removal of marabu, an aggressive, non-native invasive shrub as an essential first step. Through Output 2, technical assistance, capacity building and know-how will be extended to ensure that farmers know how to replace traditional carbon intensive practices with new resilience-enhancing production practices necessary for effective implementation of the landscape rehabilitation modules under Output 1. Output 3 will support the transformation of the political, institutional and legal framework required to shift the prevailing paradigm of production maximization to the new paradigm of economically viable climate-resilient and sustainable production systems; this will include analyses of and reforms to current financial mechanisms and economic incentive structures. GCF funds will be used to purchase essential machinery, equipment, and inputs (e.g. seedlings), train institutional staff and farmers in climate-resilient agricultural practices and systems, and assist government to analyze and enable the appropriate reforms to relevant political, institutional, legal and financial frameworks; government co-financing will cover the costs of technical and logistical support to establish the land management modules, to train farmers, and to provide assistance to farmers for business planning and access to credit and markets.
- 8. The project will directly benefit approximately 51,713 people, of which 23,788 women throughout the seven target municipalities; an additional 240,117 inhabitants of the target areas will benefit indirectly from increased food security from enhanced and more stable production, improved hydrological regulation, and increased opportunities for employment in agricultural tasks and value addition.



## B

#### **B. PROJECT INFORMATION**

#### **B.1. Climate rationale and context**

- 9. Cuba is a Small Island Developing State (SIDS), consisting of the island of Cuba, the Isle of Youth and more than 1,600 islands, islets and cays, which altogether cover a surface area of 110,922 km<sup>2</sup>. The country is divided into Western, Central and Eastern regions, as shown in Figure 1 of the Feasibility Study (FS), comprised of 116 provinces and 168 municipalities.
- 10. According to the Vulnerability and Climate Change Adaptation Index in the Latin America and Caribbean Region, Cuba is classified as a "high risk" country in terms of its vulnerability to the effects of climate change<sup>9</sup>. Observations indicate that the country's climate has been changing, and studies carried out under the Second National Communication to the UNFCCC (2015)<sup>10</sup> describe the occurrence of: i) increases in temperature; ii) increasingly erratic seasonal rains; iii) greater frequency of long and severe droughts; iv) increased frequency and severity of cyclonic activity; and v) moderate and strong coastal floods<sup>11</sup>:
- 11. **Temperature rise**: The surface air temperature has increased by 0.9°C since the middle of last century, conditioned by the increase of the average minimum temperature by 1.9°C, thereby producing a decrease in the daytime temperature oscillation (see Figure 3 in the FS). The rise in temperatures in the Central Region is even higher than the national average, at an incremental rate of 1.6% per year during the last 35 years.
- 12. Changes in precipitation patterns: There has been a slight increase in positive precipitation anomalies since the late 1970s with an increase in rainfall during the rainy season (from November to April)<sup>12</sup>.
- 13. Although the time series of annual precipitation observations for Cuba during 1961-2007 does not show a statistically significant trend, there has been a slight but steady increase in positive anomalies since the end of the 1970s and especially since the 1990s. In general, the slight increase in annual values is fundamentally conditioned by the variations that occurred during the dry season.
- 14. Table 1 (Appendix 2.4 of the FS) also shows that in the *dry season* (corresponding to November-April), negative average values predominate in the period 1961-1979. The tendency in the following decades is towards positive values with a reduction of the range of variation of the magnitude means and an increase in extreme positive anomalies. Consequently, there is a change in the mean values and in the variance in the period between 1980 and 2007, in comparison to the period 1961-1979, which in the case of the Central Region is -0.81 in the period 1961 -1979, to 0.05 in the period 1961-2007. In the Eastern Region, we can also see a tendency of increased average values of positive anomalies, particularly in the period 1980-2007 (-0.44 to -0.15), also with a reduction in the variation of the mean values.
- 15. Regarding the rainy season, the distribution of precipitation anomalies reveals a change in average values during recent decades, but contrary to the trend described for the non-rainy period, in this case there is a tendency for negative anomalies. In the rainy months, despite the predominance of negative anomalies in recent years, there has been a slight upward trend, which has been observed since the mid-1970s to the present, particularly with the increase in the magnitude of positive anomalies in the central region (see Appendix 2.4 of the FS, Table 1). This behavior implies reduction of the range of variation of the average values of rainfall, particularly in the Eastern Region. Most notable in this rainy period is the sharp decrease in the average values and variation in the Eastern Region. The reduction of accumulated rainfall in the Eastern Region is largely due to the more frequent occurrence of meteorological drought processes in recent years in that region.

#### **Extreme events**

16. **Droughts:** There has been an increase in drought events in the period 1961-1990 when compared to 1931-1960<sup>13</sup>. In the 1990s, a notably intense drought occurred in the Caribbean Basin, Central America, Mexico and the Southeastern United

<sup>&</sup>lt;sup>9</sup> Corporación Andina de Fomento, 2014. Índice de vulnerabilidad y adaptación al cambio climático en la región de América Latina y el Caribe

<sup>&</sup>lt;sup>10</sup> Second National Communication to the UNFCCC. 2015. Havana: Republic of Cuba <u>https://unfccc.int/sites/default/files/resource/cubnc2.pdf</u>

<sup>&</sup>lt;sup>11</sup> Further information on observed climate changes in Cuba are provided in Appendix 4 of this document: Somoza J., De la Colina A.: Estudio de Linea Base de Adaptación y Vulnerabilidad para el Proyecto IRES FAO. La Habana, Cuba, 2018. (Appendix 4)

<sup>&</sup>lt;sup>12</sup> Planos Gutiérrez, E.O., Rivero Vega, R., Guevara Velazco, V., 2012. Impacto del Cambio Climático y Medidas de Adaptación en Cuba. La Habana: Cuba / *Climate Change Impact and Adaptation Measures in Cuba*. Havana: Cuba.

<sup>13</sup> Lapinel, B., Rivero, R.E., Cutié, V., Rivero, R.R., Varela, N., 1993. Sistema Nacional de Vigilancia de la Sequía: Análisis del Periodo 1931-1990 (Informe Técnico). Instituto de Meteorología, La Habana, CUBA.





States (from April to July 1998), generated under the influence of the 1997-1998 ENSO. The event affected the entire Cuban archipelago and in particular the municipalities of the Eastern Region. Starting in 2000, there have been more frequent and severe drought periods, especially in the Eastern Region and in some municipalities in the Central Region, which have extended to almost the entire country in the years 2003-2005. In 2004-2005 a severe drought (catalogued as the most critical event for Cuba in the last 100 years) threatened the livelihoods of more than two million people (17% of the entire population) by causing agricultural losses and livestock death, and facilitating the invasion and spread of alien species such as *Dicostrachys cinerea* (marabú or sicklebush)<sup>14</sup>.

- 17. Hurricanes: Tropical cyclones, severe local storms and hurricanes are the meteorological phenomena that are associated with the greatest risk of disasters<sup>15</sup>. The frequency of such events in Cuba varies from zero to four annually. On average, Cuba is affected by one tropical cyclone per year and one hurricane every two years. The occurrence of these events is more frequent in the Western-Central Region of the country. Between 2005 and 2017, Cuba was affected by 11 hurricanes. Two tropical cyclones occurred in 2005, affecting<sup>16</sup> 2,600,000 people (approximately 22% of the total population) causing damage equivalent to USD 2,100,000. The impact of storms occurring from 2007 to 2017 affected 1,090,053 people and caused USD 6,672,000<sup>17</sup> in damages. From 1980 to 2000, Cuba was affected by 10 tropical cyclones and over the period of 2001 to 2018, the occurrence of such phenomena doubled (19 tropical cyclones affected Cuba from 2001-2018)<sup>18</sup>. Two tropical cyclones occurred in 2005, affecting<sup>19</sup> 2,600,000 people (approximately 22% of the total population) causing damage equivalent to USD 2,100,000. In recent years, the province of Las Tunas (Eastern Region) has been affected by four tropical storms (See Annex 2, Table 2, p.14). They bring massive amounts of rainfall which, given soil compaction and the presence of hardpans, are unable to penetrate the soil to recharge groundwater, since dramatic increases in precipitation intensity may exceed soil infiltration capacities<sup>20</sup>.
- Floods: Cuba suffers from moderate and strong coastal flooding caused by sea water intrusion or intense rains. In the period from 1996 to 2016, 12 flood events occurred affecting 134,957 people<sup>21</sup>.

#### Climate projections

#### Temperature

19. An increase in temperature as expected in national climatic scenarios signifies that temperature values in 2050 would represent mean temperatures of 29°C in the Central Region and 30°C in the Eastern Region; while the average maximum temperature values would be 35 and 36°C respectively. Trends in temperature variables are expected to increase (Appendix 2 of the Feasibility Study (FS), Figures 3, 5-a, 5-b), consistent with national trends. CMIP5 projections indicate that by 2050 the mean annual temperature will rise by 1.6°C, the total annual hot days of temperature above 35°C will rise by 20.8 days (RCP 8.5, High Emission)<sup>22</sup>

#### Precipitation

- 20. National rainfall scenarios foresee drastic reductions for 2050-2100, between 15 and 63% of the current averages. As such, according to this scenario, accumulated annual rainfall would hover between 975-481 millimeters in the Central Region and 750-370 millimeters in the Eastern Region, leading to a situation of water crisis with repercussions on crop yields and human health. CMIP5 projections indicate that the mean annual precipitation will fall by -48.7mm (RCP 8.5, High Emission)<sup>23</sup>
- 21. Of even greater concern are the anticipated changes in precipitation intensity. Anomalies in precipitation patterns have increased significantly (see FS Figure 7-b) for the Eastern Region (Station Las Tunas). A rise in mean annual precipitation is

<sup>&</sup>lt;sup>14</sup> Somoza J., De la Colina A.: Estudio de Linea Base de Adaptación y Vulnerabilidad para el Proyecto IRES FAO. La Habana, Cuba, 2018. (Appendix 4) <sup>15</sup> As severe tropical storms are included tornadoes, hailstorms, waterspouts and linear winds above 90 km / h. The cyclonic season goes from June 1 to November 30, in which the September-October bimester is the most affected and October the most dangerous month, in which most of the intense hurricanes have been reported.

<sup>&</sup>lt;sup>16</sup> It includes, Injured, Affected and Homeless estimates.

<sup>&</sup>lt;sup>17</sup> EM-DAT: The Emergency Events Database - Universite catholique de Louvain (UCL) - CRED, D. Guha-Sapir - www.emdat.be, Brussels, Belgium

<sup>&</sup>lt;sup>18</sup> EM-DAT: The Emergency Events Database - Universite catholique de Louvain (UCL) - CRED, D. Guha-Sapir - <u>http://www.emdat.be/</u>, Brussels, Belgium
<sup>19</sup> It includes, Injured, Affected and Homeless estimates.

<sup>&</sup>lt;sup>20</sup> Liu, 2011; Taylor R. et al., 2013.

<sup>&</sup>lt;sup>21</sup> EM-DAT: The Emergency Events Database - Universite catholique de Louvain (UCL) - CRED, D. Guha-Sapir - www.emdat.be, Brussels, Belgium

<sup>&</sup>lt;sup>22</sup> <u>https://climateknowledgeportal.worldbank.org/country/cuba/climate-data-projections?variable=pr</u>

<sup>&</sup>lt;sup>23</sup> https://climateknowledgeportal.worldbank.org/country/cuba/climate-data-projections?variable=pr





caused by cyclones and hurricanes, whose intensity has increased significantly: during the last decade, 11 hurricanes have struck Cuba.

#### Agricultural drought

- 22. Future climate change patterns will, therefore, affect agricultural production, particularly of staple crops, negatively impacting the livelihoods of farm households and the general availability of agricultural products, ultimately putting food security at risk. Projected net primary agricultural productivity and biomass potential density will decline; estimated yield reductions under projected climate scenarios show that for 65% of 29 crops studied, potential yields will suffer reductions from 12% (beans, rice), 16% (manioc) to as much as 48% (potatoes) (FS, Table 5<sup>24,25</sup>, *Estimated yields reductions for selected agricultural crops for the years 2030, 2050 and 2100 under climate change scenarios*).
- 23. Changes in the patterns of rainfall and its reduction, as well as expected increases in evaporation, have a significant impact on soil moisture and agricultural droughts. Data extracted from the map in Figure 1, below, show that 78 municipalities, representing an area of 50,907 km<sup>2</sup> and about 46% of the national territory, are affected most by this phenomenon in terms of intense values of agricultural drought during more than 50 days a year<sup>26</sup>. (FS, Table 3). Among these are Corralillo, Quemado de Güines and Santo Domingo in Las Villas province; Los Arabos in Matanzas province (Central Region); and Amancio Rodríguez, Colombia and Jobabo in Las Tunas province (Eastern Region).





Source: Adapted from information on agricultural droughts in Centella A. et al. (2006)<sup>27</sup>

24. In both the Central and Eastern regions, the drought processes have favored the expansion of invasive plants better adapted to the scarcity of water and the aridity of the soils. These areas are also characterized by the exodus of the population and abandonment of rural areas.

#### Flooding

25. The increased occurrence over the last three decades of moderate and strong coastal flooding is closely related to the passage of cyclones of different categories and the entry of cold fronts; consequently, the areas facing the greatest dangers are

<sup>&</sup>lt;sup>24</sup> Rivero R et al (2010) in SNC Cuba (2015). In Somoza J. De la Colina A., 2018

<sup>&</sup>lt;sup>25</sup> Municipal Statistical Data. Centella Artola et al (2006). In Somoza J. De la Colina A., 2018

<sup>&</sup>lt;sup>26</sup> Centella A, B. Lapinel, O. Solano, R. Vázquez, C. Fonseca, V. Cutié, R. Baéz, S. González, J. Sille, P. Rosario y L. Duarte (2006). La sequía meteorológica y agrícola en la República de Cuba y la República Dominicana. Tomo I, 172 pp,

<sup>&</sup>lt;sup>27</sup> Centella A, B. Lapinel, O. Solano, R. Vázquez, C. Fonseca, V. Cutié, R. Baéz, S. González, J. Sille, P. Rosario y L. Duarte (2006). La sequía meteorológica y agrícola en la República de Cuba y la República Dominicana. Tomo I, 172 pp,





located in low-lying areas, areas with flat relief, areas near rivers or channels or with poor drainage and, locations where surface runoff can exceed the water infiltration capacity of the soil. The north coast of the Central Region, in particular the municipalities of Corralillo and Quemado de Guiñes, and the south coast of the Jobabo, Amancio and Colombia municipalities are among the territories affected periodically by flooding, which has worsened with meteorological events whose impacts have increased in these territories in the last 30 years (see FS, Figure 11).

26. Based on the trend analysis of increased vulnerability to climate change based on historical records and climate models, the Government of Cuba has concluded that the entire archipelago is at increasing risk. As a consequence, in 2017, the Council of Ministers approved *"Tarea Vida"*, the Cuban State Plan to address climate change. The Plan proposes five Strategic Actions and eleven more immediate Tasks based on a multidisciplinary analysis of vulnerability and other factors, with highest priority given to 73 of Cuba's 168 municipalities (63 in coastal areas and 10 inland). Of the five Strategic Actions, two directly address the agricultural sector:

A) Adaptation of agricultural activities, particularly those with the greatest impact on the country's food security, to changes in land use as a consequence of drought and other climate change impacts.

B) Diversification of crops, improvement in soil conditions, introduction and development of varieties resistant to new temperature scenarios.

The eleven immediate Tasks identified in Tarea Vida include the following five, linked to /of relevance to the proposed porject:

- identification and implementation of activities to adapt to climate change and reduce vulnerability particularly for priority areas with threats to population and food security and recovery of mangroves and other protective ecosystems (#1);
- ensuring the availability and efficient use of water in adapting to drought, from the application of technologies for conservation (including metering for efficiency) and the satisfaction of local demands to improve and maintain hydraulic infrastructure (#4);
- reforestation for maximum protection of soils and water in quantity and quality, including mangrove recovery, prioritizing reservoirs, channels and hydro-regulatory boundaries of watersheds and basins (#5);
- implementing and monitoring sectoral climate change adaptation and mitigation measures in programs, plans and projects related to food security, renewable energy, energy efficiency, regional and urban planning, fisheries, agricultural activities, and integrated management of forests (#8);
- raising awareness of risk and increasing knowledge and participation of the entire population in addressing and adapting to climate change (#10).
- 27. This strategy is consonant with Cuban national policies, programs and legislation encompassing climate adaptation and mitigation priorities, particularly Cuba's Nationally Determined Contribution (NDC). Chiefly NDC priority 3: *Incorporating the adaptation dimension into programs, plans and projects related to food production, integrated water management, land management, forestry, fisheries, tourism and health* is particularly linked to the proposed project.
- 28. Although it considers the entire country to be at risk from climate impacts, and has prioritized 73 municipalities as highest priority, the GoC has identified two specific areas of the country for immediate action encompassing four municipalities in *Las Tunas* province (Jobabo, Amancio, Colombia) in the Eastern Region and three in *Villa Clara/Matanzas* provinces (Los Arabos, Quemado de Guines, Coralillo, Santo Domingo) (Figure 2) in the Central Region. *These are the two target areas for this project.*
- 29. The selected municipalities of Corralillo, Quemado de Güines and Santo Domingo in Las Villas province and Los Arabos in Matanzas province (Central Region); and Amancio Rodríguez, Colombia and Jobabo in Las Tunas province (Eastern Region) are among the municipalities most affected by agricultural drought in Cuba. Also, the municipalities of Corralillo and Quemado de Guiñes in the Central Region, and the south coast of the Jobabo, Amancio and Colombia municipalities in the Eastern Region are among the territories most affected by periodic flooding worsened by climate-driven meteorological events whose impacts have increased in these territories in the last 30 years (see Appendix 2 of the FS, Figure 11).





#### Figure 2 – Project areas



- 30. More than one third of soils in the two project target areas are rated as having medium to high vulnerability to temperature rise, precipitation anomalies and drought (Appendix 4, Table 18 and Figure 20). Eleven per cent (57,235 ha) of soils in the target areas are at very high risk of desertification and degradation, including 11,414 ha that are currently under pasture. Only a tenth of the area in the two target regions is forested, three times less than the overall national forest cover of 31.2%. An estimated 90% of the 14,505 ha of currently idle land is infested with marabú (Appendix 2, Figure 27). In stakeholder consultations and discussions with the local population it was found that 28 of the project areas' 55 "consejos populares" (CPs)<sup>28</sup> considered themseleves to be 'vulnerable' or 'very vulnerable' to the impacts of climate change (Appendix 2.4, Tables 37- 50).
- 31. Water supply from 21 surface watersheds as well as 30 groundwater aquifers will be affected significantly by climate change impacts on rainfall variability and seal level rise in the target areas: the National Institute for Water Resources (INRH) predicts a reduction of 17% in 2050 and up to 52% by 2100, from 835 to 695 and 398 million m<sup>3</sup> respectively (Scenario A2, IPCC)<sup>29</sup>. *Villa Clara/Matanzas* will be the most affected since the water baseline there is already relatively low: only 66 and 90 hm<sup>3</sup> respectively (Appendix 4, Table 27). Meanwhile, the reservoirs in *Las Tunas* monitored by INRH over the past 34 years had volumetric levels below 50% of nominal volume in 26 years (See Appendix 2.4, p.10 and p.81). The study carried out in the eastern area of the PIA for a period of 34 years showed that only in 8 of the 34 years (70s-2000s), the average volumes have behaved close to the nominal volumes, the other years have been below 50% of filling, evidencing that the precipitation parameters for which these dams have been designed have had changes in their behavior.
- 32. The Standardized Precipitation Index (SPI) for *Las Tunas* (Appendix 2.2 of the FS, Figure 8-a) shows that the accumulated water balance during the dry season reflects more frequent and more extreme droughts. In contrast, during the rainy season, water balance deficits have increased steadily, putting crops under significant water stress. Severe recurring droughts (years 2004, 2008, 2009) and a diminishing water balance have been observed in Cuba's Eastern Region (which includes *Las Tunas*)

<sup>&</sup>lt;sup>28</sup> The Consejos Populares (People's Councils) cover specific neighborhoods or territories within a municipality; they represent the population in this area and act, at the same time as a link to municipal, provincial and national institutions and bodies.
<sup>29</sup> The A2 scenario family is based on a high population growth scenario of 15 billion by 2100. Intergovernmental Panel on Climate

<sup>&</sup>lt;sup>29</sup> The A2 scenario family is based on a high population growth scenario of 15 billion by 2100. Intergovernmental Panel on Climate Change. Emissions Scenario. <u>https://www.ipcc.ch/site/assets/uploads/2018/03/sres-en.pdf</u>





during the last decades. The region is becoming more arid, with significant reductions in relative humidity (Appendix 2 of the FS, Figure 8-b). This, in synergy with farmers' current coping strategies, has led to a steady reduction of the area covered with agricultural crops and pastures, making them more susceptible to invasion by marabú (*Dichrostachys cynerea*).

Climate Change Impact	Villa Clara/Matanzas	Las Tunas
Temperature rise (Appendix 4 of the FS)	Increase of 1.6% per year during the last 35 years with the average minimum temperature increasing by at least 0.9 °C	The average minimum temperature has increased by at least 0.8 °C since the 1970s
Rainfall change (Appendix 4)	Drought affects 41% of the target area.	Drought affects 37% of the target area. Four hurricanes in Las Tunas in last 10 yrs.
Area of CC-enabled invasive species: Marabú, ( <i>Dichrostachys</i> <i>cynerea</i> ; Appendix 6) in Province	75,398 ha	215,387 ha

33. As climate becomes dryer, soil degradation accelerates and farmers are forced to abandon their land (Appendix 4 of the FS, Tables 24, 46 and 48). Subsequently, an aggressive, non-native invasive species, marabu, is able to establish itself and thoroughly colonize and dominate vegetative regrowth on the abandoned lands. Large areas of the project target municipalities (Appendix 2 of the FS, Figure 27) are now infested with marabu, and expansion to other areas continues to occur. Currently, 75,398 ha in *Villa Clara/Matanzas* (Central Region) and 215,387 ha in *Las Tunas* (Eastern Region) are covered with dense, impenetrable thickets of these thorny bushes. There is a direct, positive correlation between increasing climate change and the increase in infestation in these areas.<sup>30,31</sup>

#### Complementarity with other relevant land-use and climate financing initiatives

- 34. The project builds on previous and existing projects related to climate change adaptation and sustainable food production, including the following (for further detail, please see Annex 18 of the Funding Proposal: *Appraisal, due diligence or evaluation report for proposals based on up-scaling or replicating a pilot Project*):
  - Coastal Adaptation to Climate Change in Cuba through Ecosystem Based Adaptation (UNDP/GCF in preparation): This Project integrates 3 lines of action for effective climate adaptation of coastal areas: i) strengthening existing ecosystem structure (Ecosystem Based Adaptation- EBA), ii) building capacity at community and local government levels for EBA management and iii) mainstreaming adaptation to climate change (CC) within territorial institutions responsible for coastal management<sup>5</sup>. This project 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 prioritized as the most vulnerable population to CC, mainly sea level rise and increase intensity of hurricanes. The project will directly benefit 490,773 people and indirectly 1,285,322 people in 20 coastal municipalities by increasing 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 preventive approach based on maximising the natural infrastructure of Cuban coastal zones and their management.
  - Enhancing the Prevention, Control and Management of Invasive Alien Species in Vulnerable Ecosystems (UNDP/GEF): This project resulted in a set of good practices, monitoring protocols and methodologies for managing IAS in Cuba. In the GCF project, the good practices to stop the spread and propagation of IAS are being considered as an input. Additionally, the monitoring protocols for managing and eradicating Marabú will be utilized during GCF's project implementation, and have been a basis for project design. Finally, the methodologies to apply IAS management plans have been utilized for the developing of the eight modules, and will continue to be used during project implementation.
  - Support for the strengthening of the socio-productive innovation system of the livestock sector in Cuba.
     Demonstration actions in Las Tunas (FAO): This project is aimed at supporting the reorganization of the dairy chain into sustainable production and efficient marketing, from the creation of economic incentives and efficient distribution and consumption to fulfilling the basic needs of the most vulnerable population. The sustainable production of milk and beef is aimed by introducing a techno-economic-productive and efficient model in the selected demonstration areas, with

 <sup>&</sup>lt;sup>30</sup> Somoza J., De la Colina A.: Estudio de Linea Base de Adaptación y Vulnerabilidad para el Proyecto IRES FAO. La Habana, Cuba, 2018.
 31 See FS paragraph 224





emphasis on the strengthening of capacities with a gender perspective and bringing the technical and research knowledge to the countryside. This Project has served as the basis for the development of sustainable livestock management in the modules SILSOM and SILEC of the proposed GCF Project, and especially for the case of Las Tunas region, with its characteristics of drought and salinity.

- Introduction of New Farming Methods for the Conservation and Sustainable Use of Biodiversity, including Plant and Animal Genetic Resources, in Production Landscapes in Selected Areas of Cuba (GEF): This project will support a landscape production strategy agreed by stakeholders, previously identified and mapped, with a particular attention to gender and youth, applying the Save and Grow approach (FAO). The role of stakeholders in the conservation and use of agrobiodiversity will be analyzed and classified per value chain (agrobiodiversity food products). It will also promote the adoption of sustainable agricultural intensification practices (Save and Grow) at farm level. It will also promote capacity development for rural communities, cooperatives and protected areas managers on management, incentives and best practices/technologies, with a gender focus. This will include alternatives such agro-forestry and silvo-pastoral systems, conservation agriculture, and sustainable forest management. The cooperatives (mainly related to the conservation and use of priority species) will be strengthened by creating experimental pilot areas and technical services provided for the sustainable management of agricultural production. The Project is expected to provide an important contribution to capacity building for planning, budgeting and enforcing the management of productive landscapes and further scaling-up from lessons learned in the project intervention areas. The synergies with GCF project will be multiple, as both will be working in sustainable agricultural intensification practices in parallel, giving space for exchange of information and lessons learned.
- Environmental basis for local food production (BASAL) (EU): The project builds up on past and on-going experiences with a view to systematize the lessons learned and expand the effective agro ecological, low-input and sustainable practices, through the reconciliation of three poles, namely the applied and model-based science, the extension networks and the farmers. The project objective is to reach the adequate decision-making level and the widest number of food producers, on the basis of the experiences acquired to the modernization of local agriculture. This project has set the environmental basis for local food production. This environmental basis (more specifically: adaptation measures for confronting climate change that consider the specific needs of women and men and the differentiated impacts of climate change in both groups, with an emphasis on local food production; the use of more resistant species for the purposes of CC; measures for the saving, use and capture of water; of soil improvement and conservation; good agroforestry practices and silvopastoral system), as well as the resilience and adaptation measures proposed have been incorporated by the GCF project, for the planning of the Modules. The experience gained during the BASAL project on training for local farmers through the Farmer Field Schools will be incorporated by IRES, to be applied in the Farmer Field Schools (FFS) that will be implemented in the seven municipalities.
- Project to Strengthen Agro-environmental Policies in Latin American and Caribbean Countries through Dialogue and Exchange of National Experiences (FAO): This project produced a set of tools aimed at promoting dialogue and knowledge exchange among the actors involved in the formulation and implementation of policies and strategies for rural development and natural resource management. The objective being to move towards an agro-environmental policy that goes hand in hand with economic and development policies, through actions of remediation, mitigation and adaptation, as indispensable alternatives for the sustainable development of the country. The project developed a consultative process involving around 30 governmental and civil society institutions in general, and about 375 people among Cuban specialists, researchers, farmers, students, innovators, extension Agents and decision-makers from 13 provinces. Some of the actors that were consulted in this project were also part of the formulation and design of the proposed GCF FP (especially the Direction of Science, Technology and the Environment; the National Company for Flora and Fauna Protection; and some Research Institutes, such as the Research Institute of Tropical Agriculture "Alejandro de Humboldt" (INIFAT)). Additionally, the set of tools and indicators that were produced with this agro-environmental policy project will also be utilized as a basis to build the indicators for the Landscape Resilience Fund.
- Enhancing Cuba's institutional and technical capacities in the agriculture, forestry and other land-use sector for enhanced transparency under the Paris Agreement. (GCP/CUB/020/CBT) (GEF): The main objective of the project is to improve monitoring and planning systems for the agricultural sector's activities to adapt to the impacts of climate change and address the factors that affect the sector's anthropogenic GHG emissions in order to promote sustainable development in Cuba. It is an enabling project, that aims to enhance institutional and technical capacities in the country to report mitigation and adaptation actions in compliance with the Enhanced Transparency Framework (ETF), and to integrate knowledge and data and into policy and decision-making. All of these Outcomes will take place in the



agriculture, forestry and other land-use sector. The objectives of this project align directly with the Activity 8 of the National Plan Tarea Vida, and also with the output 3 of GCF IRES Cuba Project. More specifically, the methodologies and results of the GEF project will be applied to strengthen the institutional capacities to operate and monitor the Landscape Resilience Fund created by the IRES Cuba project. Synergies from both projects are increased by the fact that both have been designed, and will have active participation of the same national institutions, such as the Ministry of Science, Technology and Environment (CITMA) and the Ministry of Agriculture (MINAG).

#### **B.2.** Theory of change

- 35. The project's **Theory of Change** starts with recognition of Cuba's increasing vulnerability to CC due to its geographic location in a hurricane-prone region, increasing hurricane strength, increasing variability in rainfall (periodicity, timing and intensity), leading to flooding, land degradation from soil erosion and drought and dry decads (10-day dry periods within the historic pattern of rainy seasons), as well as sea-level rise leading to salinization of coastal groundwater and soils and increasing damage to coastal infrastructure and vegetation. While vulnerability varies somewhat across the island as a result of heterogeneous topography, vegetative cover, meteorological patterns, etc., the entire country is correctly considered vulnerable or highly vulnerable to climate change, particularly rural areas and populations (please see section B.1 Climate Rationale and Context, above).
- 36. Agroecosystems, as currently configured, degrade rapidly, losing productivity and sustainability due to maladaptive land preparation, cultivation and irrigation techniques for monocultures leading to exposed soils, rapid runoff, infestation by invasive species particularly marabu soil erosion and sediment transport to coastal areas, salinization and increased risk of flooding and loss of life and property. This business-as-usual scenario increases producer vulnerability to extreme weather events and climate variability and reduces the capacity of the country to maintain its food security.
- 37. Effective climate change adaptation in this context requires climate-resilient production systems that can withstand or mitigate stresses and shocks from rainfall variability and precipitation extremes i.e. either too much (e.g. dramatic torrential downpours from hurricanes and tropical storms) or too little (periodic droughts, or lengthy dry periods in the growing season). The overarching framework for effective adaptation then is one of climate-resilient production systems aimed at maintaining/enhancing hydrological regulation as a primary ecosystem service in the production landscape. As such, the priority management objectives for resilient agroecological landscapes in Cuba are to reduce rainfall impact on soil, slow water flow across it, and enhance infiltration into and through the soil profile, all the while maintaining or enhancing production for food security, well-being and livelihoods. Reduced impact and velocity of flow decrease erosion, while improved water infiltration into the soil increases groundwater vital for irrigation during drought and, in coastal areas, a factor against saltwater intrusion.
- 38. As a consequence, management to enhance the climate-resilience of agroecosystems focuses on establishing and managing the vegetative cover appropriate to a strategy of both optimizing ecosystem function and meeting sustainable production and food security needs, while minimizing GHG emissions. As such, in Cuba, climate-resilient production systems for different areas of the production landscape will combine trees and/or shrubs with crops and livestock. These agroforestry and silvopastoral systems diversify production, thereby reducing risk to farmers and livestock producers from climate extremes. The vulnerability of production landscapes to climate change is reduced with widespread adoption and implementation of climate-adapted, resilience-enhancing agroforestry and silvopastoral systems.
- 39. To decrease vulnerability and enhance resilience of farmers to climate-driven impacts such as drought and rainfall variability (including torrential downpours), Cuba aims to strengthen ecosystem function aimed primarily at water regulation to maintain and enhance agricultural production. This includes reforestation of key areas less suitable for agriculture to create close-to-nature planted forests (CNPFs) and assisted natural regeneration of degraded forests and logged-over areas. It is important to note that this strategy of integrating trees and bushes into the production landscape, through the proposed agroforestry, silvopastoral and forestry systems, also results in generation of significant mitigation benefits over and above the current baseline values of current maladaptive production systems and degraded and abandoned areas subject to invasion by marabu.
- 40. The Cuban government has adopted a three-phase strategic approach to enhancing the resilience of agricultural landscapes to increasing climate change while generating mitigation benefits: a first phase of research and piloting of resilience-enhancing agricultural production systems; a second of mesoscale replication based on lessons learned and knowledge from phase one; and a third of upscaling countrywide based on lessons, capacities, financial mechanisms and enabling policies resulting from phase two implementation.





- 41. In a now-concluded first phase, the Ministry of Agriculture supported research into optimal agroforestry systems for the wetter and drier areas of Cuba and identified and tested a number of options, leading to the six agroforestry, silvopastoral and forestry "modules"<sup>32</sup> proposed here (see Appendix 6 for detailed descriptions). These modules will be replicated at mesoscale in the two representative regions selected for this project located in *Las Tunas* and *Villa Clara/Matanzas* provinces (Eastern and Central Regions, respectively). By implementing these modules at the selected project sites in this, the second phase, the project will reduce the climate vulnerability of approximately 7,728 lower income producers, enhance climate resilience of approximately 35,734 hectares of production landscapes, increase producers' and institutional capacities to manage climate risk, and generate further detailed knowledge of the performance of these agroforestry systems at scale. This will include the corresponding institutional and producer capacities required for a future third phase of out-scaling countrywide. This strategy builds on Cuban national policies, programs and legislation encompassing climate adaptation and mitigation priorities (including Cuba's NDCs) ensuring coherence between the project proposed here and national objectives.
- 42. However, there are significant barriers to effectively implementing this strategy for climate adaptation and mitigation. In general, institutional staff and producers do possess insufficient awareness and knowledge of the climate risk reduction benefits of integrated agricultural and landscape management, and they lack the technical skills to manage climate risk by applying resilience-enhancing agricultural practices and systems. Existing financial mechanisms available to farmers and producers' organizations do not consider farmers' adaptation needs nor do they support resilience-enhancing initiatives to manage landscape resources for improved ecosystem services. Youth and women are disadvantaged when it comes to accessing financial, technical and other resources and training to enable them to address impacts of climate change on-farm. At the same time, Cuban agricultural and forest management institutions have limited access to international finance and are therefore unable to access and use the agricultural, information and communication technologies that would allow them to effectively support farmers and producers' organizations to implement resilient production systems and restore and enhance ecosystem services, including carbon sequestration.
- 43. This second-phase project will overcome these barriers by focusing on three <u>Fund level Impacts</u>: A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions by targeting farmers and producers' associations in areas experiencing significant drought or other climate-driven impacts; A4.0 improved resilience of ecosystems and ecosystem services particularly, improved hydrological regulation as a result of widespread implementation of agroforestry, silvopastoral and forestry systems; M4.0 reduced emissions from land use, reforestation, reduced deforestation and through sustainable forest management and conservation and enhancement of forest carbon stocks through the use of trees and shrubs in agriculture and livestock production systems, establishment of close-to-nature forests and assisted natural regeneration of forest plots.
- 44. These impacts will be the result of the corresponding *Fund level Outcomes*: M9.0 improved management of land or forest areas contributing to emissions reductions corresponding to increased CC-resilient production landscapes through investment in innovative agroforestry and forestry systems, as well as in close-to-nature planted forests; A7.0 strengthened adaptive capacity and reduced exposure to climate risks from training producers and institutional staff and equipping them to manage climate risk; and A5.0 strengthened institutional and regulatory systems for climate-responsive planning and development through analysis, discussion and potential reform of current policies, and regulatory and planning instruments including establishment and operationalization of an explicit funding mechanism the Landscape Resilience Fund to provide resources and incentives to producers to adopt and maintain resilience-enhancing practices and systems.
- 45. To achieve increased CC-resilient production landscapes through investment in innovative agroforestry and forestry systems, it will be necessary to strengthen ecosystem services of landscapes that have been infested with marabu (*Dichrostachys cinerea*), a non-native invasive woody bush species that dominates other plant species and damages or displaces crops and livestock (Appendix 2 of the FS). The spread of marabu is driven by decreasing and more erratic rainfall resulting from CC and enabled by maladaptive farmer practice; as marabu invades agricultural and pasture land, farmers struggle to cope with it without the tools and equipment this requires. This project will support farmers and producers' associations to eradicate marabu from agricultural landscapes and replace it with climate resilience-enhancing agroforestry, silvopastoral or forestry systems selected from the six tested options. These will be established and implemented by producers receiving technical

<sup>&</sup>lt;sup>32</sup> A "module" is a specific agroforestry, silvopastoral or forestry system that enhances resilience by optimizing water regulation in the production landscape while enhancing agroecosystem productivity and sustainability; a "module" comprises the structure of the system (trees, bushes, row crops, etc.), the species involved (e.g. mango, maize, beans, etc.), the inputs and land preparation needs (e.g. marabu clearance, sub-soiling, no-tillage, etc.), crop production methods (transplanting, pruning, etc.) and other elements.



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support and instruction from specialized trainers of the Ministry of Agriculture to be trained by this project. Producers' adaptive capacities will be strengthened through Farmer Field Schools<sup>33</sup>, farmer-to-farmer exchanges, and specialized training. The efficiency and effectiveness of institutional and regulatory systems to assist farmers to build the resilience of their agroecosystems will be enhanced through awareness and technical training in regard to ecosystem services and agroforestry systems, farm enterprise planning and value chain development to generate the revenue farmers require to continually invest in resilience-enhancing practices and equipment, and improved monitoring and evaluation instruments and technologies. Finally, after combining the Forestry Development Fund and Soil Conservation Fund, the project will support the development and operationalization of a Landscape Resilience Fund, to be financed from GoC fiscal resources on an annual basis, which will provide a mechanism for financial support in a third phase for countrywide out-scaling of lessons learned. The project proposed here upscales a proven approach based on research and piloting of agroforestry, silvopastoral and forestry modules in-country; the knowledge, skills, capacities and financial mechanism resulting from this second phase will provide the foundation for future countrywide upscaling.

46. The Project aims at shifting the paradigm of agricultural policy and programs from production maximization to implementation of CC-resilient production systems that enhance ecosystem services of production landscapes through agroforestry systems, silvopastoral systems, reforestation and assisted natural regeneration for improved water security and regulation and carbon storage. As presented in the Project Theory of Change, if policies and regulatory frameworks are enhanced, investment opportunities are created. This - together with capacity building of farmers and technical support for the implementation of innovative agroforestry and silvopastoral systems, reforestation with close-to-nature planted forests (CTNPFs) and assisted natural forest regeneration – will result in a strenghtened institutional and regulatory system that supports climate-responsive planning and development, improved management of land and forest areas contributing to emissions reductions and improved ecosystem services, and strengthened adaptive capacity and reduced exposure to climate risks.

The following diagram illustrates this Theory of Change:



<sup>&</sup>lt;sup>33</sup> See Farmer Field Schools description under Activity 2.2.





#### **B.3. Project description**

47. The Project's objective is to increase the climate resilience of agricultural production and ensure food security through improved ecosystem services from agroforestry, silvopastoral systems, reforestation and assisted natural forest regeneration in seven municipalities vulnerable to climate change. Critical ecosystem services will become more CC-resilient, especially regulation of water flows into and through the production landscape, through landscape rehabilitation and management that enhances agro-ecosystem productivity and sustainability by improving water infiltration rates and reducing or preventing run-off and soil erosion. At the same time, significant mitigation benefits will result from the integration of trees and bushes into agroforestry and silvopastoral systems as well as through reforestation using close-to-nature planted forests and assisted natural regeneration. In proposing the project target regions, the government of Cuba undertook a selection process to identify those areas that have been most vulnerable to climate change impacts but also possessed of the greatest potential for impact and the potential to generate lessons useful to a subsequent phase of systematic upscaling nationwide. This initial geographic selection was refined in selecting project beneficiaries<sup>34</sup>:

Туре	Criteria	Result
Selection of municipalities in the target regions	<ul> <li>Municipalities most affected by the impacts of climate change based on the increase in average local temperatures and the interconnections with extreme hydro-meteorological events, in particular hurricanes. This includes prevalence of marabu in crop areas.</li> <li>Municipalities with lower average economic income linked to impacts of climate change on income-generating activities, e.g. agriculture.</li> <li>Municipalities suffering from outmigration due to impacts of climate change on livelihoods, including demographic aging</li> <li>Prevalence of non-state agricultural production forms in Project intervention Area (PIA) municipalities e.g. cooperatives, independent producers' associations<sup>35</sup></li> <li>Comparative advantages from proximity of PIA to principal tourism regions and facilities (market access potential for products used by the sector's hotels and restaurants)</li> <li>These criteria are summarized in Sections 1.3 and 1.4 of the Feasibility Study with data, maps and indicators.</li> </ul>	The following municipalities were selected: Las Tunas Province Municipalities: Amancio, Colombia y Jobabo. Villa Clara Province: Municipalities: Quemados de Güines, Corralillo y Santo Domingo Matanzas Province: Municipality: Los Arabos

<sup>&</sup>lt;sup>34</sup> See Appendices 2.1, 2.4 and 2.5 of the Feasibility Study.

<sup>&</sup>lt;sup>35</sup> Women and men have equal access to information and opportunities to participate in and benefit from the project, there are no educational gaps between women and men that prevent access to understanding and access to project information Most of the beneficiaries belong to cooperatives that have an internal government system that obliges them to discuss and report on project issues in member assemblies, decisions are taken collectively, and participation follows voluntary principles. This process has already occurred in its initial stage, and should be ratified during the implementation of the project. The project will seek to develop a gender-sensitive communication strategy or a broad, robust and inclusive information and dissemination system that in a special way helps to make visible the successful experiences of men and women in the territories and to reduce some information gap that can be identified during implementation.

Equal participation of women and men in the project is aspired to. The specific tasks will be determined by the will, aptitudes and aspiration of each person. The project plans to create jobs that traditionally result from women's preference such as seedling management and grafting in nurseries of forest and fruit species, activities in mini-industries, management of collected milk and quality assessment, as well as in laboratories that will be strengthened to ensure essential services to support agricultural and livestock production, among others. It is possible that jobs may also arise for women who are traditionally male, and that they feel interest and empowerment to assume them or vice versa.

Some elements that can be valued as roles to be played by women in the project can be linked to the recovery of the reproduction of vegetable fibers, and the women who live in the settlements can count on sufficient raw material to develop the handicraft, be able to market it and thus improve their quality of life. There would also be potential in improving the capacity and working conditions in a CREE (Entomophagous and Entomopathogenic Reproduction Center), in linking them to the breeding of rams, chickens and rabbits, condiment plants, as well as medicinal plants to be distributed to pharmacies in forest areas or in small mini-industries to favor their use in the processing and conservation of different productions such as tomato, cucumber and some fruits such as guava and mango that develop well in these municipalities.

<sup>(</sup>Please see further information on the Gender Analysis and Action Plan in Annex 8).



The table below lists modules implemented in each municipality. Modules were selected for each municipality based on agronomic, edaphological, climatic and other factors. Please see Annex 2.6 of the Feasibility Study for further details.

#### Table: Modules per municipality (hectares)

	Area Villa Clara - Los Arabos		Sub total	Ib total Area Las Tunas			Sub total (ha)	Total (ha)		
	Los Arabos	Santo Domingo	Corralillo	Quemado de Güines	(114)	Jobabo	Colombia	Amancio Rodríguez		
С	94	0	79	0	173	1053	61	467	1581	1754
M G	724	360	650	510	2244	651	200	0	851	3095
M F	510	2000	4757	0	7267	0	0	900	900	8167
F	227	750	515	0	1492	522	59	456	1037	2529
S C	490	150	2465	214	3319	5198	1982	0	7180	10499
S L	537	2214	4603	210	7564	0	0	2127	2127	9691
Т	2582	5474	13069	934	22058	7424	2302	3950	13676	35734

Modules: C: CEDPLA: Agroforestry system with Cedrela odorata (cedar) intercaled with other forest species and agricultural crops with live perimeter fences; MG: MAREG: Establishment of forests through natural regeneration assisted in marabou affected areas;

MF: MARFOM: Establishment and management of polifunctional forest plantations in zones invaded by marabou;

F: FRUAGR: Agroforestry system with fruit trees, agricultural crops and living fences;

SC: SILLEC: Silvopastoril system with arbustive leguminous;

SL: SILSOM: Silvopasture with shadow trees and protein Banks;

T: Total AREA in hectares

- 48. The project will directly benefit approximately 51,098 smallholders throughout the seven target municipalities corresponding to the number of households benefiting from the project activities<sup>36</sup>; an additional 240,117 inhabitants of the target areas will benefit indirectly from increased food security from enhanced and more stable production, better hydrological regulation, and increased opportunities for employment in agricultural tasks and value addition. Indirect beneficiaries correspond to the total population of the seven municipalities targeted by the project. Approximately 20% of lands in which the Project will be implemented belong to private owners and 80% are lands owned by the Government granted to cooperatives under National Decree n° 358, which guarantees the right to freely use the lands for a 20-year period, extendable for another 20 years. Cooperatives are voluntary associations of small farmers who have the property or usufruct of their respective lands and other means of production. It is a form of agrarian cooperation through which the technical, financial and material assistance that the State provides to increase the production of small farmers and facilitate their commercialization is processed and made viable. It has its own legal personality and they respond to their actions with their assets.
- 49. Project beneficiaries include: Note that in addition to the 51,098 direct smallholder beneficiaries, a number of other stakeholders will also benefit directly from capacity development (primarily training) carried out by the Project. These are, along with the 51,098 direct smallholder beneficiaries (15,968 households):
  - a. 51,098 people (farmers and their families) (activities 1.1 and 1.2, 2.2)
  - b. 74 machinery operators (activity 1.1)
  - c. 68 machinery operators (activity 1.2)
  - d. 443 extension service technicians, agricultural technicians, and cooperative leaders/administrators (activity 2.1)
  - e. 30 leaders of local producers' organizations (activity 3.3)

<sup>&</sup>lt;sup>36</sup> The number of household members being considered is 3,2 and the number of farmers is 15,968.



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#### 50. The following table includes the stakeholders and the criteria for selection:

Type of Beneficiary	Selection Criteria
Farmers <sup>37</sup> Sub-activities: 1.1.6, 1.2.6, 2.2.1, 2.2.2	<ul> <li>Farmers most threatened by the impacts of climate change, especially those whose agricultural lands are driest and/or most affected by hurricanes and torrential rains.</li> <li>Farmers participating in different cooperative production modalities (Credit and Service Cooperatives, Base Units of Cooperative Production, etc.) which will allow them a greater capacity to adapt or assimilate the changes in production that the project will bring about, and are readier to work in groups and more inclined to share knowledge with others.</li> <li>Farmers with different extensions of agricultural land and with different uses of land from the production of grains and vegetables to larger extensions such as cattle farms.</li> <li>Farmers living in communities most affected by outmigration.</li> <li>Farmers willing to assimilate new knowledge, with leadership capacity and willing to apply science and technology on their farms and production areas.</li> <li>Farmers who have developed different experimental production models and who are positively inclined to participate in upscaling processes.</li> </ul>
Local Producers' Organizations <sup>38</sup> Sub-activities: 3.1.1, 3.2.2, 3.3.1, 3.3.3	<ul> <li>Geographical proximity of these organizations to the project target areas.</li> <li>Organizations have been and/or will be identified based on alignment between the proposed activities and the organizations' mandates, expertise and/or services delivered. Note that these determinations have been/will be made by MINAG, in consultation with FAO.</li> <li>Organizations must be assessed as possessing the potential capacity to sustain the implementation of the new productive modules as a viable enterprise beyond the duration of the project.</li> <li>Taken into account the singularities of the economics conditions in Cuba Organizations must have financial independence to manage their financial resources including bank accounts to deposit their incomes.</li> <li>Identified organizations will be invited to nominate staff to participate in the activities based on the alignment between the contents of the proposed activity (e.g. technical focus of the training) and the respective individuals' responsibilities and expertise within their organization.</li> <li>Gender balance prioritizing women and young people (over 18 years old according to Cuba regulations)</li> </ul>
Extension service technicians, agricultural technicians, and cooperative leaders/administrat ors <sup>39</sup> (Professional Beneficiaries) Sub-activities: 1.1.2, 1.2.2; 2.1.1, 2.1.2, 2.1.3; 3.1.1-3.1.4; 3.2.1-3.2.3; 3.3.3f	<ul> <li>Organizations have been and/or will be identified based on alignment between the proposed activities and the organizations' mandates, political roll, expertise and/or services delivered and territorial representation in the project target areas (note that these determinations have been/will be made by the Project Coordination Committee);</li> <li>Identified organizations will be invited to nominate staff to participate in the activities based on the alignment between the contents of the proposed activity (e.g. technical focus of the training) and the respective individuals' responsibilities and expertise within their organization</li> </ul>

<sup>&</sup>lt;sup>37</sup> As per defined in the funding proposal

<sup>&</sup>lt;sup>38</sup> Credit and Service Cooperatives, Base Units of Cooperative Production, and Base Enterprise Units

<sup>&</sup>lt;sup>39</sup> Under this definition are considered: a) Governments representatives from national, provincial and municipality levels, b) extension service technicians and agricultural technicians, c) Base Enterprise Units for Integrated Technical Services d) other representatives of specialized research institutions.





	- Gender balance prioritizing women and young people (over 18 years old according to Cuba regulations)
Machinery	- Licenses and permits in accordance to the Cuban legislation.
operators	- Minimum of 5 years-experience in operating machinery in agricultural labors.
Sub-activities: 1.1.3, 1.1.4, 1.1.5; 1.2.3, 1.2.4, 1.2.5	- Commitment to serve in the Producer Organization at least during the project implementation (desirable)

#### **Component 1: Climate reslient agricultural systems**

## Output 1: Increased CC-resilient production landscapes through investment in innovative agroforestry and silvopastoral systems, reforestation with close-to-nature planted forests (CTNPFs) and assisted natural forest regeneration

- 51. Agroforestry, silvopastoral and forestry principles, methodologies and low-impact modern technologies will be applied to restore vital ecosystem services for water regulation on 35,734 ha of production landscapes across the seven municipalities of the target project areas. This will be achieved by implementing six climate-resilient production modules (described in Appendix 6 of the Feasibility Study) in seven vulnerable municipalities. These modules have been assessed for their technical, financial and social feasibility. They are based on local best practices, applied research results from national institutions, and thorough assessments of their climate resilience, adaptation and mitigation benefits. The modules were presented, discussed and adjusted during two consultation workshops with the active participation of farmers (cooperatives and independent producers), experts and stakeholders from national, provincial and municipal institutions, as well associal actors in both project areas40. The implementation of these modules will result in improved water regulation, decreased soil erosion, augmented soil moisture content, increased groundwater, and improved root penetration, as well as substantially increased carbon storage in soils and biomass. Crop yields will improve, as will the health and well-being of farmers, by reducing water scarcity and food insecurity. To ensure effective establishment of these modules, it will be necessary to build and revitalize irrigation systems, including small water reservoirs for rainwater.
- 52. Land productivity will be reconditioned through the implementation of agroforestry systems, silvopastoral and forestry systems (Modules 1-6, described in Appendix 2.6 of the Feasibility Study). Successful establishment of these systems will require installation of small-scale water reservoirs to ensure adequate and timely supply, specifically, water storage and irrigation for agroforestry modules and water storage and livestock drinking facilities for silvopastoral systems. The GCF will cover the costs of land preparation, small water reservoirs and provision of equipment, inputs and training to producers to establish the modules but not pay them to implement them.
- 53. Further information on water availability, crop water requirements and irrigation requirements is provided in Appendix 2.6 of the Feasability Study and relates to: water reservoir volume; monthly potential water harvesting for representative reservoirs; potential irrigation needs, calculated for representative modules, using crop-specific coefficients and considering an irrigation efficiency of 90%; and change in volume of water in the reservoirs considering monthly water harvesting and crop / irrigation water requirements. In addition, in the case of silvopasture modules, the reservoirs have been designed to provide drinking water for cattle. The harvested water in the reservoirs will be distributed to a network of drinking troughs that will be built for each reservoir. Although recycling of water resources is not applicable in this case, distribution efficiency will be ensured.
- 54. The government and FAO will coordinate the purchase and distribution of the machinery, equipment and inputs required for the implementation of the modules. The government will guarantee the implementation and efficient use of these resources. The GoC has established Base Enterprises for Integrated Technical Services (UEBIST) in each municipality to provide agricultural mechanization services and technical assistance to producers (see Appendix 6 of the FS for more detailed information) through which the implementation of the six agroforestry and silvopastoral and forestry system modules will be supported. The direct beneficiaries of the services will be farmers, including women farmers, and other individual producers or extension officers from MINAG and the National Association of Small Farmers (ANAP). The UEBIST will continue to provide mechanization and technical assistance services to farmers after completion of the project and will be an essential part of the countrywide up-scaling in phase three of the program. UEBIST will also provide maintenance and technical

<sup>&</sup>lt;sup>40</sup> The technical description of each of the modules, as well as the documentation of the two consultation workshops, can be found in Appendices 6 and 10 of the Feasibility Study. Also, for further information on stakeholders' engagement process during the project formulation, please see Annex 7.





assistance for the efficient use of irrigation equipment and infrastructure, as well as all land preparation machinery. The multiple ecosystem goods and services provided by agroforestry, silvopastoral, and forestry systems (CTNPFs and assisted natural regeneration) have been extensively documented, indicating their suitability for restoring degraded soils 41 and increasing resilience to climate change<sup>42</sup> (please see Appendix 2.6 of the FS and Table 30 in Section 5.1 of the FS for expected climate change benefits with the implementation of the proposed modules). Implementation of these systems will also produce significant mitigation benefits over the 20-year span of growth and utilization of agroforestry, silvopastoral and forestry systems (see section 5.5 of the FS for methodology and results regarding carbon calculations / Appendix 2.3).

55. Regarding socio-economic benefits, production landscapes with multifunctional forests provide promising options for increasing income and sustaining livelihoods<sup>43</sup>. They enable diversified production systems because of various intercrops, and reduce risks associated with pests and diseases, while also enabling a wider diversity of products, which reduces the impact of variations of seasonal harvests<sup>44</sup>.

<u>Activity 1.1 Restore approximately 15,544 ha of farmland, and increase CC-resilience through sustainable agroforestry (AF),</u> <u>CTNPFs and assisted natural regeneration (mitigation co-benefit 833,950.60 million tCO<sup>2</sup>-eq. in 7 years of implementation)</u>

GCF: 20,513,221 USD MINAG: 38,840,764 USD

- 56. While marabú provides some soil cover and fixes atmospheric nitrogen, it accumulates only a fraction of the biomass of forests or agroforestry systems<sup>45</sup>. From the climatic and hydrological points of view, the replacement of marabú by planted forests has the following advantages:Forests can buffer the effects of extreme climate events, higher temperatures and provide alternative sources of food during droughts or floods<sup>46</sup>. Moreover, agroforestry systems and CTNPFs are known to improve microclimate<sup>47</sup>.
- 57. Forests contribute a greater volume of biomass (litter, branches, fruit, etc.) to the soil that, when decomposed, constitutes a fundamental factor in the improvement of the hydrophysical properties of the soils (structure and porosity among others). In addition, a planted forest root system is deeper and more expansive such that when penetrating the ground, it opens tunnels through which the water filters towards lower levels, thereby influencing infiltration capacity and soil moisture retention.
- 58. Planted forests have also been shown to regulate the quantity and availability of water, improve water quality, increase groundwater recharge and provide riparian buffers<sup>48</sup>. Marabú's relative influence on the water regime is considered comparable to a permanent crop such as fruit trees (mango or citrus), which uses soil similarly to marabú. In this case, forest-covered soil has an average runoff coefficient 3.4 times lower and an erosion rate 13 times lower than marabu-dominated

<sup>&</sup>lt;sup>41</sup> Miccolis Andrew et al 2017: Restoration through agroforestry: options for reconciling livelihoods with conservation in the Cerrado and Caatinga biomes in Brazil. Cambridge University Press doi:10.1017/S001447971700013

 <sup>&</sup>lt;sup>42</sup> Jacobi, J., Schneider, M., Bottazzi, P., Pillco, M., Calizaya, P. and Rist, S. (2013). Agroecosystem resilience and farmer's perceptions of climate change impacts on cocoa farms in Alto Beni, Bolivia. Renewable Agriculture and Food Systems 30(2):170–183.
 <sup>43</sup> Bene et al., 1977; Sinclair, 2004; Vira et al., 2015, in Miccolis A 2017

<sup>&</sup>lt;sup>44</sup> Izac, a. M. N. and Sanchez, P. a. (2001). Towards a natural resource management paradigm for international agriculture: The example of agroforestry research. Agricultural Systems. 69(1-2):5–25.

<sup>&</sup>lt;sup>45</sup> Only 2-3% of Marabú biomass is actually used for poles or charcoal (Herrero J. 2018)

<sup>&</sup>lt;sup>46</sup> Lasco, R. D., Delfino, R. J. P. and Espaldon, M. L. O. (2014). Agroforestry systems: Helping smallholders adapt to climate risks while mitigating climate change. Wiley Interdisciplinary Reviews: Climate Change 5:825–833.

<sup>&</sup>lt;sup>47</sup> Kandji, S. T., Verchot, L. V., Mackensen, J., Boye, A., Noordwijk, M., Tomich, T. P., Ong, C., Albrecht, A. and Palm, C. (2006). Opportunities for linking climate change adaptation and mitigation through agroforestry systems. Chapter 13. In World Agroforestry into the Future, 113–123 (Eds D. Garrity, A. Okono, M. Grayson and S. Parrott). World Agroforesty Centre.

<sup>&</sup>lt;sup>48</sup> Araújo Filho, J.A. de (2013). Manejo Pastoril Sustentável da Caatinga, 200. Recife, PE: Projeto Dom Helder Camara. Bargués Tobella, A., Reese, H., Almaw, A., Bayala, J., Malmer, A., Laudon, H. and Ilstedt, U. (2014). The effect of trees on preferential flow and soil infiltrability in an agroforestry parkland in semiarid Burkina Faso.Water Resources Research 50:2108–2123.





soil (Appendix 6 of the FS). Planted forests are also effective at controlling erosion and landslides and at producing organic matter and cycling nutrients<sup>49</sup>.

- 59. Planted forests decrease wind speed, which is critical for managing the water economy in production systems (reducing losses from evapotranspiration in pastures and agricultural crops). Planted forests, even those not designed as windbreaks, fulfill these functions:
  - a. Planted forests can reach up to three times the height of marabú and thereby lengthen the distance of their influence on winds; and
  - b. Planted forests have a complex vertical structure, composed of herbaceous, shrub and other strata that serve as obstacles and barriers to the passage of prevailing winds in the area. These characteristics are absent in marabu-infested shrublands.
- 60. Planted forests are superior in the provision of other services, such as CO2 sequestration, which is much lower in marabú due to its slow increase in biomass (Vidal et al. 2015 in Appendix 6 of the FS); the increase in biomass in the planted forest is 12 times higher than in marabu. The conversion of marabú to planted forests provides a notable contribution to CC mitigation.
- 61. Through the project, GCF funds will be used to purchase low impact modern machinery, such as a mulching tractor<sup>50</sup>, successfully pilot tested under Cuban conditions, that will be applied at scale to clear marabú thickets on soils at high risk of climate-driven desertification and degradation. Marabú wood and biomass will be ground to wood chips to form a mulch layer that will support in protecting soils from erosion and sun and eventually restore soil organic matter. The land will then be reconditioned through the implementation of agroforestry systems or CTNPF (Modules 1-4, described in Appendix 6 of the Feasibility Study). Other alternative uses for the marabu were discarded due to its aggressive and invasive nature. The GCF will provide equipment and training to producers to establish the modules and develop resilience-enhancing farm management plans. The government and FAO will coordinate the purchase and distribution of the machinery and equipment, and the government will guarantee the implementation and efficient use of these resources through its Base Enterprise Units for Integrated Technical Services (UEBIST).
- 62. The UEBIST are internal divisions that are created to organize the processes of production of goods and provision of services, act with relative independence, subordinate to the head of the entity that creates them and have no legal personality or heritage of their own. They are characterized by having controlled autonomy under the principle of covering their expenses with their income.
- 63. Approximately 20% of lands on which the Project will be implemented belong to private owners and 80% are lands owned by the Government granted to cooperatives under National Decree n° 358, which guarantees the right to freely use the lands for a 20-year period, extendable for another 20 years. Cooperatives are voluntary associations of small farmers who have the property or usufruct of their respective lands and other means of production. It is a form of agrarian cooperation through which the technical, financial and material assistance that the State provides to increase the production of small farmers and facilitate their commercialization is processed and made viable. It has its own legal personality and they respond to their actions with their assets.
- 64. GCF will finance acquisition of identified technologies, development of training materials, and training of machinery operators, implementation of marabu eradication and soil preparation, establishment of agroforestry and CTNPF modules, and O&M of the marabu eradication and soil preparation technologies during the life of the project. The Government of Cuba will finance logistical and technical support (transportation, lodging, trainers, materials) to trainees; supervision, management and execution of agroforestry and CTNPF production modules once they have been planted and established; and O&M of marabu eradication and soil preparation technologies, and irrigation equipment and infrastructure after project end. The average implementation area for each beneficiary is estimated to be 2.3 ha. Please see Appendix 2.6 of the Feasibility Study for further information on the agroforestry modules.

GCF investments to support this activity will consist of the following sub-activities:

- 1.1.1: Procure identified technologies and equipment
- 1.1.2: Develop training materials for operations and maintenance
- 1.1.3: Train 74 machinery operators
- 1.1.4: Eradicate marabu on 15,544 ha

<sup>&</sup>lt;sup>49</sup> Souza, M. de and Piña-Rodrigues, F. (2013). Desenvolvimento De Espécies Arbóreas Em Sistemas Agroflorestais para Recuperação de Áreas Degradadas na Floresta Ombrófila Densa, Paraty, RJ. Revista Árvore 37(1):89–98

<sup>&</sup>lt;sup>50</sup> An example of a mulching tractor can be seen at https://www.youtube.com/watch?v=fVygSS7i3kA





1.1.5: Construct/ Install 452 water reservoirs for the agroforestry systems of a capacity of no more than 4900 m3 and 440 irrigation systems

1.1.6: Establish agroforestry, reforestation and assisted natural regeneration modules, including development of farm management plans

#### <u>Activity 1.2 Restore approximately 20,189 ha of rangeland with compacted soils and increase CC-resilience through improved</u> <u>silvopastoral systems (mitigation net co-benefit</u> <u>381,311.51 million t CO<sup>2</sup>ea in 7 years of implementation).</u>

GCF: 14,151,122 USD MINAG: 37,453,037 USD

- 65. There are 20,189 ha of degraded grasslands in the two project target areas with compacted soils, often with a hardpan layer, into which root systems grow very poorly because of physical resistance and poor moisture movement. These compacted soils do not absorb rainfall, causing accelerated runoff and erosion. During dry periods, the hardpan is an impermeable barrier for plant roots to reach groundwater reserves. To loosen the soil and break the hardpan, the project will introduce low-disturbance sub-soiling, designed for conservation agriculture<sup>51</sup>, which will restore the soil's porosity, so that rainfall can be absorbed and excess moisture drain away, recharging groundwater tables and making groundwater accessible to roots during dry periods. Soil structure improvement and stabilization, introduction of trees and improved, more drought resistant, deep rooting and nutrient rich pastures, as well as grazing rotation, will be achieved through the implementation of the two modules for silvopastoral systems adapted to climate change, described in Appendix 2.6 of the FS. The average implementation area for each beneficiary is estimated to be 2.3 ha.
- 66. GCF will finance acquisition of identified technologies (e.g. sub-soilers, rippers), development of training materials, training of trainers and training of farmers to carry out soil restoration, implementation of sub-soiling of compacted area, establishment of silvopastoral modules, O&M of the soil preparation technologies during the life of the project and resilience-enhancing farm management plans. The Government of Cuba will finance logistical and technical support to trainees during and after training, implementation of silvopastoral modules following initial established and O&M of sub-soiling technologies, water storage, and livestock drinking stations after project end.
- 67. The UEBIST are internal divisions that are created to organize the processes of production of goods and provision of services, act with relative independence, subordinate to the head of the entity that creates them and have no legal personality or heritage of their own. They are characterized by having controlled autonomy under the principle of covering their expenses with their income.
- 68. Approximately 20% of lands on which the Project will be implemented belong to private owners and 80% are lands owned by the Government granted to cooperatives under National Decree n° 358, which guarantees the right to freely use the lands for a 20-year period, extendable for another 20 years. Cooperatives are voluntary associations of small farmers who have the property or usufruct of their respective lands and other means of production. It is a form of agrarian cooperation through which the technical, financial and material assistance that the State provides to increase the production of small farmers and facilitate their commercialization is processed and made viable. It has its own legal personality and they respond to their actions with their assets.
- 69. The project will ensure effective establishment of silvopastoral systems by guaranteeing their water security through improved small-scale water reservoirs and livestock drinking facilities (fountains). The project will construct a reduced number of new water-harvesting and storage facilities. These structures and facilities will be fed from rainwater harvesting and runoff water and conditioned to maximize their efficiency and sustainability through appropriate soil conservation and landscaping. GCF will also finance acquisition of water provision equipment and materials for these modules. The Government of Cuba will cover the costs of labor and other locally available materials for construction of these small water reservoirs, as well as their Operations and Maintenance.
- 70. GCF investments in support of this activity will consist of the following sub-activities:
  - 1.2.1: Procure identified technologies and equipment
  - 1.2.2: Develop training materials
  - 1.2.3: Train 68 machinery operators

<sup>&</sup>lt;sup>51</sup> Livingston and Blade. Texas A&M University System

<sup>(</sup>http://publications.tamu.edu/FORAGE/PUB\_forage\_Paratill%20Renovations%20of%20Pastures%20and%20Hayfields.pdf).May 5<sup>th</sup> 2018.





- 1.2.4: Implement low impact sub-soiling of 20,189 hectares of compacted rangeland
- 1.2.5: Construct 700 water reservoirs for livestock (no more than 63m3).

1.2.6: Establish and implement silvopastoral modules, including improved grazing systems and development of farm management plans

**Component 2: Strengthened institutional and technical capacities** 

Output 2: <u>Strengthened institutional and farmer capacities to improve ecosystem services through agroforestry, silvopastoral</u> and forestry systems and enhance the climate-resilience of production landscapes

- 71. To catalyze the shift from a tightly focused production maximization paradigm to one of productive climate resilient agroecosystems that enhance ecosystem services, farmers, producer organizations and institutional staff require significant capacity building. These stakeholders require technical training to understand climate change and its effects on agroecosystems and production landscapes, the role of forests, agroforestry and silvopastoral systems in the production of ecosystem goods and services, and how to adapt agricultural production to continually evolving climate change farmers need to develop the skills to adopt and apply resilience-enhancing agricultural practices and systems. Part of the impetus to adopt and apply these systems stems from interest in the sale under contract of agricultural products to government programs and the possibility of accessing growing supply-and-demand markets, combined with the reduction in crop losses and food insecurity.
- 72. The Cuban agricultural sector is currently immersed in major reforms and transformations with the objective to implement new economic measures aimed at facilitating the development of sectoral production, while establishing a resilient and sustainable agriculture in the face of growing climate change. The aim of government policy is to achieve efficient agricultural production based on resilience to climate change as well as incentives for sustainable production.
- 73. These reforms encourage production by farmers and act to balance supply and demand, contain prices at equitable levels, guarantee consumer safety and interests, guarantee sustainability of production, and enhance resilience to climate change. This project is integrated within the framework of these reforms and transformative actions, including the benefits to agriculture and food security from markets and marketing. Activity 3.2 of the Funding Proposal, in particular, will support further analysis of the current transformations.
- 74. As part of capacity development activities under this Output, farmers will receive training in how to effectively access the secondary supply-and-demand markets, and producers' organizations will work with MINAG to analyze and develop value chains for specific products from climate-resilient production systems. GoC will ensure that production contracts are provided to producers' organizations for adequate sale of harvests, and will provide technical assistance to producers to access supply-and-demand markets.
- 75. The Government of Cuba is implementing several programs to improve human nutrition through national food production and by reducing food lost and waste and dependence on imported food. In support of this, the National Committee for the Reduction of Food Loss and Waste (CNPDAC) was established in 2017 and its Secretariat is hosted by FAO Cuba. In 2018 and 2019, a National Strategy for the Prevention of Food Loss and Waste was developed, including three reinforcing programs:
  1) Integrated Productive Program for Urban, peri-urban and Family Farming;
  2) Municipal Food Self-Supply Plan, and;
  3) Program for the development of small scale agro-industry.
- 76. A major focus of the strategy has been strengthening capacities of staff from different Ministries and other institutions, as well as stakeholders on Food Loss and Waste. Nutrition and food loss and waste are an integral part of Farmer Field School training under Output 2.2, below.

<u>Activity 2.1: Increase institutional capacities to support farmers and producers' organizations to establish and maintain</u> <u>agroforestry, silvopastoral and forestry systems for improved ecosystem services</u>

GCF: 108,000 USD MINAG: ----- USD

77. The project will apply a comprehensive approach to agroecosystem management with the aim of maximizing the ability of agroforestry, silvopastoral and forestry systems to cope with variations in water availability and volumes, while maintaining or increasing productivity. This approach builds on farmers' knowledge and experience, observations and response to observed changes in climate conditions, cropping and livestock production systems and water management, incorporates



## B

use of resilience-enhancing soil, water and crop cultivation technologies (sub-soiling, zero-till, precision fertilization, drip irrigation, etc.), and implements a package of low-cost agricultural practices based on agro-ecological principles that reduce risk from drought. Adoption of this approach by farmers and producers' organizations will be enabled through training, coaching and technical advice by institutional staff from the Ministry of Agriculture and its affiliated institutes and agencies.

- 78. The Ministry of Agriculture will strengthen and intensify its training-and-visit system, coupling off-site instruction and participatory research through Farmer Field Schools (FFS) with farm visits to provide technical assistance. MINAG extensionists and "champion farmers" (see Activity 2.2, below) will be trained to support farmers and producer organizations to acquire the necessary skills to establish, maintain and operate resilience-enhancing agroforestry, silvopastoral and forestry systems across production landscapes. The project will train extension workers from MINAG to train farmers in Farmer Field Schools (FFS) in the seven municipalities, according to the type of agroforestry, silvopastoral or forestry system to be implemented and provide technical expertise to help farmer groups maintain the agroforestry, silvopastoral and forestry systems established under Output 1, above. Trainers of extensionists will be identified from an in-house roster of qualified MINAG experts. Extension workers will also promote farmer-to-farmer exchanges in the FFS and through farmer markets and agricultural fairs.
- 79. At the same time, extensionists will receive the logistical and technological support they need from MINAG to monitor the agroforestry, silvopastoral and forestry systems in the field, collect data and store it appropriately, provide on-site advice and training, and build an interactive network of agroforestry/silvopastoral/forestry practitioners.
- 80. GCF will finance acquisition or development of substantive pedagogical materials, training of trainers and training of extensionists.
- 81. GCF investments in support of this activity will consist of the following sub-activities:
  - 2.1.1: Develop training materials

2.1.2 Train 443 extension service technicians, agricultural technicians, and cooperative leaders to lead farmers in gender and age-sensitive learning-by-doing regarding the implementation, operations and maintenance of their agroforestry or forestry systems; topics covered will include no-till cultivation; inter-cropping; cut-and-carry forage feeding; sub-soiling; soil conservation with gabions, gully plugs, bunds, and contour farming; agroforestry and silvopastoral system design; application of efficient irrigation technologies (FS paragraphs 210-212) and water harvesting and storage systems;

2.1.3 Development of supplementary learning materials and information on CC impacts, projections, ecosystem function and services, agroecology, agroforestry and forestry systems, and farm business planning and marketing.

#### <u>Activity 2.2 Train agricultural producers to collectively revitalize and manage landscape resources through climate resilience-</u> <u>enhancing agroforestry, silvopastoral and forestry systems for gender-equitable agricultural production and ecosystem</u> <u>services</u>

GCF: 718,870 USD MINAG: ------ USD

82. The long-term construction of climate-resilient production landscapes requires that farmers adopt and apply cropping and livestock systems that improve and maintain ecosystem services and agricultural productivity as they adapt to evolving climate hazards. Aside from the concrete inputs and activities provided under Output 1, above, to establish agroforestry and forestry systems, farmers require a substantial body of knowledge on agroecology, climate change adaptation and mitigation, agroforestry, silvopastoral and forestry systems management, and basic business economics so that farmers can generate the revenue needed to sustain adopted resilience-enhancing practices and systems. Farmers, through their day-to-day activities, possess a solid basis of experience and knowledge to build on and complement. At the same time, farmers also need to acquire the practical skills to apply new knowledge to concretely enhance the climate resilience of their production systems. Farmer Field Schools (FFS) are the most effective and efficient way to carry out farmer training. The project will establish an integrated FFS program to cover the seven municipalities and their different agroforestry, silvopastoral and forestry systems. FFS programs work at multiple scales to build social capital by helping strengthen producer organizations and by contributing to greater organizational capacity along the entire value chain – from financing, post-harvest processing and marketing, to investments.





- 83. The Farmer Field Schools (FFS) approach<sup>52</sup> was developed by FAO and its partners over 20 years ago as an alternative to the then prevailing top-down extension method of the Green Revolution, which failed to work in situations where more complex and counter-intuitive problems existed (see the FS- Annex 2- Section 5.3- Output 2 description- for more detail on FFS).
- 84. This project will establish 17 FFS in the seven project municipalities in appropriate locations based on agroforestry, silvopastoral or forestry systems to be implemented, and logistical and other considerations such as the availability and access to markets. These FFS will provide farmers with updated information and knowledge on CC, ecosystem function and services, agroecology, agroforestry, silvopastoral and forestry systems, and farm economics, as well as knowledge and information regarding practical consequences and applications for their farming practice. In order to generate revenue to pay for ongoing adaptation to climate change, farmers will learn farm and business planning, as well as new practices e.g. no-till cultivation, inter-cropping, cut-and-carry forage feeding, sub-soiling, soil conservation with gabions, gully plugs, bunds, contour farming, agroforestry system design, application of efficient irrigation technologies and water harvesting and storage systems. The FFS will pay particular attention to the specific needs of women farmers and youth, devising gender-sensitive and age-sensitive curricula and learning-by-doing methodologies.
- 85. GCF will finance the establishment of Farmer Field Schools not actual buildings but rather agroforestry, silvopastoral and/or forestry plots on farmers' fields where irrigation and soil preparation technologies can be demonstrated and where training and experience of new systems and technologies can take place. GCF resources will also cover the costs of training farmers throughout the seven target municipalities. The Government of Cuba will finance logistical and technical support to trainees during and after training. GCF investments in support of this activity will consist of the following sub-activities:

2.2.1 Establish Farmer Field Schools (17) in appropriate locations in the seven municipalities based on type of agroforestry, silvopastoral or forestry system to be implemented and logistical and other considerations;

2.2.2 Operation of 17 Farmer Field Schools and training of 15,549 farmers using the participatory research and learning-by-doing approach.

#### Component 3: Strengthened governance, legal and regulatory framework

#### Output 3: Effective governance to support climate resilience-enhancing production systems and ecosystem services

- 86. This project is posited as a second phase of a three-phase program aimed at establishing and operationalizing agroforestry/silvopastoral/forestry systems for landscape resilience countrywide. To enable implementation of this longer-term vision, concrete policy options will be identified, analyzed and discussed under Activity 3.1. These options, structured and adopted into a comprehensive legal and regulatory framework, will ensure effective institutional coordination and support to farmers to build the productivity and sustainability of their agroecosystems and the resilience of their shared production landscapes. The project will analyze and evaluate existing policies such as land usufruct Decree No 300/2012 (see paragraph 22) and propose any needed reforms to remove barriers and facilitate individual landholders to adopt resilience-enhancing practices and technologies.
- 87. The landscape resilience policy developed under Activity 3.1 will be implemented *on the ground* by farmers and producers' organizations who will be financed through a Landscape Resilience Fund developed under Activity 3.2, below. This Fund will provide financial resources to farmers and production units as risk-reducing incentives to motivate adoption of resilience-enhancing production practices and technologies. The Fund will also lower the inherent risk associated with entry into the supply-and-demand markets for agricultural produce. Please see below under Activity 3.2 for more details.
- 88. Under Activity 3.3, below, the project will work directly with local level organizations and the local branches of national organizations to build their capacities for multi-sectoral and multi-stakeholder support and coordination in implementing the landscape resilience policy from Activity 3.1 through programs and projects on the ground. An in-depth analysis of existing coordination mechanisms at the provincial and local level, as well as the institutional resources and capacities for project implementation can be found in Appendix 7 of the FS.
- 89. Through this Output, FAO will provide the Government with assistance in legal, normative and policy matters needed to implement the clear political mandate contained in the NDP 2030, Tarea Vida and the NDCs described in paragraphs 25 and 26 above, and to overcome the barriers that still hinder their implementation.

<sup>&</sup>lt;sup>52</sup> For a description of FFS, please see <u>http://www.fao.org/agriculture/ippm/programme/ffs-approach/en/</u>



Activity 3.1 <u>Develop, discuss and analyze options for policy reforms to support implementation of agroforestry, silvopastoral</u> and forestry systems for landscape resilience through improved ecosystem services

#### GCF: 260,500 USD

MINAG: ----- USD

- 90. A concrete policy to support the building of landscape resilience through ecosystem service enhancement is essential. This policy will build on current policies e.g. Tarea Vida, etc., but also incorporate analyses and information from other experiences and studies.
- 91. The policy analysis and development process will identify gaps and weaknesses in the current policy framework vis a vis the long-term goal of landscape resilience through enhanced ecosystem services. These include identifying *substantive weaknesses* e.g. insufficient understanding of and focus on ecosystem services and their relation to vulnerability and resilience; general lack of a comprehensive approach (multi-sectoral, multi-stakeholder) to building landscape resilience; *implementation weaknesses* include a lack of coordination among key actors/sectors/stakeholders at the local and landscape levels; and the absence of local level strategic planning instruments; *financial weaknesses* include the insufficient availability of micro-credit, grants, loans; insufficient farm-level business planning and management capacities; inefficient marketing capacities, etc.
- 92. The project will analyze stakeholder roles and responsibilities under potential policy reforms, defining specific mandates and areas of action depending on the type of reforms envisioned.
- 93. Multi-stakeholder and multi-sectoral workshops will identify or discuss policy objectives and outcomes and the role of the different actors in implementing a landscape resilience policy. Expert assistance will be applied to draft policy options and lead workshops and consultations. The consultation process will be highly participatory and well documented. Draft policy options will be discussed and input incorporated into final drafts which will then be validated by national authorities.
- 94. GCF investments in support of this activity will consist of the following sub-activities:

3.1.1 Ten workshops with expert assistance and input (international and national experts) and involving national stakeholders, including farmers to facilitate inter-institutional analyses and discussions regarding policy objectives, needs and options for the modification or reform of agricultural and land-use policy;

3.1.2 Definition and discussion of institutional modifications or adaptations to support the different options for policy reforms for landscape resilience through improved ecosystem services;

3.1.3 Development of specific proposals for policy reforms;

3.1.4 Discussion and subsequent validation of reform proposals at national level.

Activity 3.2 <u>Establish a Landscape Resilience Fund to support adoption and implementation of agroforestry, silvopastoral and</u> forestry systems in support of landscape resilience through ecosystem service enhancement

#### GCF: 91,500 USD MINAG: 551,192 USD

- 95. MINAG, with project support, will transform its Forestry Development Fund (FONADEF) and Soil Conservation Fund (SCF), as well as any other funds established to support land use and rural development, into a single Landscape Resilience Fund (LRF); no GCF funding will be used to capitalize the LRF. The purpose of the Landscape Resilience Fund will be to motivate, incentivize and otherwise support resilience-enhancing land use particularly agroforestry, silvopastoral and forestry systems by farmers and producers' organizations around the country, starting with the most vulnerable geographic areas. As such, the Landscape Resilience Fund (LRF) is intended to support on-the-ground implementation of landscape resilience policy (see Activity 3.1) by farmers. The LRF will be designed and legally established by the end of this project.
- 96. Transformation of FONADEF and SCF will initiate with expert analysis of their current funding scope, organization, financing, management and administration, and identification of strengths and weaknesses, lessons and best practice of these funds as well as others from around the world. At the same time, expert analysis will be carried out on the feasibility of a single Landscape Resilience Fund (LRF), identifying the necessary modifications, reforms and other steps required to transform FONADEF and SCF into a single funding mechanism. Experts and their institutional counterparts will identify potential legal requirements; governance and management arrangements; operational modalities; financing modalities; project eligibility criteria, review, approval and support processes; organizational structures for portfolio management, monitoring, evaluation and reporting and other decision making and management factors. A draft proposal for the LRF and its establishment and operationalization will be formulated.





- 97. As part of the LRF feasibility study, analysis will be undertaken on options for economic instruments to capitalize and sustain the fund, criteria for grants and loans, governance arrangements, integration with public policy priorities, and other topics. Experts and institutional counterparts will review existing experience in the region and globally and explore options for adoption and application of appropriate economic instruments. Proposals for the most efficient economic instruments will be drafted and submitted to national authorities with the proposal for the LRF. MINAG and other authorities, as appropriate, will discuss and debate the expert analysis and LRF study as prelude to establishment and operationalization of the Landscape Resilience Fund. With establishment of the LRF, MINAG will elaborate and carry out a communication strategy to generate interest by farmers throughout Cuba in the Fund and its objectives and to encourage their engagement with it.
- 98. It is anticipated that farmers and production units will use LRF funds to purchase inputs and services (e.g. land preparation, transport), storage, processing and value-addition facilities, breeding stock, tools, irrigation equipment and other essential elements of climate-resilient agricultural production and animal husbandry.
- 99. Workshops will be held with representatives of producers' organizations, Ministries, institutions, tourism industries to discuss on-the-ground implementation of the landscape resilience policy and what financial and technical and operational resources and support would be required. These workshops will generate support for and validate the LRF and landscape resilience policy.
- 100. The GCF will cover the costs of workshops and expert analyses and assistance, international exchanges to incorporate lessons learned from other governments and institutions, development of proposals for reforms to regulations, policies and planning; analyses of financial mechanisms and economic instruments to incentivize farmers to adopt and maintain resilience-enhancing practices and cropping systems, and development and execution of a communication strategy to engage farmers with the LRF. The Government of Cuba will provide discussion and working spaces for consulting experts and task forces and working groups, as well as logistical and organizational support.
- 101.GCF investments in support of this activity will consist of the following sub-activities:

3.2.1 Expert analyses of existing funds (FONADEF, SCF) and other funds both regionally and globally (current funding scope, organization, financing, management and administration, and identification of strengths and weaknesses, lessons and best practice);

3.2.2 Ten workshops to analyze and develop options for a Landscape Resilience Fund to support implementation of landscape resilience policies on the ground;

3.2.3 Design of a Landscape Resilience Fund to support resilience-enhancing land use by farmers and producers' organizations;

- 3.2.4 Formal legal establishment of the Landscape Resilience Fund (LRF)<sup>53</sup>;
- 3.2.5 Elaboration of communication strategy and materials, and dissemination.

Activity 3.3 <u>Strengthen planning, governance and coordination at the landscape level in support of landscape resilience</u> <u>through enhancement of ecosystem services</u>

#### GCF: 41,500 USD MINAG: ------ USD

- 102. The purpose of this activity is to build the capacities of the different institutional and organizational stakeholders in the project areas to coordinate their support to farmers and producers' organizations for the implementation of the Landscape Resilience policy, as well as localized multi-stakeholder governance. This support will take the form of direct technical assistance, provision of inputs, aid in marketing produce, support to maintenance of machinery and equipment, enabling access to financing, as well as other factors. Interinstitutional coordination is essential to avoid duplication of efforts, stakeholder confusion and potential loss of beneficial synergies among landscape players. By coordinating their programming and on-the-ground efforts, institutions will be better able to contribute more efficiently and effectively to landscape resilience and producer productivity.
- 103. This project will train key organizations and farmers in the seven target municipalities to participate collaboratively in planning and decision-making processes that determine the management outcomes, outputs and activities in the production landscapes to enhance their climate resilience. Strengthening of governance mechanisms will also include development of

<sup>&</sup>lt;sup>53</sup> The formal legal establishment of LRF is part of the project scope and will require the government endorsement/approval which will be granted through the publication of an Executive National Decree.





norms, agreements and organizational capacities for the collaborative management of areas targeted for restoration with the aim of augmenting the stability and sustainability of the management and use of water flows into, across and out of the landscape as a key element to enhancing its climate resilience.

- 104. Targeted organizations will have access to required modeling and visualization technologies to improve their analytical capacities, as well as the most effective tools and instruments for coordinated planning and management of landscape resources from farm to landscape level. These organizations are selected for their character of mass stakeholder organizations that represent different key constituencies at grassroots level both in the target areas, as well as nationally. The project will ensure that women and youth have equal opportunities to participate in the project activities<sup>54</sup>. The project aim at ensuring that their interests, concerns and perspectives are represented in these processes both individually as members of organizations, as well as collectively in women and youth organizations. Participating organizations include cooperatives and other producer's associations, entrepreneurship groups, youth groups, and women's groups, including the *Asociacion Cubana de Tecnicos Agricolas y Forestales (ACTAF), Asociacion Cubana de Produccion Animal (ACPA), Asociacion Nacional de Agricultures Pequeños (ANAP)*, and *Federaciòn de Mujeres Cubanas (FMC)*. Experience accrued by these organizations during the project will contribute to country-wide replication of project technologies, methods and practices in phase three of this landscape resilience program.
- 105. While capacity development under Output 2 is aimed squarely at building technical capacities of farmers on the ground and the Ministry staff directly providing them services, capacities to be strengthened under this Output are intended to strengthen key organizations to support landscape resilience policy at municipal and provincial levels, including planning and programming. These capacities include technical and analytical skills to better understand the links between landscape resilience, ecosystem services and farming sustainability and productivity; pedagogic skills for extension of climate-resilience enhancing farming practices; logistical capacities to ensure institutional staff can meet farmers in the field; data and information management technologies so that monitoring and evaluation of performance with new practices can be credibly recorded and analyzed; and abilities of stakeholder groups at local level to participate in multi-stakeholder deliberations and decision making.
- 106. The project will also support multi-level review and analyses of existing landscape planning methodologies through interinstitutional collaborative teams (including ACTAF, ACCPA, ANAP, FMC, amongst others) and provincial discussion and debate forums, with the aim of integrating climate adaptation and mitigation principles and concerns into these instruments, including the prioritization of agroforestry/silvopastoral/ forestry systems for sustainable production and ecosystem service restoration. Institutional staff will train municipal environmental units, local development associations, and local communities to analyze, discuss and propose agreements and negotiated norms on the governance of natural resources at landscape level, including the protection of aquifer recharge areas, micro-watersheds and headwaters, and areas targeted for restoration.
- 107.GCF will cover the costs of development of strategies and local planning for resilience-enhancing land use management, integration of climate change principles into local plans and programs, and use of modeling and visualization technologies for coordinated planning and management of landscape resources. Government of Cuba resources will cover logistical and ongoing support to local organizations and institutional staff to participate in training workshops and forums.

108.GCF investments in support of this activity will consist of the following sub-activities:

3.3.1: Train 10 local branches of established organizations (*Asociacion Cubana de Tecnicos Agricolas y Forestales* - ACTAF, *Asociacion Cubana de Produccion Animal* - ACPA, *Asociacion Nacional de Agricultures Pequeños* -ANAP, and *Federaciòn de Mujeres Cubanas* - FMC) to participate effectively in local planning and decision-making for climate-resilience land use;

3.3.2 Multi-level review and analysis of landscape resilience policies and planning instruments as a framework for adaptive landscape management to enhance climate resilience and integration of CC adaptation principles into local plans and programs;

3.3.3 Fifteen workshops to strengthen coordination in local landscape governance structures for climate change adaptation: *Comision de Reforestacion, Grupo de Bahia, Comision de Cuencas Hidrograficas, Comision de Asuntos Agrarios; Grupos Provinciales y Municipales de Tarea Vida.* 

109. In addition to the costs of the Outputs and Activities, the project includes a Project Management Unit:

GCF: 1,760,079 USD

<sup>&</sup>lt;sup>54</sup> The project aim at ensuring women and youth participation in all activities proposed. For further information, please see Annex 8 on Gender Analysis and Action Plan as well as the Appendix 2.5 of the Feasibility Study which presents the Socio Economic Characterization of the PIA.



#### MINAG: 4,612,400 USD

110. Finally, some costs for Evaluation have been considered, including costs of an Impact Evaluation (for more details see Annex 11):

#### GCF: 562,000 USD MINAG: 250,000 USD

#### **B.4. Implementation arrangements**

- 111. The governance of the project and the institutional arrangements reflected below are the result of an inter-ministerial dialogue facilitated by FAO, led by the Ministry of Agriculture (MINAG), which includes the Ministry of Science, Technology and Environment (CITMA), which is the GCF's National Designated Authority (NDA) in Cuba, and the Provincial Agricultural Delegations.
- 112. The government of Cuba, represented by MINAG, will act as the Executing Entity (EE) of the project, and FAO, as requested by the NDA (Annex 1), will serve as the Accredited Entity (AE) and as a Co-Executing Entity (CEE) responsible for the project financial and operational implementation <sup>55</sup>56.

113. As FAO functions as both AE and Co-EE, FAO will consequently separate both functions and establish the following:

- An appropriate institutional arrangement for the separation of both functions in different departments of FAO; and
- Clear lines of responsibility, reporting and accountability within FAO between project implementation and execution functions. This separation will help ensure the financial management and segregation of duties is maintained between: processing of payments, procurement processing, evaluation and monitoring, risk management and accounting.
- 114.FAO, in its role as AE, will be responsible for the overall management of this project, including (i) all aspects of project appraisal; (ii) administrative, financial and technical oversight and supervision throughout project implementation; (iii) ensuring funds are effectively managed to deliver results and achieve objectives; (iv) ensuring the quality of project monitoring, as well as the timeliness and quality of reporting to the GCF; and (v) project closure and evaluation. To perform the AE functions, FAO will set up a dedicated FAO-GCF project task force comprising relevant staff from the FAO Country Office in Cuba, the FAO Regional Office for Latin America in Chile, and FAO Headquarters in Rome (Appendix 2.7 FS). The project supervision team will remain independent of the Executing Entity functions also performed by FAO.
- 115.FAO, in its role as a EE, will set up a Project Operational Support and Financial Management Unit (OSFMU), which will be led by the FAO Representation of Cuba and will have the main function of supporting the National Project Management Unit (NPMU), providing procurement services and financial management services for the GCF proceeds. The OSFMU will be financed through the Project Management budget line of the project's overall budget.
- 116.A Project Agreement will be signed between FAO and MINAG as co-EE, which will be legally binding and detail the roles and responsibilities of FAO, CITMA, MINCEX, and MINAG, and contain the relevant provisions for the compliance by FAO with the requirements from the Accreditation Master Agreement (AMA\*) and Funded Activity Agreement (FAA). The Project Agreement will also contain provisions on the applicability of the Convention on the Privileges and Immunities of the Specialized Agencies (the "the Specialized Agencies Convention") to FAO, including to the GCF Proceeds held by FAO.

#### Project Governance Structure

- 117.For the governance and strategic decisions of the project, a National Project Steering Committee (NEC) will be established, composed of Ministers from MINCEX, CITMA, MINAG and the FAO representative in Cuba. The NC will be chaired by MINAG.
- 118. The main function of the NEC is to coordinate, guide and provide political and strategic guidance for the implementation of the project, as well as to ensure strong inter-institutional coordination. It will also ensure that planned co-financing from government entities is delivered in a timely manner, verify and approve annual work plans, and approve Financial and Technical Reports (IFTs).
- 119.Project governance also includes a Project Coordination Committee (PCC) composed of the National Project Director, technical representatives from MINAG and FAO, and the National Project Coordinator (NPC). The PCC will serve as a key communication channel between the National Project Management Unit (NPMU) and key local stakeholders and will assist

<sup>&</sup>lt;sup>55</sup> The cost of salaries and benefits of all government officials, in whichever capacity associated with the project, will be provided as co-financing by the Government Executing Entity. The government recognizes the key importance of the project implementation and they will therefore ensure the mobilization of the human resources to focus on the project activities.





in the implementation of the stakeholder participation plan. The PCC will be accompanied by national technical and scientific institutions (extensionists, academia) and provincial coordinators.

#### **Project Implementation Structure**

- 120.For project implementation, a government-funded National Project Management Unit (NPMU) will be established with the primary function of ensuring project coordination and execution through the effective implementation of annual work plans, following the guidelines of the NEC and PCC. The NPMU reports to the PCC, and will be led by the NPC. The NPC will be selected by MINAG, in consultation with FAO.
- 121. The NPMU will establish three Provincial Project Management Units (PPMU- Las Tunas, Villa Clara and Matanzas/Los Arabos) to ensure sound implementation at the local level (provincial). Each PPMU will have a Provincial Coordinator, a Logistics and Training Assistant and an Administrative Assistant. The PPMU will be advised by a Provincial Project Coordinating Committee (PPCC)- represented by the provintial delegetaions of MINAG, CITMA, National Association of Small Farmers, Council of the Provincial Administration, Council of the Municipal Administration and academic and scientific institutions (more details in Appendix 2.7 FS)- who will guarantee the effectiveness of the actions at the provincial level, in terms of planning, coordination, implementation and evaluation of the processes required as part of the project.
- 122. In addition, the NPMU will establish seven Municipal Project Management Units (MPMU) to ensure solid implementation at the municipal level. Each MPMU will have a Municipal Coordinator, a Logistics and Training Assistant and an Administration Assistant. The MPMU will be advised by a Municipal Project Coordinating Committee (MPCC), which will guarantee the effectiveness of actions at the municipal level and promote a fluid exchange of information for decision making.
- 123. The provincial coordinators of Las Tunas, Villa Clara and Matanzas will be the link with the seven municipal coordinators and will promote a fluid exchange of information and decision making at two specific levels of management and articulation: territorial/national. Staff from the provincial and municipal units will be financed by the government and will report to the NPMU.
- 124.A description of the governance and implementation units' functions/responsibilities can be found in Appendix 7 of the Feasibility Study. The governance and implementation structure of the project is shown in figure 3.







#### Figure 3. Governance and Implementation Structure of the IRES Cuba Project.

#### **Collaborating Institutions**

- 125. The **Ministry of Science, Technology and Environment (CITMA)** has the mission of directing, executing and controlling State and Government policy in the areas of science, technology and environment; promoting the coherent integration of these to contribute to the sustainable development of the country. It is the National Authority Designated by Cuba for the Green Climate Fund. CITMA will be part of the National Project Steering Committee (NSC), according to its functions as the governing body, facilitating knowledge management processes and compliance with environmental regulations. CITMA will manage the application and development of scientific knowledge, technological innovation and environmental protection in the process of sustainable agricultural development, promoting actions to adapt to climate change. This Institution has provincial delegations and a representation at the municipal level.
- 126. The **Ministry of Agriculture (MINAG)** is in charge of proposing and implementing the policy on the use, tenure and sustainable exploitation of the country's agricultural surface; agricultural and forestry production for the satisfaction of the food needs of the population, industry and export. In addition, it regulates and controls local administrations in terms of their competence, directly or through the structures of provincial and municipal delegations. It generates learning and technology, and coordinates the exchange of information and decision-making. The MINAG is the counterpart of the Cuban government for the project, will be part of the National Project Steering Committee (NSC) and will act as the Project's EE.
- 127. The **Ministry of Foreign Trade and Investment (MINCEX)** is the body of the Central State Administration whose mission is to propose, direct and control the application of State and Government policies on foreign trade, foreign investment and international cooperation. Is an important counterpart from the Government for the project. The Ministry doesn't have municipal representation, but they have provincial instances with which close cooperation and exchange will be maintained to establish links that facilitate the good management of the Project in accordance with what is established by the norms,





regulations and laws related to international cooperation. They will be in charge of the governance of the project through the National Project Steering Committee (NSC).

- 128. The **Cuban Association of Animal Production (ACPA)** is a national organization with vast experience in animal diversification, animal feed and genetics for breed improvement. It's role in the project will be training and extension (specialized knowledge), participating in learning teams and in the FFS. It has grassroots associations in the provinces and municipalities of the country. They will act as advisors to the Project Coordination Committee (PCC).
- 129. The **Cuban Association of Agricultural and Forestry Technicians (ACTAF)** is a national Association that facilitates ways to build models of sustainable agrarian systems. It has a work structure organized in branches in all the provinces. It is considered a key actor for the proposal due to its experience in working with local actors of agricultural development and the promotion of agro ecological alternatives in Cuban agroforestry systems. They will act as advisors to the Project Coordination Committee (PCC).
- 130. The **National Association of Small Producers (ANAP)** encompasses local producers' associations and is considered a key ally for the project in project municipalities because it reflects the views and perspectives of local producers. They will contribute to the further development of Cuba's Agroecological Movement through farmer-to-farmer communication and dissemination of project-generated best practice. ANAP also has extensive experience in gender analysis and programming for women's empowerment and will collaborate with the project in delivering the gender action plan. ANAP will facilitate Project implementation in relation to farm planning and management of agroforestry, silvopastoral and forestry systems. ANAP will form part of the PPCC and the MPCC of the project.
- 131. Academic and scientific institutions will provide accompaniment and scientific-technical support and training in the implementation of the project. They will work as part of the agrarian extension system. Some of them are: The Central University of Las Villas and the University of Las Tunas have Municipal University Centers; the Tropical Viandas Research Institute (INIVIT), which is the main extension institution, located in one of the AIP (Villa Clara Province, Santo Domingo municipality); the Agricultural Engineering Research Institute (IAgric), that has branches in the provinces where the project will be implemented; The Tropical Fruit Research Institute (IIFT) and the Research Center for Animal Improvement and Tropical Livestock (CIMAGT) do not have offices at the municipal level, but their researchers and technicians will join the extension work in the AIP. Researchers, professors, specialists and technicians from other institutions may participate in the implementation of the Project at the local level, integrating with the teams in each municipality.

#### Flow of Funds

132.At the request of the Government of Cuba, FAO will be the financial and operational executor of GCF resources, including financial management, procurement of goods and contracting of services (through OSFMU). Each year, FAO will present an annual work plan and budget that will include a procurement plan. The PCC together with the NEC will validate and approve the annual work plan, procurement plan, and budget. FAO will be responsible for the disbursement of funds according to established conventions, norms and standards.

#### **B.5. Justification for GCF funding request**

- 133.Cuba is unable to cover the incremental costs of adapting to climate change in light of the serious barriers it has historically faced in accessing international financing and the necessary technologies and equipment to build the climate resilience of its productive sectors. External financial support to meet the incremental costs of managing climate risks and impacts is absolutely essential, particularly as Cuba's climate vulnerability continues to increase in high priority sectors such as agriculture. The Government of Cuba requests maximum concessionality to support vulnerable farmers to adapt to increasing rainfall variability including greater numbers and intensities of hurricanes and tropical storms and drought attributed to climate change. Cuba is currently unable to access loans from multilateral lending institutions, making concessional grants the only option for financing to overcome barriers related to water security undermined by climate change. Fiscal limitations currently hinder the potential for investments to meet the additional costs of building resilience of agricultural production systems. Costs of effective adaptation to climate change will only rise with delay in action and investment.
- 134.Cuba has coped with these ongoing impediments to investment in equipment and technology by building its capacities for knowledge generation, institutional expertise, and innovation as much as possible under intense economic pressure. Nevertheless, additional investment is urgently needed to cover the costs of building the capacities of farmers and producers'





organizations and their support institutions. This would allow them to understand and act on climate change adaptation in the production landscape, optimize ecosystem services, develop and refine resilience-enhancing agricultural production models, and enhance farm and business planning to generate the revenue required for continued investment in adaptive responses to climate change. This additional investment in institutional and producer capacities is, in and of itself, insufficient to fully meet the challenges posed by increasing climate vulnerability. The primary limiting factor in adapting to climate change in Cuba is the lack of the necessary technologies and equipment that, when applied appropriately, will release Cuba's adaptive potential and well-known capacity for innovation in agriculture.

- 135. Farmers and producers' organizations in the two provinces are unable access sufficient financial resources required to invest in the resilience of their agricultural production systems. Government financial support, while steady, is insufficient to meet investment needs, particularly in relation to the activities required for enhancement of ecosystem services and landscape resilience. The climate-driven pace of infestation by marabu, an aggressive invasive species which has taken over thousands of hectares of once productive farm land, easily overwhelms the ability of the Government to provide the technologies and equipment needed to eradicate it in a timely, cost effective manner. Water security is a fundamental need in agricultural adaptation to climate-induced drought – water storage and irrigation systems are urgently needed to enable establishment of resilience-enhancing agricultural systems.
- 136. While annual government investment places a heavy emphasis on developing and maintaining human capital, institutional staff and farmers lack a state-of-the-art understanding of climate change and production landscape vulnerability in Cuba, the scientific basis for emerging climate risk, and needed climate adaptation and mitigation options regarding agroecosystems, including livestock systems. With increasing climate change-driven rainfall variability, institutional staff and farmers need to understand the fundamental relationship between ecosystem services particularly water regulation climate change, and land degradation, disaster risk and loss of productivity. As such, GCF resources will be used in the project to build the technical and farm management capacities of farmers and producers' organizations, as well as build the capacities of institutional and technical staff to plan for climate risk mitigation and manage landscape resources accordingly.
- 137. This project represents a second phase of a three-phased program to ensure the climate resilience of the agricultural sector in Cuba. Through investment in the first phase, the Ministry of Agriculture (MINAG) analyzed the current cropping systems and their agronomic vulnerability to climate hazards related to increasing rainfall variability. MINAG further analyzed the relationship to ecosystem services in this context and opted for a strategy of stabilizing and increasing productivity while simultaneously reducing climate risk, primarily through the development of more climate-resilient agro-ecosystems. With increasing variability of rainfall, including drought and torrential rains, MINAG concluded that resilient agroecosystems should be based on agroforestry and silvopastoral systems, in which trees provide long-term if not quasi permanent ground cover, improve soil porosity, protect the soil against raindrop impact, and act to recycle nutrients back to the soil surface through leaf fall – these benefits affect water regulation by increasing the ability of soils to allow penetration of water by slowing its flow across the soil surface, reducing rainfall impact on the soil surface, and improving organic matter content and coverage of the soil's top layer. Different agroforestry and silvopastoral options were developed, tested and evaluated, with the six listed in this proposal selected for up-scaling to the two project areas of the country, broadly representative of climatic conditions in key areas of the main island of Cuba (see Appendix 6 of the Feasibility Study).
- 138.GCF investment in this second phase up-scaling of six tested agroforestry and silvopastoral systems in vulnerable farms and production enterprises will provide direct resilience benefits to 30,912 farmer families in the two regions. At the same time, the knowledge generated and institutional capacities built during this phase, including the transformation of the Forestry Development and Soil Conservation Funds into a single Landscape Resilience Fund to finance landscape resilience policy, will provide a solid foundation for the third phase of countrywide up-scaling of the agroforestry and silvopastoral systems, as well as water use efficiency measures. In this sense, investment in phase two can also be considered a pre-investment in phase three leading to national scale benefits.
- 139. Investing in up-scaling of tested, innovative agroforestry systems will generate a number of other benefits impacting the current baseline of climate vulnerability by allowing for the production and sale of marketable climate-resilient crops. This will result in improved food security through the state system of food distribution, as well as increased farmer income from sales in local farmers' markets or through contracts with tourism entities. Investing in water storage and irrigation will enable farmers to produce climate-resilient crops using highly efficient technologies that maximize water productivity. Access to water resources is a critical factor in scenarios of increasing drought and dry periods. By enhancing water storage and ensuring the adoption and implementation of climate-resilient agroforestry and silvopastoral systems, GCF investment will play a critical role in assisting vulnerable farmers to strengthen their adaptive capacity.





- 140.At the same time, by investing in agroforestry, silvopastoral and forestry systems, this project will generate significant carbon benefits. Trees and bushes integrated into agricultural production, together with the corresponding effects on soil organic matter of reduced tillage, increased organic inputs from leaf litter, roots, will store increasing amounts of carbon (see section D.1. Impact Potential, below and Appendix 2.3 of FS).
- 141. This project will use incremental finance in the form of GCF grant resources to deliver direct resilience benefits to farmers and producers' organizations, increasing the effectiveness of and maximizing returns on government investments in knowledge generation, capacity development and innovation, and setting the stage for cost-effective countrywide up-scaling of climate-resilient agroforestry, silvopastoral and forestry systems. Women and youth are expected to benefit significantly from a specific emphasis on their inclusion and building their capacities to manage climate-resilient agricultural production. In the absence of GCF resources these farmers would be unable to benefit from water security measures or establishment of resilient agro-ecosystems.
- 142. In shifting the prevailing agricultural paradigm from yield maximization to agro-ecosystem resilience, sustainability and productivity to mitigate increasing climate vulnerability, the project will combine investments in water supply and irrigation, agroforestry, silvopastoral and forestry systems, and farmer and institutional capacity strengthening for climate risk management. Other funding sources are unavailable, in part because the project goes beyond the scope of their eligibility criteria and in part given the volume of resources needed to adequately address the problem. However, lessons learned from the previous GEF-funded initiative on invasive species have been incorporated into the design of this proposal, particularly with regard to marabú, and coordination with current and new GEF initiatives has been planned and agreed. The funding requested from the GCF is therefore crucial to address existing resource and technology gaps and to achieve the necessary paradigm shift to increase resilience of production landscapes and ecosystem services.

#### B.6. Exit strategy and sustainability

#### Government commitment and institutional capacities

- 143. This project enjoys strong government commitment as it is originated directly from government policies for climate change adaptation and mitigation. It is also fully aligned with Ministry of Agriculture strategies for agricultural development through extension and technical assistance, infrastructure development, and provision of equipment, inputs and other goods and services. This project will train the Ministry's agricultural extensionists to support farmers in establishing and operating agroforestry, silvopastoral and forestry systems, application of water efficient technologies, climate-resilient agricultural practices and cropping systems, and farm business planning. The project will build the capacities of producers' organizations to support extension activities related to agroforestry and silvopastoral systems and ecosystem services, particularly through Farmer-to-Farmer extension of climate-resilient agricultural and agroforestry practices.
- 144. The government has committed to the establishment of a Landscape Resilience Fund (LRF)<sup>57</sup> to directly support farmers with financial resources to implement business plans that produce products from resilience-enhancing cropping systems. The project will train LRF staff in analysis and support to the development of farm enterprise business plans. Funding will be provided for specific farmer initiatives originating in and supporting these plans. This project will identify economic instruments for use in generating the financial resources required to capitalize the LRF on a continuous basis, particularly within the context of phase three (countrywide up-scaling of agroforestry, silvopastoral and forestry systems).
- 145. The Cuban government will be responsible for Operations and Maintenance after project termination of equipment and machinery required for land preparation and crop and livestock protection. The GoC's Base Enterprise Units for Integrated Technical Services will be the entities charged with O&M. O&M will be subsidized by fiscal resources supplied through standard budgetary processes. Technical, planning, management and other capacities of key institutions like the Ministry of Agriculture are highly regarded and are the result of government prioritization of the agricultural sector for decades, resulting in highly competent and skilled extensionists and other support staff.

#### Capacity building of farmers to sustain climate resilient cropping systems

146. Farmers will receive training within the Ministry's formal capacity building structure of Farmer Field Schools, demonstration plots, research stations, comprehensive training-and-visit extension system, and links to academic and other experts. The project's capacity building program will ensure that farmers receive in-depth training and support on and off-site, including Farmer-to-Farmer exchanges and through training-and-visit approaches. Farmers will be motivated to participate in training by the prospect of acquiring new skills that will enable them to increase yields, secure and implement institutional contracts

<sup>&</sup>lt;sup>57</sup> Note that no GCF funds will be used to capitalize the Landscape Resilience Fund.





for agricultural products, and successfully market surpluses in the growing variety of supply-and-demand markets, particularly the tourism market.

#### Access to financing and markets

- 147. Effective value chains provide a fundamental incentive to drive and support the adoption of climate-resilient agroforestry and silvopastoral systems, crops and practices. Producer participation in these value chains requires access to funding as well as markets. With co-financing from GoC, this project will support producers to access state markets through production contracts, as well as the increasing number of other markets, including supply-and-demand markets and direct sales to tourism entities. In particular, the GoC will establish a Landscape Resilience Fund by combining the National Forestry Development Fund (FONADEF) and Soil Conservation Fund (SCF) to finance value chain enhancement and coordination, including production improvements, value addition and commercialization to specific markets (e.g. tourism enterprises).
- 148.GCF will finance the sub-activities and inputs focused on the development of climate-resilient agroforestry systems. GCF will also support institutional coordination and planning processes that bring together the different value chain actors producers, input providers, buyers, to more efficiently coordinate their activities in support of climate-resilient value chain development.
- 149. The project will build the capacities of farmers by providing them with the knowledge, information, and access to critical equipment and technologies to reduce their climate risk and enable them to generate revenue for continual re-investment in resilience-enhancing production practices and systems. The project will train farmers to plan and manage their production assets with a value chain approach to climate-resilient crop production in agroforestry systems.

#### Operations and Maintenance and post-project O&M<sup>58</sup>

- 150. The O&M of the project for established infrastructure and technologies will be carried out through a hub-centered system managed by the Government of Cuba involving the UEBIST (Base Enterprise Units for Integrated Technical Services). The UEBIST offer services of mechanization to the agricultural entities in their resident municipality as well as repair and maintenance of agricultural machinery, irrigation equipment and vehicles. O&M of equipment and technologies will be managed in these hubs for a specific set of farm enterprises to achieve economies of scale and maximum efficiency in their use.
- 151.0&M will be focused on Output 1 of the Logical Framework: *Increased CC-resilient production landscapes through investment in innovative agroforestry systems, reforestation with close-to-nature planted forests (CTNPFs) and assisted natural forest regeneration* and specifically activities 1.1 – 1.2 involving establishment of agroforestry systems and planted forests. O&M for each of these activities is focused on specific technologies and equipment for land clearance, marabu eradication, soil preparation, and irrigation and comprises maintenance protocols, operational procedures and scheduled monitoring of use and repairs (please see Annex 20 for description of O&M).
- 152. The operation and maintenance (O&M) costs for the life of the project implementation (7 years) is US\$9,189,682.9. Of this, US\$7,972,374 represent Operation costs that will be entirely financed by the Cuban Government. Maintenance costs represents US\$1,217,308.68 of which FVC will finance US\$1,095,102, and the Government of Cuba finances US\$122,206. During project implementation, the FVC contributes with 13% and the Government of Cuba with 87% of O&M total cost. The Operational (O) and Maintenance (M) Costs for the post-implementation project phase (13 years) is US\$12,690,334 (US\$11,040,590- Operational Costs (O) and US\$1,649,744 de Maintenance. The O&P costs will be entirely financed by the Government of Cuba. Further details about O&M are provided in Annex 20.
- 153. Farmers and producers' organizations will be fully responsible for maintaining farm-level tools and equipment provided by the project, with technical guidance, assistance and training from MINAG staff. Future farmer investments in O&M will be enabled through small farm business planning, resulting in enhanced income generation from sales of surplus yields to institutions and supply-and-demand markets.

<sup>&</sup>lt;sup>58</sup> Please see Annex 20 for more detail.



## С

#### C. FINANCING INFORMATION

C 1	Total	finanain	
<b>C</b> . I.	ισιαι	IIIIaiicii	'y

(a) F	Requested GCF funding	Total amount				Currency			
(i +	ii + iii + iv + v + vi + vii)	38.207				million USD (\$)			
GC	CF financial instrument	Amou	nt		Tenor	Grace period		Pricing	
(i)	Senior loans	NA		En	ter years	Enter <b>ye</b>	ars		Enter %
(ii)	Subordinated loans	NA		En	ter years	Enter years			Enter %
(iii)	Equity	NA						Er	nter % equity return
(iv)	Guarantees	NA		En	ter years				
(v)	Reimbursable grants	NA						İ	
(vi)	Grants	38.20	7						
(vii)	Result-based payments	NA	NA				ĺ		
(b) Co-financing		Total amount			Currency				
infor	mation <sup>59</sup>		81.707	7		million USD (\$)			\$)
	Name of institution	Financial instrument	Αmoι	unt	Currency	Tenor & grace	Pricin	g	Seniority
	MINAG	Grant	23,220,250		million USD (\$)	Enter years Enter years	Enter%	6	Options
	MINAG	<u>In kind</u>	58,487,	,143	Options	Enter years Enter years	Enter%	6	Options
C	Click here to enter text.	Options	Enter amo		Options	Enter years Enter years	Enter%	6	Options
C	Click here to enter text.	Options	Enter am	nount	Options	Enter years Enter% Enter years		6	Options
		Amount				Currency			
(c) Total financing (c) = (a)+(b)			119.91	L4			million l	JSD	(\$)
(d) O arrar cont	Other financing ngements and ributions (max 0.5 page)								

<sup>&</sup>lt;sup>59</sup> MINAG contribution will be in the form of a cash grant and in-kind support. FAO applies the official UN exchange rate set on a monthly basis by the UN Treasury – this exchange rate is currently set at \$1 USD to \$1 Cuban Peso.



C

#### C.2. Financing by Component

			Indicativ	GCF fi	nancing	Co-financing			
Components	Components Output Activity		e cost million USD (\$)	Amount million USD (\$)	Financial Instrument	Amount million USD (\$)	Financial Instrument	Name of Institutions	
Component 1: Climate reslient agricultural systems	<b>Output 1:</b> Increased CC-resilient production landscapes through investment in innovative agroforestry and silvopastoral systems, reforestation	1.1 Restore approximately 15,544 ha of farmland from marabu, and increase CC-resilience through sustainable agroforestry (AF), CTNPFs and assisted natural regeneration (mitigation co- benefit 833,950.60 million tCO2-eq. in 7 years of implementation)	59.354	20.513	Grants	38.841	Grants	MINAG	
	with close-to-nature planted forests (CTNPFs) and assisted natural forest regeneration	1.2 Restore approximately 20,189 ha of rangeland with compacted soils and increase CC-resilience through improved silvopastoral systems (mitigation net co-benefit 381,311.51 million t CO2eq in 7 years of implementation).	51.604	14.151	Grants	37.453	Grants	MINAG	
Component 2: Strengthened institutional and technical capacities	Component 2:       2.1 Inclusion         Strengthened       support         institutional and       Output 2:         technical capacities       Strengthened         institutional and technical capacities       system         capacities to improve       service		0.108	0.108	Grants	00.00	Choose an item.	n/a	
	ecosystem services through agroforestry and forestry systems and enhance the climate-resilience of production landscapes	2.2 Train agricultural producers to collectively revitalize and manage landscape resources through climate resilience-enhancing agroforestry, silvopastoral and forestry systems for gender-equitable agricultural production and ecosystem services	0.719	0.719	Grants	00.00	Choose an item.	n/a	
Component 3: Strengthened governance, legal	Output 3: Effective governance to support climate resilience- enhancing production	3.1 Develop, discuss and analyze options for policy reforms to support implementation of agroforestry, silvopastoral and forestry systems for	0.261	0.261	Grants	00.00	Choose an item.	n/a	

#### GREEN CLIMATE FUND FUNDING PROPOSAL V.2.0 | PAGE 36 OF 64 GREEN and regulatory systems and ecosystem landscape resilience through improved framework services ecosystem services 3.2 Establish a Landscape Resilience Fund to support adoption and implementation of agroforestry, 0.643 0.092 Grants 0.551 Grants MINAG silvopastoral and forestry systems in support of landscape resilience through ecosystem service enhancement 3.3 Strengthen planning, governance and coordination at the landscape level Choose an in support of landscape resilience 0.042 0.042 Grants 00.00 MINAG item. through enhancement of ecosystem services **Project Management Costs** 6.372 1.760 Grants 4.612 Grants MINAG Evaluation (includes cost of an impact evaluation) 0.812 0.562 Grants 0.250 Grants MINAG 119.914 38.207 81.707 Indicative total cost (USD)



#### C.3 Capacity building and technology development/transfer

C.3.1 Does GCF financing fund capacity building activities?	Yes 🛛	No 🗆
C.3.2. Does GCF financing fund technology development/transfer?	Yes 🖂	No 🗆

154.Over past decades, Cuba has strengthened the generation of knowledge, capacity building of institutions, production enterprises and technical staff, and innovation in the agricultural sector to mitigate the difficulties in accessing international finance and in obtaining the requisite equipment and technology to effectively adapt to climate change. While institutional and technical capacities are considered by FAO to be relatively high, farmers and producers' organizations, as well as institutional staff, will benefit from training to acquire a state-of-the-art understanding of climate change and vulnerability in relation to Cuban agroecosystems, including livestock systems, and the scientific basis for emerging climate risk management and climate adaptation/mitigation options. With increasing climate-driven rainfall variability, institutional staff and farmers need to understand the fundamental relationship between climate change, ecosystem services – particularly water regulation – and land degradation, disaster risk and progressive loss of productivity.

- 155.As such, GCF resources will be used in the project to train farmers and producers' organizations as well as institutional and technical staff to plan for climate risk mitigation and adaptation and manage landscape resources, specifically operations and maintenance of agroforestry and silvopastoral systems. To establish agroforestry, silvopastoral and forestry systems effectively under Outcome 1, particular land preparation is required: land must be cleared of invasive marabu, conservation tillage effected, sub-soiling to ensure root as well as water penetration, saplings planted, etc. While agroforestry and silvopastoral systems, once established, are reasonably low technology systems to operate, land preparation requires technology and equipment that can be used efficiently to prepare land without augmenting carbon emissions or land degradation. Minimal logistical and other equipment is required to ensure adequate and timely institutional support to farmers and producers' organizations. Since marabu removal and land preparation machinery are to be centrally managed by the UEBs (Base Enterprise Units) in the project areas, their staff will receive intensive training in machinery operations and maintenance.
- 156. While the bulk of GCF funding is requested for technology and equipment, given historical obstacles to accessing international funding sources, a portion is solicited for capacity development under Output 2. Given the already considerable capacities of the Ministry of Agriculture (MINAG) and other institutions, the technology and equipment requested here will allow the project to unlock and galvanize MINAG's existing potential for innovation and adaptation to climate change. Farmers and producers' organizations will receive training through their participation in 17 Farmer Field Schools located in the project areas. The project will build their capacities to understand and implement no-till cultivation, inter-cropping, cut-and-carry forage feeding, sub-soiling, soil conservation with gabions, gully plugs, bunds, and contour farming, marabu eradication and management, agroforestry and silvopastoral system design and maintenance, application of efficient irrigation technologies, and water harvesting and storage systems among others.
- 157. Under Output 3, the project will ensure that government officials from key Ministries and Provincial and Municipal authorities build their capacities through their participation in analysis and discussion on climate change vulnerability, adaptation measures, ecosystem services, agricultural ecosystems and productivity, and land use regulations, legislation and policies. A subset of these officials will build their capacities through the analysis and discussion of economic instruments and financial mechanisms in general and their potential application in Cuba to capitalization and operations of the Landscape Resilience Fund.



#### D. EXPECTED PERFORMANCE AGAINST INVESTMENT CRITERIA

#### D.1. Impact potential

- 158. The project directly contributes to **GCF Fund Level impact areas** of (A1.0) *increased resilience and enhanced livelihoods of the most vulnerable people, communities, and regions;* (A4.0) *Improved resilience of ecosystems and ecosystem services;* and *(M4.0) Reduced emissions from land use, reforestation, reduced deforestation, and through sustainable forest management and conservation and enhancement of forest carbon stocks* of approximately 2,675,727 t CO2 eq over twenty years.
- 159. The project will reduce climate change vulnerability for farmers and producers' organizations by improving ecosystem services, primarily water regulation, in two vulnerable regions of Cuba through integration of trees and bushes into agricultural production landscapes. The project will take a three-pronged approach: 1) removal of invasive marabu from farmland, where needed, sub-soiling of compacted soils to break up hardpans, and establishment of agroforestry, silvopastoral and forestry systems (close-to-nature planted forests and assisted natural regeneration) based on a previous phase of research and development carried out by the Ministry of Agriculture and related institutes; 2) training of institutional staff and lead farmers to plan, manage and operate agroforestry, silvopastoral and forestry systems, including learning how to access Cuba's diversity of markets; and 3) improving governance to support climate resilience-enhancing production systems and ecosystem services by transforming policy instruments and incentive mechanisms to motivate adoption and implementation of agroforestry, silvopastoral and forestry systems for climate change adaptation and mitigation, as well as strengthening local planning, governance and coordination in support of climate resilient production systems and restoration of ecosystem services.
- 160.By strengthening the capacity of farmers to adopt and apply these innovations and access markets, vulnerable farmers, including women farmers and youth will not only increase their food security but also their incomes. Increased incomes will provide farmers with the means to re-invest in resilience-enhancing agricultural practices and systems and keep pace with ongoing climate change. The project will directly benefit women farmers and men through equal opportunities for training in resilience-enhancing agricultural practices and cropping systems as well as agroecosystem planning and management in response to rainfall variability and drought.
- 161.Overall, 51,713 people or approximately 30% of the total population in climate-vulnerable areas of Las Tunas and Villa Clara/Matanzas provinces will benefit directly from project interventions that build resilience through restoration of ecosystem services. The project will provide indirect benefits to 240,117 people in communities around the target areas through strengthened institutional capacities for training and technical assistance, enhanced agro-ecosystem management, and widespread dissemination of lessons and best practices in climate-resilient agriculture. These figures also include institutional staff at local, municipal and provincial levels who will benefit indirectly from improved information, institutional capacities and knowledge management. For more detail on how beneficiary numbers were calculated, please see Section 1.4 of the Feasibility Study titled *Description of profiles of target beneficiaries*.

#### 162.Specifically:

- 15,549 farmers (3,123 women heads of household)<sup>60</sup> on areas averaging 2.3 ha per farmer will have the capacity to manage agroforestry, silvopastoral and forestry systems to cope with rainfall variability and drought (direct beneficiaries represent 51,098 people as the average number of people per household is 3.2).
- 443 agricultural extension workers and staff of the Ministry of Agriculture, including extension-service technicians, agricultural technicians, and cooperative leaders/administrators, as well as 142 machinery operators will benefit from increased skills in training and technical assistance and improved capacities for agro-ecosystem planning and implementation of resilience-enhancing solutions.

163. The project will invest in risk reduction strategies for the targeted stakeholders by increasing their productivity and stabilizing their agricultural production by mitigating the climate vulnerability of agroecosystems and broader ecosystem services.

<sup>&</sup>lt;sup>60</sup> See FS Annex 2, Table 25a, p.64.





Innovative agroecological practices and agroforestry and silvopastoral systems will increase, stabilize and sustain yields while enhancing the climate-resilience of their agroecosystems. Yield surpluses will be sold on contract to institutions or in the supply-and-demand market, and with the profits, farmers will re-invest in reducing or managing their climate vulnerability by improving, maintaining and sustaining the climate resilience of their production assets.

- 164. The project, through Activity 2.1, builds the technical capacities of MINAG to assess climate risks and vulnerabilities, identify options to build resilience of agroecosystems and identify innovations for climate-risk informed agricultural development. The project will also integrate gender and climate change concerns across policies and programs for resilience-enhancing agricultural development.
- 165.Impact potential beyond the project lifetime will be catalysed through investments in knowledge codification and dissemination; development and strengthening of FFS to build adaptive farmer capacities; and development of policies, regulatory frameworks and financial mechanisms that enable further dissemination and replication of agroforestry, silvopastoral and forestry systems countrywide in a third phase.
- 166. The project will also produce significant mitigation benefits through the integration of trees and bushes into production systems. With implementation of this project, approximately 2,675,727t CO<sup>2</sup><sub>eq</sub> tonnes of CO<sup>2</sup><sub>eq</sub> will be sequestered over a 20-year period (please see Section 5.5 of the Feasibility Study for details).

#### D.2. Paradigm shift potential

- 167. This project will shift the prevailing paradigm of production maximization to one of production systems that enhance climate resilience of production landscapes through the promotion of agroforestry, silvopastoral and forestry systems as climate-resilient production systems, supported by stronger institutions and a purpose-built financial mechanism. The current paradigm does not consider climate vulnerability or evolving and projected climate risk, nor does it consider the importance of optimizing ecosystem services for climate resilience of vulnerable households at landscape level. As a result, institutional staff and producers are not equipped to address climate risk in planning and managing crop and livestock production. Financing and other incentives to adopt resilience-enhancing practices and systems are also weak. Women, in particular, generally receive less attention and support although they make up an increasing share of the producers in vulnerable areas, for example, of the 18,614 members of agricultural cooperatives in the project areas, 15% are women, and of the 4,000 employees of the 40 state companies in these areas, 25 % are women.
- 168. The project will enable farmers individually and collectively to plan and manage production systems that enhance ecosystem services and reduce vulnerability and climate risk. Farmers will receive concerted technical support and training from institutional staff to strengthen their understanding of ecosystem function/services in production landscapes, the relation of these to climate risk management, and practical application of this knowledge and development of the required skills to establish and manage agroforestry, silvopastoral and forestry systems to enhance landscape climate resilience. A specific funding mechanism a Landscape Resilience Fund will be established to support farmers and producers' organizations with the resources required to invest in and implement resilience-enhancing approaches, light irrigation and storage infrastructure, productivity-enhancing equipment and technologies, and value-addition enterprises and activities. Women will receive targeted training, access to subsidies and grants, and value-addition and marketing support. This Fund will result from the transformation of the current Forestry Development and Soil Conservation Funds of the Ministry of Agriculture and potentially include new fiscal and economic instruments and other sources of finance.

#### Potential for scaling up and replication

169. Cuba has chosen to improve ecosystem services in production landscapes aimed primarily at water regulation to enhance and sustain diversified agricultural production without land degradation to adapt to CC. *In a first phase*, the Ministry of Agriculture supported research into optimal agroforestry and forestry systems for wetter and drier areas of Cuba, including coastal zones and upland watershed areas, and identified and tested a number of options. The six modules designed and tested in this first phase are proposed for initial up-scaling in this project – *the second phase* - in two regions in the provinces of Las Tunas and Villa Clara/Matanzas, which are representative of prevailing climatic conditions across the island and of increasingly vulnerable populations. By implementing these modules at the selected project locations with selected





stakeholders<sup>61</sup> in this second phase, the project will reduce climate risk for vulnerable producers, enhance production landscape resilience, increase producers' and institutional capacity to manage climate risk, and generate further knowledge of the performance of these agroforestry systems at scale, as well as the corresponding institutional and producer requirements for a program of countrywide up-scaling i.e. *the third phase.* This third phase will be designed based on the experience and lessons learned from the implementation of the second-phase (this Project).

#### Potential for knowledge sharing and learning

170. The project builds on the lessons learned and best practices identified by the Ministry of Agriculture from research and analysis of the performance of a variety of agroforestry systems piloted and tested in the field during the first phase (see Appendix 2 of the FS, Section 5.1). Implementation of the second phase (the project proposed here) will yield, aside from the results pursued, a further wealth of knowledge based on this up-scaling of best practice. The project will monitor and assess the performance of each module under the conditions at each site, including agro-ecological, climate mitigation/adaptation, socio-economic, institutional and capacity factors. Case studies, cross-site and cross-module analyses, and thematic studies will be carried out to be used as a basis for effective up-scaling. Knowledge generated by this project will be made freely available on the project website by the Ministry of Agriculture, through FAO's knowledge network and in relevant international and regional forums.

#### Contribution to the creation of an enabling environment

171. The Project, through its activity 3.2, will improve the accessibility of incentives from the National Forestry Development Fund and the Soil Conservation Fund by transforming these funds into a single Landscape Resilience Fund aimed at farmer cooperatives and especially vulnerable small landholders. Through this activity, FAO will provide the Government with assistance in legal, normative and policy matters, and facilitate the inter-institutional dialogue needed to implement the clear political mandate contained in the NDP 2030, Tarea Vida and the NDCs, and to overcome the barriers that still hinder their implementation. Furthermore, in activity 3.3, the project will train key organizations in the seven target municipalities to participate effectively and collaboratively in planning and decision-making processes that determine the management outcomes, outputs and activities in the target landscapes to enhance their climate resilience. Strengthening of governance mechanisms will also include development of norms, agreements and organizational capacities for the collaborative management of areas targeted for restoration with the aim of augmenting the stability and sustainability of water flows into, across and/or out of the landscape as a key element in enhancing its climate resilience.

#### Contribution to the regulatory framework and policies

- 172. Knowledge generated by this project in case studies, analyses or other forms will be presented to government authorities for their review and consideration as inputs to policy discussions and debate, as relevant. Useful information and lessons of value will be available to policy makers and other stakeholders, including farmers, who might further refine the expansion of climate resilience-enhancing agroforestry in Cuba, including aspects relating to the increased involvement and participation of women, integration with biodiversity conservation programs and strategies (biological corridors), links to the tourism industry, input supply, commercialization, value addition, product certification an capacity development at both institutional and producer levels. The Project will contribute to regulatory framework adjustments by inclusion of relevant climate adaptation criteria into agricultural extension programs and policies at the national level, including in relation to revising and implementing Cuba's NDC under the Paris Agreement.
- 173.Output 3 of this project is aimed squarely at transforming policy and financial mechanisms to motivate adoption and implementation of agroforestry, silvopastoral and forestry systems for climate change adaptation and mitigation, and strengthening local planning, governance and coordination in support of climate resilient production systems and restoration of ecosystem services. The resulting reforms to policy and regulatory frameworks will provide a robust enabling environment for replication of and support to agroforestry, silvopastoral and forestry systems by vulnerable farmers and producers' organizations. In fact, the results of Output 3 will be vital to the follow-on phase phase three of countrywide up-scaling of this project's results.

<sup>&</sup>lt;sup>61</sup> See Section 1.3, *Criteria for selecting beneficiaries*, in Annex 2- Feasibility Study.





### Overall contribution to climate-resilient development pathways consistent with relevant national climate change adaptation strategies and plans

174. This strategy builds on Cuban national policies, programs and legislation encompassing climate adaptation and mitigation priorities, particularly *Tarea Vida*<sup>62</sup> (the national climate change plan, strategic actions 3 and 4, and Tasks 1, 4, 5, 8, and 11), and Cuba's Nationally Determined Contribution, ensuring alignment with the project proposed and GCF objectives. This project contributes directly to Cuba's national adaptation strategies and plans, particularly priority 3 of the NDC: *Incorporating the adaptation dimension into programs, plans and projects related to food production, integrated water management, land management, forestry, fisheries, tourism and health.* This project will also produce mitigation co-benefits aligned with measures proposed in the Second National Communication <sup>63</sup>: (i) CH<sub>4</sub> emission reduction from enteric fermentation (by improvement of pastures); (ii) transition from traditional, high-input agriculture to conservation agriculture to reach 220,000 ha by 2050<sup>64</sup>; and (iii) afforestation and forest protection with the objective of reaching a national forest cover of 35% by 2050. By establishing and operationalizing a Landscape Resilience Fund, the project will enable funding to be made available to farmers and producers' associations countrywide for adoption of resilience-enhancing practices and systems.

#### D.3. Sustainable development

- 175. *Environmental co-benefits* will be produced by this project as a result of agricultural diversification and the extension of agroecological practices for climate adaptation and risk mitigation. The project will promote multi-cropping systems with the aim of maintaining soil cover throughout the year, enhancing soil organic matter and carbon content, reducing soil erosion, increasing groundwater recharge, reducing vulnerability to insect pests and enhancing their diversity, including pollinators and increasing water absorption capacity and soil biodiversity. More efficient irrigation will allow for the growth of green manure crops, improving nutrient cycling at farm and landscape level and providing continuous vegetative cover on farmland. The use of leguminous trees in agroforestry systems will permit reduction or elimination of the use of nitrogen fertilizers, reducing greenhouse gas emissions from this source. Use of trees and shrubs in silvopastoral systems will assist in avoiding soil compaction and provide shade for soil, thereby reducing soil temperatures, erosion and the speed of physical, chemical and micro-biological processes. Agricultural diversification through integration of trees and shrubs into crop production will produce significant climate change mitigation and resilience benefits.
- 176. Social co-benefits will result from implementation by farmers and producers' organizations of agroforestry systems, resilience-enhancing agricultural practices and more efficient water use. Farmers will learn to plan and implement their operations while managing climate risk. Capacity building through the established system of Farmer Field Schools and its proposed expansion, training-and-visit extension, and farmer-to-farmer exchanges will build a broader culture of climate resilient agriculture and livestock raising in which knowledge and experience are freely exchanged, contributing to social cohesion and resilience. It is expected that increased and more stable yields will permit farmers and producers' organizations to achieve a level of food and livelihoods security based on contractual agreements with buyers, as well as sales to supply-and-demand markets. Women, in particular, will receive strong support given the increasing percentage of women in rural areas owing to rural-to-urban migration of male family members. Women will receive gender-sensitive training and skill building, including for farm management, business development, use of weather and climate information, and marketing of farm products.
- 177. This project will aim at equal gender participation in all activities as well as promote increased opportunities for women through specific activities. Increased incomes from climate-resilient agroforestry and silvopastoral production will empower women farmers to participate more fully in decision making and economic activity. With increases in income, women farmers will be encouraged to allocate a larger portion of household resources to the education and health of their household members. By demonstrating an increase in autonomous decision making, participating women farmers will provide positive role models for adolescent girls. At the same time, as women and girls become more empowered members of their communities, they may more effectively advocate community improvements to better serve their needs, which can increase the adaptive capacity of their communities.

<sup>62</sup> https://www.ecured.cu/Tarea\_Vida#Acciones\_estrat.C3.A9gicas

<sup>&</sup>lt;sup>63</sup> Second National Communication to the UNFCCC. Cuba 2015.

<sup>&</sup>lt;sup>64</sup> An inter-ministerial working group on Conservation Agriculture conveyed by the MINAG with FAO support formulated a Roadmap for Conservation Agriculture, which this project will help to implement.





- 178. *Economic co-benefits* will accrue to producers overall through sale of farm surpluses to farmer markets, the tourism industry, and other formal and informal markets. Sales of farm products to annually contracting institutions will provide a basic level of economic security to producers, while sales of surpluses to these markets will increase farm revenues and income. More diversified agricultural production systems will provide greater opportunities for on-farm employment throughout the year. Improvements in access to and the efficiency of water use will result in labor saving, permitting farmers to achieve higher degrees of economic efficiency.
- 179. Under *Tarea Vida*, the Cuban government is investing institutional, financial and technical resources to support the diversification of production as a strategy to build the climate-resilience of landscapes and rural communities. The government's three-phase approach guarantees incremental investments in agricultural and livestock systems based on scaling up of lessons and knowledge from their implementation. The project scales up proven modules developed under actual farm level conditions in response to climate change models and assessments that predict increasing climate variability; this science-based approach to climate-resilient agriculture enhances economic efficiency. With the implementation of this project, evidence will become available for further development and refinement of the country's climate adaptation and mitigation policies.
- 180. Benefits expected from strengthening the climate resilience of farmers and producers' organizations in *Villa Clara/Matanzas* and *Las Tunas* provinces include enhanced crop yields and income due to increased and more reliable water during the dry season. With this project, loss of income from drought will be avoided. With the project, farm households will benefit from application of agroforestry and silvopastoral modules on formerly marabu-infested or degraded land. Through this project farm households will have access to 35,734 has of reclaimed farmland for production of subsistence and commercial crops.

#### D.4. Needs of recipient

181.According to the Climate Change Vulnerability Index, Cuba is classified as "high risk"<sup>65</sup> and, as a Small Island Developing State (SIDS), faces serious impacts from climate change (CC)<sup>66</sup>. These include a rise in average temperatures and increasing rainfall variability, as well as higher hurricane frequency and increasing sea level rise. The consequences of these changes include diminishing availability of water for agricultural production and increasing drought, accelerating land degradation, decreasing productivity, growing infestation of agricultural lands by an invasive non-native species (marabu - *Dichrostachys cinereal*), and increasing saltwater intrusion. These impacts are increasingly affecting rural livelihoods and food security. The vulnerability of the population in the rural agricultural sector is mitigated to a great degree by Cuba's social protection policy, which establishes a comprehensive system of risk mitigation in regard to natural disasters, including extreme weather events linked to climate change e.g. hurricanes and torrential rainfall, and drought. However, in prioritizing areas of the country for immediate action, the plan acknowledges the necessity of a phased approach to implementing solutions to adaptation challenges in the agricultural sector.

#### Economic and social development

182. Household and productive landscapes in the regions targeted by the Project are vulnerable to climate change effects (see also the FS, Sections 1.3 and 1.4 and Appendices 2.1 and 2.2 to FS). This project will provide farmers with the capacities, technology and machinery they require to establish and operate sustainable agroforestry and silvopastoral systems that will improve the climate resilience of agricultural production, as well as its productivity. The project will stimulate resilience-enhancing agricultural production by farmers and producers' organizations by providing them with the information, knowledge, skills and technologies they require to successfully manage their climate risk and produce the necessary revenues to re-invest in climate resilient production systems as the impacts of climate change continue to evolve. GCF resources will finance capacity building of farmers to plan and manage their agroecosystem and technological assets. Farmers and producer organizations will take a business approach to climate-resilient crop production with the aim of building their capacities to access the variety of existing markets. Application of efficient irrigation technologies and resilience-enhancing agricultural practices will ensure sustainability and productivity of innovative agroforestry and silvopastoral systems, stabilizing and sustaining yields while decreasing vulnerability to climate change impacts.

<sup>&</sup>lt;sup>65</sup> Corporación Andina de Fomento, 2014. Índice de vulnerabilidad y adaptación al cambio climático en la región de América Latina y el Caribe.

<sup>&</sup>lt;sup>66</sup> Segunda Comunicación Nacional a la Convención Marco de las Naciones Unidas sobre Cambio Climático. La Habana 2015.





#### Financial needs

- 183. Every year Cuba is affected by a variety of climate change impacts that are increasing in strength and frequency: droughts, torrential rainfall, including from hurricanes; saltwater intrusion, flooding; landslides and extreme temperatures. Increased exposure of farmers and agricultural assets to climate change impacts has been a significant source of economic losses.
- 184.Severe recurring droughts (years 2004, 2008, 2009) and a diminishing water balance is one of the most concerning changes observed in Cuba's Eastern Region (including Las Tunas) during the last decades, along with significant reductions in relative humidity (FS, section 1.2.3.2.1 Water Resources). This, combined with a lack of climate change-adapted agriculture, has led to a steady reduction of the area covered with agricultural crops and pastureland, making them more prone to invasion by marabú.
- 185. Future climate scenarios predict a temperature rise of 4°C and a decline in rainfall between 15 and 63% for years 2050-2100<sup>67</sup>. This would result in a decline in rainfall of 975-481 mm in Villa Clara/Matanzas, and 750-370 mm in Las Tunas, with devastating impacts on agricultural productivity: yield would be reduced by 6-9% for sugarcane, 10-22% for beans, rice, manioc and maize, and up to 48% for potatoes (Appendix 2.2. Tables 2-a, 2-b). Rice and maize constitute more than 70% of cereals consumed by Cubans, while beans are the second most consumed food in Cuba (only preceded by rice) and the main source of vegetable protein in the diet of Cubans<sup>68</sup>. Projected cattle birth rate reduction could reach 15-25%, while livestock mortality could reach 27% and up to 70% respectively by 2050 and 2100<sup>69</sup>. The business-as-usual (BAU) scenario for livestock production in the project's two target regions (i.e. continuing with the traditional grazing practices) will result in a reduction of total grassland biomass of 18% and a growing dominance of C4 grasses, with increasing C/N ratios that would produce higher methane emissions from enteric fermentation of ruminants (Please see Appendix 2.4 of the FS).
- 186.Cuba has limited access to international financial institutions and faces significant obstacles in importing the machinery and technology that could support adaptation of agricultural production to the evolving impacts of climate change. While the Ministry of Agriculture's organizational and technical capacities are some of the highest in the LAC region, its ability to transform the current production-maximizing paradigm to one of stable, sustainable and climate-resilient production is obstructed by the lack of the necessary machinery and technology. Cuba's ability to generate sufficient fiscal resources is hindered by the account deficit of the balance of payments, bank deductions on foreign transfers and the high degree of debt maturity, all of which reduce its ability to obtain necessary loans.

#### Institutional needs

187. The Ministry of Agriculture has successfully concluded the research and development required to identify and test models of agro-ecosystems that are more resilient to climate change. While the ministry is widely regarded by outside experts as having a high level of technical and organizational capacity, the Ministry staff at all levels have insufficient awareness, understanding and knowledge of climate change and its effects on ecosystem services and agroecosystem productivity to lead or facilitate agricultural adaptation by farmers and producers' organizations. Farmers and producers' organizations lack technical knowledge and understanding, along with the skills and capacities to mitigate climate risk and reform maladaptive agricultural practices. Farmers require state-of-the-art knowledge of the agroecology of agroforestry and silvopastoral systems, projected climate change impacts, as well as the management and planning skills to enhance climate resilience at farm and landscape levels. MINAG has the technical and institutional capacities to facilitate adoption of resilience-enhancing agricultural practices and technologies, however, they lack the access to technology and machinery that would galvanize widespread adoption both individually and collectively.

#### D.5. Country ownership

#### Existing national climate strategy

188. The **First National Programme to Combat Climate Change (***Programa de Enfrentamiento al Cambio Climático – PECC, 2017*) outlines Cuba's adaptation strategy regarding, in particular, the sustainable use and protection of water and soil resources; the upgrading of Cuban agriculture; the conservation and protection of forest resources; land use planning with emphasis on

<sup>&</sup>lt;sup>67</sup> PRECIS modelling (Centella et al 2008) in Cuba, SNC to the UNFCCC (2015); and Somoza J. de la Colina (2018)

<sup>&</sup>lt;sup>68</sup> Rivero et al 2010, Rivero and Vega 2004. Rodriguez Vega et al 2003. In Somoza J. De la Colina (2018)

<sup>&</sup>lt;sup>69</sup> Rivero et al 2010, Rivero and Vega 2004. Rodriguez Vega et al 2003. In Somoza J. De la Colina (2018)





human settlements; and the protection of biodiversity. The PECC, coordinated by CITMA and its Executive Environmental Agency (AMA), is mandated to ensure that the science-based environmental dimension is included in the development and implementation of all climate change adaptation actions.

189. In April 2017, the Council of Ministers approved the **National Plan to Confront Climate Change (***Tarea Vida: Plan de Estado para el enfrentamiento al cambio climático***). This comprehensive plan establishes national priorities for the short (2020), medium (2030) and long-term (2050 and 2100), which includes assessing and updating policies such as the Environmental Law (Law 81) and the National Decree on Coastal Areas. Tarea Vida includes five priority actions, two of which directly address adaptation in the agricultural sector<sup>70</sup>, with 11 activities focused specifically on coastal and agricultural areas.** 

#### Alignment with existing policies such as NDCs, NAMAs, and NAPs

- 190. In November 2015, Cuba presented its **Nationally Determined Contribution (NDC)** to the UNFCCC, listing six priority actions for climate change adaptation. One of these priority actions is directly related to this proposed project: "Incorporating the adaptation dimension into programs, plans and projects related to food production, integrated water management, land management, forestry, fisheries, tourism and health."
- 191. The NDC also identifies two priority sectors for reducing GHG emissions: agriculture and energy, which account, respectively for 76% and 15% of the country's emissions. The forestry sector has shown sustained growth forest coverage increased from 14% of the country's surface area in 1959 to 29% in 2013. Currently, it is estimated that Cuban forests have a sequestration capacity of approximately 14.3 million tonnes of CO<sub>2</sub> per year, according to data from the latest GHG inventory. Cuba has not yet developed either a NAP or a NAMA. However, a NAMA in the pork production sector is currently under development.

#### Capacity of Accredited Entities or Executing Entities to deliver

- 192. The Ministry of Agriculture is the body of the Cuban Government (central administration of the state (OACE)) responsible for proposing and implementing the policy on the use, tenure and sustainable exploitation of the agricultural area of the country, agricultural and forestry production, to meet the needs of population, industry and export. As such, it has as responsibility to direct, execute and control the policy of the Cuban government and administration in the following areas: use, conservation and improvement of soil; ownership and possession of agricultural and forestry land; plant health; veterinary Medicine; conservation, management and rational use and sustainable development of the country's livestock forest resources; mechanization and irrigation of the production programs that it is responsible for; livestock and forestry agricultural production activities; profit activities and industry of rice, tobacco, citrus, coffee, apiculture products, feed, forestry, poultry and activities of collection No. 9: Manage the use and use of agroforestry heritage, including fruit trees and the administration of the National Fund for Forest Development (FONADEF). At the municipal level, specific function No. 8: Execute and control the use and exploitation of agroforestry heritage, including fruit trees and the administration of the several functions must be fulfilled. (more details on capacities to deliver is available in Appendix 2.7 to the FS).
- 193. The Food and Agriculture Organization of the United Nations (FAO) is a GCF-accredited entity. It is an international organization whose main goals are the eradication of hunger, food insecurity and malnutrition; the elimination of poverty and the driving forward of economic and social progress for all; and the sustainable management and utilization of natural resources, including forest, land, water, air, climate and genetic resources for the benefit of present and future generations. In line with the vision for sustainable food and agriculture to "Make agriculture, forestry and fisheries more productive and more sustainable", FAO promotes conservation and climate resilient, sustainable agriculture as a way to increase productivity, adapt and build resilience of food systems and, wherever possible, reduce GHG emissions. FAO has supported projects for climate adaptation and mitigation worldwide and has led and managed numerous climate change related projects.

<sup>&</sup>lt;sup>70</sup> Adapt agricultural and livestock activities, particularly those with the greatest impact on the country's food security, to changes in land use as a result of sea level rise and drought; and reduce cropping areas of the coastal area affected by saline intrusion and diversifying crops, improve soil conditions, introduce and develop varieties resistant to the new temperature scenario".





## Engagement with civil society organizations and other relevant stakeholders, including indigenous peoples, women and other vulnerable groups

- 194.Several consultation meetings and stakeholder engagement workshops were held during the Project preparation (2017-2018). Government entities and representations of the project's beneficiaries have been continuously consulted, who have provided information and inputs for the elaboration of the project, in support to the work of the technical design team. The consultations focused on meetings with authorities, civil society organizations, cooperatives, producers and communities' representatives to provide information on: a) the purposes of the project; b) general information on potential impacts; and c) preliminary ideas of the way the project would be implemented. These meetings were used to exchange on aspects of gender, attention to young people and possible less favored groups, assess the interests and priorities of people and entities, as well as assess support for the Project. For further information, please see Annex 7, Summary of Consultations and Stakeholder Engagement Plan, Section 1.2).
- 195.Long-term institutional ownership and sustainability of this project has been established via the efforts of the Ministry of Agriculture (MINAG) in leading a broad consultation process, including two national consultation workshops during the development of this proposal. This process involved the technical advisory team of the NDA (CITMA), the Environment Agency; the provincial delegations of MINAG, the technical advisory group of the agricultural and forestry sector to support local provincial development; the Agroforestry Institute; the Institute for Research on Grasses and Forages; the Livestock Department of the Ministry of Agriculture; the Department of Science and Technology, Innovation and Environment of the Ministry of Agriculture; the Institute for Fundamental Research on Tropical Agriculture (INIFAT); Institute of Soils; Center for Research on Animal Improvement (CIMINAGT); Institute of Agricultural Engineering (IAGRIC); Institute of Plant Health (INISAV); and Universities as well as farmers, including women farmers and farmer cooperatives.

#### Role of National Designated Authority

- 196.MINAG and CITMA, Cuba's NDA, have thoroughly participated in the development of this Proposal. FAO has facilitated dialogue between the Ministry of Agriculture and the NDA, who have confirmed both the relevance of the proposal and its priority. In particular, the following was addressed:
  - Coherence and alignment with the country's national climate strategy and priorities in mitigation or adaptation: as described above, the project is fully aligned with Cuba's development and climate change adaptation policies, strategies and proposed actions. Cuba's NDA granted full support to the first draft of this concept note through the "no-objection" letter that was submitted to the GCF in November 2019.
  - Integration of lessons learned: past and ongoing initiatives that have generated substantial knowledge and experience regarding revitalization of productive ecosystems under changing climatic conditions have been analyzed and lessons integrated into the design of this proposal.
- 197. This proposal was prepared in response to the expression of interest by Cuba's NDA for assistance in building the climate resilience of the agricultural sector in light of increasing vulnerability. Meetings began with the NDA and the Ministry of Agriculture in late 2017, when FAO, the Ministry of Agriculture (MINAG) and NDA staff identified potential technical solutions to the problem of diminishing water security in central and eastern Cuba due to increasing rainfall variability. Key stakeholders were identified within the Ministry of Agriculture and in the municipalities and provinces targeted by *Tarea Vida*, the state plan to combat climate change.
- 198.FAO assisted the government to gather technical inputs and institutional information on the mandates, roles, capacities and programs of these institutions and worked with the NDA in coordinating work among them. Once the targeting and scope of the proposed project were outlined in meetings, and following the identification of the target areas based on their vulnerability, as outlined above, with officials from the Ministry of Agriculture, individual interviews took place with officials in Las Tunas, Santa Clara and Matanzas provinces and in the municipalities of Corralillo, Quemado de Güines, Santo Domingo, and Los Arabos (Central Region); and Amancio Rodríguez, Colombia and Jobabo (Eastern Region).
- 199. Following initial scoping and information gathering, FAO and MINAG provided their preliminary findings and suggestions to the NDA. Based on feedback, an expanded FAO team was put together, drawing on in-country and international technical expertise to explore selected issues in more detail. This team carried out field missions in 2018 and early 2019, and its indepth engagement has been on-going in the form of data collection and analysis as well as through on-site visits, focus group meetings and field level consultations with farmers (with special attention to women), producer groups, suppliers, and others in the proposed project area.





200. The provincial and national governments contributed to the formulation of the project by allocating experts to provide specific technical information as well as data necessary for formulation of the project. Additionally, the Project formulation process involved several consultations meetings with authorities, civil society organizations, cooperatives, producers and communities `representatives in order to ensure the Project activities would be responsive to the beneficiaries `needs. FAO also closely engaged with development partners in Cuba working in agriculture and water management in order to benefit from their insights and to determine how GCF financing for climate change adaptation could help increase the returns to investments that the country is making with the external financing they are providing. Amongst these partners, FAO has conferred most closely with UNDP.

#### **D.6. Efficiency and effectiveness**

- 201.As presented in Section 1, climate change is already affecting agricultural areas in Cuba, including forests and pastures, and this is expected to worsen according to climate change projections. Increased temperatures and variations on precipitation patterns due to climate change will lead to the expansion of Marabú, the invasive species that has a high capacity for adaptation and growth. Rehabilitating areas after Marabú infestation is a high cost endevour and farmers who own land under these conditions do not have the economic capacity to make investments needed for their recovery. This leads to lands abandonment, limiting the development of production systems that conserve soil and water resources, build resilience to CC and generate income to improve livelihoods. Economic and financial analyses were therefore carried out to estimate the costs and benefits of the project, vis-a-vis a no-project basline.
- 202. For the financial analysis the revenues accruing from the agroforestry modules in Output 1 of the project were considered, as well as the production costs incurred. Taking into consideration that the agroforestry modules proposed in Output 1 of this project will be implemented in areas that would remain unused without the project, all the investments, costs and revenues would be incremental. Over the project lifespan of 20 years, the proposed modules proved to be financially viable (please see Table 1 in Annex 3 for the financial evaluation indicators of the agroforestry and silvopastoral modules of the IRES project, specifically, the net present value, the internal income rate and the equivalent annual NPV for planning horizons of 10 years and 20 years), except for the natural regeneration model. The incremental net present value and the internal rate of return ranged between US\$1,998 (IRR of 2.45%) and US\$82,430 (IRR of 29.52%). The Annual Incremental Equivalent NPV, which is equivalent to the yearly incremental net present value, ranges from US\$268 to US\$11,036. The results show that the models generate benefits for farmer families that are higher than the investment costs. Sensitivity analyses results are presented in Annex 3 table 2.
- 203.An economic analysis was carried out for the entire project, considering the costs of implementing the full project (US\$ 38.20 million contributed by the Green Climate Fund and US\$ 81.70 million of national matching contribution) and project generated benefits in terms of generated income (from financial analyses results), as well as improvement and restoration of ecosystem services (avoided soil erosion and carbon capture ) in the biomes where interventions will be carried out (Woodlands and Grasslands). The economic benefit for the entire project is estimated in US \$22.469 million, with an internal rate of return of 15.4%. In other words, with an investment of US\$119.9 million, it is expected to create economic benefits in excess to the opportunity cost of capital (12%) and produce a bonus of US\$22.469 million. This means an economic net present value per benefited hectare of US\$628.81, an economic net present value per household of US\$1,407.15 and an economic net present value per beneficiary of \$439.73, considering 3.2 family members per household. Results of the sensitivity analyses are presented in Annex 3 Table 6.
- 204.Cost-effectiveness of this project was determined by evaluation of previous in-country experiences with rehabilitation of Marabú infested areas as well as agroforestry, silvopastoral systems and natural regeneration. The design of project investments was based on lessons learned from multiple sources, including FAO with its global and decades-long experience in promoting climate resilient land use. The recommendations offered as part of the Feasibility Study informed the process of analysis and design of this proposal and provide a high degree of confidence that the project's predicted impacts will be achieved cost-effectively.





#### E. LOGICAL FRAMEWORK

#### E.1. Paradigm shift objectives

☑ Shift to low-emission sustainable development pathways
 ☑ Increased climate resilient sustainable development

#### E.2. Core indicator targets

E.2.1. Expected tonnes of carbon dioxide equivalent (t CO <sub>2</sub> eq) to	Annual	133,786 t C	O <sub>2</sub> eq
be reduced or avoided (mitigation only)	Lifetime 2,675,727 t		: CO <sub>2</sub> eq
	(a) Total pro	pject financing	<u>119.914</u> million USD
F 2 2 Estimated cost per t CO <sub>2</sub>	(b) Request	ed GCF amount	38.207 million USD
eq, defined as total investment	(c) Expected	d lifetime emission reductions	2,675,727 t CO2eq
cost / expected lifetime emission	(d) Estimat	ed cost per t CO₂eq (d = a / c)	<u>44.82</u> USD / <b>t CO₂eq</b>
reductions (miligation only)	(e) Estimat (e = b / c)	ed GCF cost per t CO₂eq removed	<u>14.28</u> USD / <b>t CO₂eq</b>
	(f) Total fina	ince leveraged	<u>81.707 million</u> USD
E.2.3. Expected volume of finance to be leveraged by the	(g) Public so	ource co-financed	81.707 million USD
proposed project as a result of	(h) Private s	source finance leveraged	<u>n/a</u> USD
the Fund's financing,	(i) Total Lev	verage ratio (i = f / b)	<u>2.139</u>
private sources (mitigation only)	(j) Public so	urce co-financing ratio (j = g / b)	<u>2.139</u>
	(k) Private s	ource leverage ratio (k = h / b)	<u>n/a</u>
E.2.4. Expected total number of direct and indirect beneficiaries,	51,713 Direct 25,136 (46%)		3 ) female
(disaggregated by sex)	Indirect	240,11 46% fem	7 pale
E.2.5. Number of beneficiaries	Direct	0.45 % of total Female direct beneficiaries: (	population ).2 % of total population
relative to total population (disaggregated by sex)	Indirect	2.1% of total p Female indirect beneficiaries:	opulation 0.96 % of total population





E.3. Fund-level impacts							
Expected Results	Indicator	Means of Verification	Rasolino	Та	rget	Assumptions	
	malcator	(MoV)	Dasenne	Mid-term	Final	Assumptions	
A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	A1.2 Number of males and females benefiting from the adoption of diversified, climate resilient livelihood options (including fisheries, agriculture, tourism, etc.)	Secundary and ancillary Data from other sources, such as national reports and statistics, Baseline, mid- term, final Project reports. Qualitative assessment through questionnaires and surveys	0 farmers Male: 0 Female: 0	25,549 Male: 13796 Female: 11,753	Total: 51,098 Male: 27,593 Female: 23,505	Farmers and agricultural enterprises will be motivated to participate. Both women and men will act to participate when invited.	
A4.0 Improved resilience of ecosystems and ecosystem services	A4.1 Coverage/scale of ecosystems protected and stregnthened in response to climate variability and change	Progress reports Farm records. Qualitative assessment through questionnaires and surveys	Hectares: 0	Hectares: 17,867	Hectares: 35,734	Implementation of agroforestry and forestry modules will be sufficiently widespread that there will be a measurable impact on ecosystem function/services.	
M4.0 Reduced emissions from land use, reforestation, reduced deforestation, and through sustainable forest management and conservation	M4.1 Tonnes of carbon dioxide equivalent (t CO2 eq) reduced or avoided (including increased removals) - forest and land use	Progress reports and monitoring of carbon stock by comparison to baseline x C stock (see VCS Project Descriptions)	Tonnes CO2eq: 0	Tonnes CO2eq: 468,252	Tonnes CO2eq: 2,675,727	Stakeholders will readily adopt and implement agroforestry/ forestry practices and systems and be motivated to sustain them over the next seven years at a minimum and over 20, constituting the life of the Project (target is reference to 20 year liftime)	





and enhancement of forest carbon stocks		using Ex-A Methodolo	ct ogy					
E.4. Fund-level outcomes								
				Means of		Tar	get	
Expected Outcome	s	Indicator		Verification (MoV)	Baseline	Mid-term	Final	Assumptions
A5.0 Strengthened institu	ıtional	A5.1 Institutional and regulat	tory	Regulatory and normative framework approved by competent authority and published in official media	0	01 specific proposal for policy reforms discussed and drafted;	01 specific proposal for policy reforms approved	No crisis emerges that impedes expeditious analyses and discussions of institutional and regulatory systems.
and regulatory systems for climate-responsive planning and development		systems that improve incentives for climate resilience and their effective implementation		Farmers perception survey on improved incentives for Climate resilience	0% of response	50% of the beneficiaries have a good perception about the improved incentives for climate resilence	100% of the beneficiaries have a good understandin g about the improved incentives for climate resilence	The regulatory and normative framework is expected to be finalized and approved during the second half of the Project implementation.
A7.0 Strengthened adapt capacity and reduced exp to climate risks	ive oosure	A7.1 Use by vulnerable households, communities, businesses and public-sector services of Fund-supported to instruments, strategies and activities to respond to climat change and variability	ools te	Records of stakeholder participation in project activities (training, tasks, etc.) Farmers and producers`organiza tions interest in learning new skills and apply new knowledge will be assessed through questionnaires	0	15,329 (30%) of direct beneficiaries of which 7131 (46%) are female with enhanced knowledge on CC-resilient production landscapes solutions	51,713 (100%) of direct beneficiaries of which 46% are female) with enhanced knowledge on CC-resilient production landscapes solutions. Farmers and producers'	Farmers and producers' organizations continue to be interested in learning new skills and apply new knowledge to production.





		applied at the Project mid-term and final phases. Questionnaires will follow guidances from FAO's OED Capacity Development Evaluation Framework <sup>71</sup> .			organizations continue to be interested in learning new skills and applying new knowledge to production	
M9.0 Improved management of land or forest areas contributing to emissions reductions	M9.1 Hectares of land or forests under improved and effective management that contributes to CO2 emission reductions	Satellite monitoring Field inspections of agroforestry, silvopastoral and reforested areas	0 ha	17,867 ha	35,734 ha	Plantations are unaffected by extreme weather events e.g. drought, hurricane

E.5. Project performance indicators							
		Means of Verification (MoV) Baseline	- "	Target			
Expected Results	Indicator		Mid-term	Final	Assumptions		
<b>Output 1:</b> Increased CC- resilient production landscapes through investment in innovative agroforestry and silvopastoral systems, reforestation with close-to- nature planted forests (CTNPFs) and assisted natural forest regeneration	Hectares of land implementing agroforestry, silvopastoral and forestry modules	MAG field inspections and reports Farmer surveys and questionnaires	0 hectares	17,867	35,734 ha	Farmers will be motivated to adopt and sustain innovative agroforestry and forestry systems at sufficient scale	
	% of farmers perception about the advantage of including new methods to improve resilience to CC.		0% of positive response by trained farmers	90% of positive response by trained farmers	100% of positive response by trained farmers	Correct Implementation of sustainable and innovative agroforestry and silvopastoral	
	Population of target municipalities indicating they preceive improved ecosystem services		0%	10%	35%	systems will lead to improved overall environmental and ecosystem service provision	

<sup>&</sup>lt;sup>71</sup> The Office of Evaluation (OED) Capacity Development Evaluation Framework is a document developed in 2019 by FAO to provide guidances on how to assess capacity development at different levels in projects and programmes. Detailed information on the evaluation framework is available on <a href="http://www.fao.org/3/ca5668en/ca5668en.pdf">http://www.fao.org/3/ca5668en/ca5668en.pdf</a> .





	% of Resilience of production as perceived by farmers	Random representative survey	Low	Medium	High			
	- Numbers of institutional staff trained	MAG field reports and follow-up surveys of lead	0 Institutional staff	300 institutional staff trained	585 Institutional staff trained			
	- Numbers of farmers trained	farmers participating in FFS Training records	0 Farmers	9,228 farmers trained (4,614 will be women)	15,549 farmers trained (7,774 will be women)			
<b>Output 2:</b> Strengthened institutional and farmer capacities to improve ecosystem services through agroforestry and forestry systems and enhance the climate-resilience of production landscapes	- Percentage of trained farmers who, indicate they have acquired new knowledge on Climate resilience of production landscape	The application of the skills from trainings will be assessed through questionnaires applied to the Project beneficiaries	The application of the skills from trainings will be assessed through questionnaires applied to the Project beneficiaries	The application of the skills from trainings will be assessed through questionnaires applied to the Project beneficiaries	0% of the farmers	90% of the trained farmers identify themselves with new knowledge on CC and resilience.	100% of the trained farmers identify themselves with new knowledge on CC and resilience	
	institutional and farmer capacities to improve ecosystem services through agroforestry and forestry systems and enhance the climate-resilience of production landscapes	- number of institutional staff trained who indicate they use or apply information received	beneficiaries participating in tranings at the Project mid-term and final phases. Questionnaires will follow guidances from FAO's OED Capacity Development Evaluation Framework <sup>72</sup>	0%	100 institutional staff	468 insitutional staff trained	Farmers will be motivated to attend and participate fully in Farmer Field Schools	
	% of farmers trained who indicate they use at least one of the practices learned in FFS on their own farms	Follow-up surveys of extension services and lead	Low	30% farmers trained	80% farmers trained			
	Farmers' capacity on agroforestry and forestry systems that includes CC adaptation	farmers participating in FFS	Low	Medium	High			
Output 3: Effective governance to support climate resilience-enhancing production systems and ecosystem services	Proposals for policies, plans, financial incentives to motivate and sustain CC adaptation by farmers formally approved	Evidence of integration of CC adaptation principles into	Currently no relevant financial incentives exist	Analyses and discussions ongoing	Proposals for policy, planning reforms; Landscape Resilience Fund established and operational	Interinstitutional collaboration can be effectively achieved to establish multi-sectoral resiliency mechanism to provide financial incentives to farmers		

<sup>&</sup>lt;sup>72</sup> The Office of Evaluation (OED) Capacity Development Evaluation Framework is a document developed in 2019 by FAO to provide guidances on how to assess capacity development at different levels in projects and programmes. Detailed information on the evaluation framework is available on <u>http://www.fao.org/3/ca5668en/ca5668en.pdf</u>.





	% of perception of governament authorities that new policies, plans, financial incentives are including CC adaptation elements Representatives of key organizations in seven target municipalities that indicate they have improved capacity to participate effectively and collaboratively in local, regional and national planning and decision- making processes related to management of the target landscapes Women and youth organizations targeted	Perception survey per year amongst government officials Training reports, surveys of organizations, NGOs and CSOs in target municipalities Workshop, training	0% of response	60% of the surveyed individuals have a good perception that new policies, plans, financial incentives are including CC adaptation elements 10	100% of the surveyed individuals have a good perception that new policies, plans, financial incentives are including CC adaptation elements 20	NGOs, CSOs participate in training and are invited to and permited to participate in relevant meetings and planning discussions at municipal, local, regional and national level
	organizations targeted and involved in trainings	Workshop, training reports	0	2	5	
E.6. Activities						
Activity	[	Description			Sub-activities	Deliverables





1.1 Restore approximately 15,544 ha of farmland from marabu, and increase CC-resilience through sustainable agroforestry (AF), CTNPFs and assisted natural regeneration ( <i>mitigation co-benefit</i> 833,950.60 million tCO2-eq. in 7 years of implementation)	GCF funds will be used to clear marabú thickets on soils at high risk of desertification and degradation <sup>73</sup> . Low impact technologies will be acquired that have been successfully pilot tested under Cuban or similar conditions and will be applied at scale. Marabú wood and biomass will be ground to wood chips to form a mulch layer that will protect soils from rain and restore soil organic matter. Agroforestry systems, CTNPF and assisted natural regeneration will then be initiated through the application of Modules described in Appendix 6 of the Feasibility Study attached to this proposal to restore ecosystem function and services. GCF funding will provide equipment, training and inputs to producers to establish the agroforestry modules but not pay for their implementation once established. Government and FAO will coordinate the purchase and distribution of technology and equipment, and the government will guarantee application, proper use and maintenance of the technologies, equipment and inputs.	<ul> <li>1.1.1: Procure identified technologies and equipment</li> <li>1.1.2: Develop training materials for operations and maintenance</li> <li>1.1.3: Train 74 machinery operators</li> <li>1.1.4: Apply technologies to marabu eradication on 15,544 ha</li> <li>1.1.5: Construct/install 452 water reservoirs for the agroforestry systems of a capacity of no more than 4900 m3 and 440 irrigation systems</li> <li>1.1.6: Establish agroforestry, reforestation and assisted natural regeneration modules, including development of farm management plans</li> </ul>	<ul> <li>a) Training materials developed</li> <li>b) 74 machinery operators trained</li> <li>c) 15,544 hectares of marabu eradicated</li> <li>d) 452 water reservoirs and 440 irrigation systems constructed/installed</li> <li>e) Agroforestry, assisted natural regeneration and reforestation modules, including farm management plans established and under implementation</li> </ul>
1.2 Restore approximately 20,189 ha of rangeland with compacted soils and increase CC-resilience through improved silvopastoral systems ( <i>mitigation net co-</i> <i>benefit -381,311.51</i> <i>million t CO2eq in 7</i> <i>years of</i> <i>implementation</i> ).	The project will introduce low-disturbance sub-soiling, designed for conservation agriculture, <sup>74</sup> which will improve soil structure so that rainfall can be absorbed and excess moisture can drain away, recharging groundwater tables and allowing roots to more easily reach groundwater during dry periods. Soil structure improvement and stabilization, introduction of trees and improved, more drought resistant, deep-rooting and nutrient-rich pastures, as well as grazing rotation will be achieved through the implementation of the two modules for silvopastoral systems adapted to climate change, described in Annex X of the Feasibility Study attached to this proposal. The average implementation area for each beneficiary is estimated to be 5 ha.	<ul> <li>1.2.1: Procure and field identified technologies and equipment</li> <li>1.2.2: Develop training materials</li> <li>1.2.3: Train 68 machinery operators</li> <li>1.2.4: Implement sub-soiling of 20,189 hectares of compacted rangeland</li> <li>1.2.5: Construct 700 small water reservoirs for livestock (no more than 63m3)</li> <li>1.2.6: Establish and implement silvopastoral modules, including improved grazing systems</li> </ul>	<ul> <li>f) Training materials developed for machinery operations</li> <li>g) 68 machinery operators trained</li> <li>h) 20,189 hectares of compacted soils improved</li> <li>i) 700 small water reservoirs constructed</li> <li>j) Silvopastoral modules established and under implementation</li> </ul>
2.1 Increase institutional capacities to support farmers and producers' organizations to establish and maintain agroforestry, silvopastoral and forestry systems for improved ecosystem services	The project will train 443 extension-service technicians, agricultural technicians, and cooperative leaders/administrators in integrated landscape rehabilitation and CC adaptation. Local extension service capacities will be strengthened to improve climate risk planning/management and service delivery.	<ul> <li>2.1.: Develop training materials for use by trainers of extensionists</li> <li>2.1.2 Train 443 extension service technicians, agricultural technicians, and cooperative leaders to lead farmers in gender and age-sensitive learning-by-doing regarding the implementation, operations and maintenance of their agroforestry or forestry systems; topics covered may include no-till cultivation; inter-cropping; cut-and-carry forage feeding; sub-soiling; soil conservation with gabions, gully plugs, bunds, and contour farming; agroforestry and silvonastoral system design:</li> </ul>	<ul> <li>k) Training materials developed for trainers of extensionists</li> <li>l) 443 extension service technicians, agricultural technicians, and cooperative leaders/administrators trained</li> </ul>

<sup>&</sup>lt;sup>73</sup> Due to the extremely aggressive, invasive nature of marabú, total mechanical clearing of these areas is projected.

<sup>&</sup>lt;sup>74</sup> Livingston and Blade. Texas A&M University System (http://publications.tamu.edu/FORAGE/PUB\_forage\_Paratill%20Renovations%20of%20Pastures%20and%20Hayfields.pdf).May 5<sup>th</sup> 2018.





2.2 Train agricultural producers to collectively revitalize and manage landscape	The project will train 15,549 farmers to plan and manage production landscapes to enhance resilience and productivity of agricultural ecosystems as well as ecosystem services. Training will go beyond technical aspects of agro-ecosystem revitalization and production to include topics vital to landscape resilience such as	<ul> <li>application of efficient irrigation technologies and water harvesting and storage ;</li> <li>2.1.3 Development of supplementary learning materials and information on CC impacts, projections, ecosystem function and services, agroecology, agroforestry and forestry systems, and farm business planning and marketing</li> <li>2.2.1 Establish Farmer Field Schools (17) in appropriate locations the seven municipalities based on type of agroforestry, silvopastoral or</li> </ul>	m) 17 Farmer Field Schools established
and manage landscape resources through climate resilience- enhancing agroforestry, silvopastoral and forestry systems for gender-equitable agricultural production and ecosystem servicesand production to include topics vital to landscape resilience such as gender agricultural production to include topics vital to landscape resilience such as gender equality of farmers and beneficiaries as well as value chain improvement, market access, rural entrepreneurship and other rural employment opportunity-creating activities.Capacity development, in conjunction with the activities of Output 1, will lead to a number of permanent jobs being created, with a particular emphasis placed on creating opportunities for women and youth. Direct interventions for young people are expected to reduce out-migration of this group to urban areas, thereby decreasing the vulnerability of older populations with regards to climate change and food security	forestry system to be implemented and logistical and other considerations; 2.2.2 Operation of 17 Farmer Field Schools and training of 15,549 farmers using the participatory research and learning-by-doing approach.	n) 15,549 farmers, of which 50% are female, trained in revitalization and management of production landscapes for climate-resilient agriculture and ecosystem services	
3.1 Develop, discuss and analyze options for policy reforms to support implementation of agroforestry, silvopastoral and forestry systems for landscape resilience through improved ecosystem services	The project will facilitate processes of policy review to determine adjustments to or modifications of existing land use, development, environmental or other policy instruments to enhance national scale adoption of agroforestry and forestry systems for climate change adaptation and mitigation. This will be achieved through a combination of expert-led desk reviews of the instruments and their implications and provisions, multi-level and multisectoral forums informed by the desk reviews with the aim of discussing and prioritizing needs for adjusting the policy instruments, and institution-specific analytical, advisory and orientation support. An inter-institutional working group will be established and an operational plan will be developed to adjust public policies and regulatory frameworks as necessary. Corresponding discussion spaces will be established at technical, institutional/ministerial and legislative levels, as well as at local/municipal levels.	<ul> <li>3.1.1 Ten workshops with expert assistance and input (international and national experts) to facilitate inter-institutional analyses and discussions regarding policy objectives, needs and options for the modification or reform of agricultural and land-use policy;</li> <li>3.1.2 Definition and discussion of institutional modifications or adaptations in support of the different options for policy reforms to support landscape resilience through improved ecosystem services;</li> <li>3.1.3 Development of specific proposals for policy reforms;</li> <li>3.1.4 Discussion and subsequent validation of reform proposals at national level.</li> </ul>	<ul> <li>o) Workshops/expert leading to analyses, discussions, options</li> <li>p) Proposals for reforms of policy, regulatory, planning instruments</li> </ul>
3.2 Establish a Landscape Resilience Fund to support adoption and implementation of agroforestry,	MINAG, with project support, will transform its Forestry Development Fund (FONADEF) and Soil Conservation Fund (SCF), as well as any other funds established to support land use for rural development, into a single Landscape Resilience Fund (LRF). The purpose of the LRF will be to support resilience-enhancing land use by farmers and producers' organizations	3.2.1 Expert analyses of existing funds (FONADEF, SCF) and other funds both regionally and globally (current funding scope, organization, financing, management and administration, and identification of strengths and weaknesses, lessons and best practice);	<ul> <li>q) Landscape Resilience Fund established and operational</li> <li>r) Communication strategy and materials Workshops/expertise</li> </ul>





silvopastoral and forestry systems in support of landscape resilience through ecosystem service enhancement	around the country in support of climate change adaptation and mitigation policies, starting with the most vulnerable geographic areas. Expert analysis will be carried out on the feasibility of a single Landscape Resilience Fund, identifying the necessary modifications, reforms and other steps required to make it a reality. As part of the feasibility study, analysis will be undertaken on options for economic instruments to sustain the fund, criteria for grants and loans, governance arrangements, integration with public policy priorities, and other topics. MINAG and other authorities, as appropriate, will discuss and debate the expert analysis and feasibility study as prelude to decision making regarding establishment and operationalization of a Landscape Resilience Fund.	<ul> <li>3.2.2 Ten workshops to analyze and develop options for a Landscape Resilience Fund to support implementation of landscape resilience policies on the ground;</li> <li>3.2.3 Design of a Landscape Resilience Fund to support resilience-enhancing land use by farmers and producers' organizations;</li> <li>3.2.4 Formal legal establishment of the Landscape Resilience Fund;</li> <li>3.2.5 Elaboration of communication strategy and materials, and dissemination.</li> </ul>	
3.3 Strengthen planning, governance and coordination at the landscape level in support of landscape resilience through enhancement of ecosystem services	This project will train key organizations in the seven target municipalities to participate effectively and collaboratively in planning and decision-making processes that determine the management of the target landscapes to enhance their climate resilience. These organizations will have access to required modeling and visualization technologies to improve their analytical capacities, as well as the most effective tools and instruments for coordinated planning and management of landscape resources from farm to landscape level. Participating organizations include cooperatives and other producer's associations, entrepreneurship groups, etc., including the <i>Asociacion Cubana de Tecnicos Agricolas y Forestales (ACTAF), Asociacion Cubana de Tecnicos Agricolas y Forestales (ACTAF), Asociacion Cubana de Tecnicos agricolas entrepreneurship groups, etc., including the <i>Asociacion Cubana de Tecnicos Agricolas y Forestales (ACTAF), Asociacion Cubana de Produccion Animal (ACPA), Asociacion Nacional de Agricultures Pequeños (ANAP), and Federeaciòn de Mujeres Cubanas (FMC).</i> Women and youth will receive specific attention to ensure that their interests, concerns and perspectives are represented in these processes both individually as members of organizations, as well as collectively in women and youth organizations. The project will support multi-level review and analyses of existing landscape planning instruments through inter-institutional collaborative teams and provincial discussion and debate forums, with the aim of integrating climate adaptation and mitigation principles and concerns into these instruments, including the prioritization of agroforestry/forestry systems for sustainable production and ecosystem service restoration. The instruments in question will involve Territorial Planning and Urban Development Territorial Water Resources Program, Territorial Reforestation Plan, Watershed Management Plans, Municipal Food Self-sufficiency Plan, Territorial Land Use Planning.</i>	<ul> <li>3.3.1: Train 10 local branches of established organizations (<i>Asociacion Cubana de Tecnicos Agricolas y Forestales -</i> ACTAF, <i>Asociacion Cubana de Produccion Animal -</i> ACPA, <i>Asociacion Nacional de Agricultures Pequeños -</i>ANAP, and <i>Federaciòn de Mujeres Cubanas -</i> FMC) to participate effectively in local planning and decision-making processes for climate resilient land use;</li> <li>3.3.2 Multi-level review and analysis of landscape resilience policies and planning instruments as a framework for adaptive landscape management to enhance climate resilience and integration of CC adaptation principles into local plans and programs;</li> <li>3.3.3 Fifteen workshops to strengthen coordination in local landscape governance structures for climate change adaptation: <i>Comision de Reforestacion, Grupo de Bahia, Comision de Cuencas Hidrograficas, Comision de Asuntos Agrarios; Grupos Provinciales y Municipales de Tarea Vida.</i></li> </ul>	<ul> <li>s) 10 local branches of established organizations trained to participate in local planning/decision making processes</li> <li>t) Existing landscape planning instruments integrate climate adaptation and mitigation principles and considerations</li> <li>u) Local institutional staff trained to produce and negotiate agreements for governance of landscape resources</li> </ul>



## E

#### E.7. Monitoring, reporting and evaluation arrangements

- 205.Project-level monitoring and evaluation will be undertaken in compliance with FAO policies. FAO will ensure the implementation of a well-designed, operational and effective impact monitoring and measurement system to measure the causal and attributable change, the contribution and the overall causal results of the project. This will include an implementation of a monitoring system to understand efficacy, targeting and verifying the assumptions that the program is making as well as implementing a learning plan so elements emerging from the monitoring systems can feed back into the project implementation and planning Outcomes (Annex 11).
- 206.FAO Cuba as Executing Entity will have oversight of monitoring and reporting throughout the reporting period. FAO Cuba will implement tools and methods to facilitate monitoring of the project. The methods will support vertical monitoring, from the beneficiaries to management, and will facilitates comparative and standardized monitoring. The National Project Management Unit (NPMU) will use the tools including workplans platform to monitor activities, and develop reports to the National Project Steering Committee (NEC) that combining financial reporting and progress toward achieving results set out in the Performance Management Framework.
- 207. Within the monitoring system, the detailed articulation is contemplated between the Project workplan and the action plans for gender, indigenous people, biodiversity and the social and environmental framework to safeguard and ensure a comprehensive and holistic monitoring system.
- 208. The day-to-day project monitoring and implementation responsibility rests on a national recruited Coordinator that will lead the NPMU. S/he will be supported by a monitoring and evaluation specialist, who will lead the NPMU's Monitoring and Evaluation Unit. The M&E Specialist will coordinate the annual work plans to ensure the efficient implementation of the project. The Coordinator will inform the ESC and FAO Country Office of any delays or difficulties during implementation, including M&E plan, so that appropriate and corrective measures can be adopted. The National Coordinator will ensure that all project staff maintain a high level of transparency, responsibility and accountability in monitoring and reporting project results. FAO will support the National Coordinator as needed, including through annual monitoring missions. Additional M&E and implementation quality assurance and troubleshooting support will be provided by FAO as needed. The Technical and Scientific Committee (TSC), project beneficiaries and stakeholders will be involved as much as possible in project-level M&E.
- 209.A project inception workshop will be organized in order to aid to: a) orient project stakeholders to the project strategy and discuss any change in the overall context that might influence implementation; b) discuss the roles and responsibilities of the project team and ESC, including reporting and communication lines; c) review the results framework and discussion, reporting, monitoring and evaluation roles and responsibilities, and to finalize the M&E plans; d) review financial reporting requirements; and e) planning and scheduling ESC meetings; and f) finalize the first year work plan. The final Inception Report will be approved by the ESC and FAO.
- 210. The National Coordinator will provide inputs to the Annual Report for each year of implementation. The National Coordinator and the M&E Specialist will ensure that the indicators in the results framework are monitored annually. The Annual Reports will be shared with the ESC and other stakeholders. The annual performance reports will be submitted to the GCF less than 60 days after the end of each calendar year. The final project annual report and the terminal evaluation report will serve as the final project report package.
- 211. In accordance with the AMA between FAO and GCF, the FAO Office of Evaluation will be responsible for the independent interim and final evaluations. The evaluations will be conducted using a question-driven approach, and may include assessments against the criteria of relevance, effectiveness and sustainability, among others. The interim evaluation will be instrumental in contributing through operational and strategic recommendations to improve implementation, setting out any necessary corrective measures for the remaining period of the project. The final evaluation will assess the relevance of the intervention, its overall performance, as well as sustainability and scalability of results, differential impacts and lessons learned. The evaluation should also assess the extent to which the intervention has contributed to the Fund's higher-level goal of achieving a paradigm shift in adaptation to climate change in Guatemala. The evaluation will draw on mixed-methods, using qualitative methods (e.g. participatory rural appraisal) in combination with counterfactual analysis, depending on the existence of reliable control group data from the project's baseline and endline surveys. In addition to





primary data collected by the evaluators and secondary national data, both interim and final evaluations will draw on the monitoring reports and activities prepared by project staff. Careful attention will be paid to the disaggregation of data, results and outcomes by gender and cultural groups, considering the high percentage of indigenous peoples in the project area and the different level of vulnerability of project beneficiaries. The independent Mid-Term Evaluation will be undertaken when delivery will reach 50% of the initial total budget or mid-point of CGF scheduled as mention before. The MTE will be instrumental for contributing through operational and strategic recommendations to improved implementation for the remaining period of the project's life.

212. The following additional M&E actions will take place to ensure compliance with GCF evaluation requirements:

-Methodologies for monitoring and reporting of the key outcomes of the project. -An overview of the methodologies for monitoring and reporting of the key outcomes of the project are briefly described below, and will be elaborated in a detailed Monitoring Plan that will be included as part of the Project Inception Report. The first activity will be to verify and update the baseline information included in this proposal (see Annex B Feasibility Study). Monitoring activities will be overseen by the National Project management Unit M&E Specialist. Monitoring of impacts and results will be guided by the Logic Framework, which will be the basis for a Performance Management Framework. Monitoring of results will take place on a quarterly basis, with the Municipal and Project management Units providing input to the M&E Specialist.

213. Monitoring the progress toward expected outcomes will be supported through a series of studies to be undertaken in the third and fifth year of implementation, listed below:

Outcome A5.0: Strengthened institutional and regulatory systems for climate-responsive and low-emission planning and development - institutional strengthening and territorial governance

Outcome A7.0: Strengthened adaptive capacity and reduced exposure to climate risks

Outcome M9.0: Improved management of land or forest areas contributing to emissions reductions

Progress toward Outcome A5.0 will be monitored by tracking the number of policy instruments and incentive mechanisms that enable climate change adaptation that are developed and presented to the national government for discussion and policy dialogue.

- 214. The farm plans will provide information for monitoring and reporting on Outcome A7.0. Monitoring of the implementation of farm plans by beneficiary farmers (sex-disaggregated) will enable the tracking of uptake of climate resilient agricultural practices within agroforestry and silvopastoral systems. The farm plans will include clear and precise indicators for soil quality, water availability, production quality and quantity, number of trees planted, crop phenology, weather behavior, and the incidence of extreme climate events, such as droughts and floods, among others. MINAG technicians will gather this information once a month with the assistance of community extension agents. In-depth analysis in the third year of the project of the results of demonstration farms will enable tracking of food production, for consumption and for market; increases in or maintenance of crop yields during extreme weather events; improvements in water regulation in production landscapes; uptake of rainwater harvesting activities, use of water purifying filters, improvements in water quality.
- 215. The methodologies to measure Outcome M9.0 will focus on measurement of the area of degraded land and the expected tCO2-eq sequestered through activities of the project. GIS, such as aerial and satellite imagery, as well as specialized software programs to generate maps, will be used to measure forest areas and trees on farms. MINAG will work with the the NPMU's Monitoring and Evaluation Unit, to show how the project has increased or decreased forest cover. FAO's EX-ACT tool will be used to determine the tCO2-eq sequestered because of project activities. These measurements will be undertaken at the mid-point of the project (third year of implementation) and after Project is completed (sixth or seventh year after the start date of the project).
- 216.An independent mid-term technical and financial evaluation will be conducted and the independent final evaluation will be initiated within three months prior to the actual completion date (NTE date) of the GCF intervention to be completed within six months from the end of project implementation delivery date. The evaluation will aim at identifying outcomes achieved, their sustainability and actual or potential impacts. It will also have the purpose of indicating future actions needed to assure continuity of the process developed through the project. A self –assessment will also be conducted at the mid-term and final stage of the Project.
- 217.Also, the following considerations are to be considered as part of the M&E: a) On the first year of the project, during the implementation of the baseline study (during which the baseline values given in the results framework will be completed





and validated), two groups will be defined: a) group of direct beneficiaries, and b) control group; to mark the initial situation of the direct beneficiaries. Subsequently, the monitoring system will be established to record the changes that will arise during the implementation of the project, b) the monitoring and evaluation will focus on the measurement of the results attributable to the project as a consequence of the implementation of measures and practices for adaptation to climate change. As well as, the impact on the harmonization of policies at territorial level, c) Based on farm plans and adaptation practices outside farms; the lines of action for monitoring and evaluation will be established to collect qualitative and quantitative information; and evaluate the effect of actions in the process of adaptation to climate change. In this process, the project will directly involve the beneficiary producers as key actors in the execution, monitoring and evaluation process, and d) The project will have monitoring and evaluation specialists who will be responsible for the project will be supported by the information management and monitoring system developed and used by MINAG, which will complement FAO's tools and methods. The results of the monitoring process will serve as a basis for the evaluation processes of the project and the decision making for the incidence in public policy.



#### F. RISK ASSESSMENT AND MANAGEMENT

#### F.1. Risk factors and mitigations measures

The Project has been classified as Moderate risk (Category "B") and its activities are expected to activate the following Socio-Environmental Safeguards Policies: ESS2 and ESS5.

The primary reason for the moderate risk categorization is due to the use of herbicides in the control of marabu, a highly invasive species, as well as the risks of controlled use of one specie that may show invasive behavior in conditions without management.

#### Selected Risk Factor 1

Category	Probability	Impact				
Other	Low	High				
Description						

The project will not introduce any new potential Invasive or Alien Species (IAS). The only potential IAS included in the project (Moringa (Moringa oleifera) which is well known in the country. The specie already exists in the project areas, and technical recommended and promoted in all the Cuban methodological documents and guidelines for livestock management (Manual of Livestock Technology July 28, 2014, Ministry of Agriculture). The technologies designed consider measures evaluated and validated for more than 20 years by Cuban scientific institutions, with the approval of environmental authorities (Ministry of Science Technology and Environment) and ensure that due to the management there are minimal risks for agro-biodiversity and natural biodiversity. See more details in Annex 6- Environmental and Social management framework.

#### Mitigation Measure(s)

For the Moringa oleiferea, a risk assessment on the use of it in Cuba context, is enclosed in the Appendix 2.6 of the Annex 2: Feasibility study, under the supplementary material 2.6.7. Some management measures are more deeply explained in the technical annex 2.6 of the Feasibility study. Among the measures envisaged for the management of the Moringa oleifera are the following:

- Periodic monitoring of Moringa's behavior will be carried out.
- Management plans of the species will be elaborated for the different areas of the project.
- Farmers who manage the species will be informed of the risks of the species and will receive training.
- Moringa will be planted away from the boundaries of farms, roads and highways.
- The planted areas will be surrounded by tree barriers (Guazuma ulmifolia) to prevent them from being carried by the wind.
- Herbaceous barriers (grasses) will be placed to prevent the water from promoting dispersion, especially where runoff is directed.
- The landuse planning within the farms of the SILSOM module will consider location for the planted areas of Moringa, including siting which is far away from rivers, where their expansion is known to be greater.
- The schedule foreseen for cutting and carrying fodder will be respected, always avoiding periods when the plant produces flowers and fructifies.

#### Selected Risk Factor 2

Category	Probability	Impact
Technical and operational	Medium	High
Description		
The use of herbicides may cause problems of contamination in soil and water and may affect biodiversity and human health.		

Herbicides will be used to control marabu regrowth, following integrated management practices (IPM). These will be applied to a limited extent, in specific areas and only in the initial phase of the project. No highly hazardous pesticides will be used in the





project areas. The applications will be carried out in a restricted way, and only in the areas that require it, depending on the degree of infestation and there commendations of the experts. Pesticides will be used only when the mechanical methods of elimination have been exhausted. Pesticides will be dose limited under supervision and technical evaluation (Agriculture Vegetable Health Department and National Project Management Unit). To mitigate this, the project will use IPM and train producers, among other mitigation measures that will be listed later. The use of highly dangerous herbicides will also be avoided.

#### Mitigation Measure(s)

- Implement Integrated Pest Management (IPM).
- Prepare a Pest Management Plan that will be a part of the Project's Social and Environmental Commitments.
- Ensure the acquisition and use of the means of protection necessary to ensure the health of the producers, who will be trained to perform these tasks.
- The entities that store and handle pesticides will follow their established management plans.

# Selected Risk Factor 3 Category Probability Impact Technical and operational Medium Medium Description Description Description

Limited availability of qualified human resources with the necessary field experience to mainstream climate resilience and adaptation concepts and approaches into agroforestry, silvopastoral and forestry schemes and marabú eradication.

#### Mitigation Measure(s)

The project will use FAO's experience and contacts in the region to support the identification of highly qualified and motivated candidates with the required experience to introduce and promote the new landscape restoration and multifunctional, sustainable plantation and agroforestry concepts.

#### **Selected Risk Factor 4**

Category	Probability	Impact
Other	Medium	High
	Description	

Description

Farmers, communities and new landholders benefitting from the project show low interest in engaging in project activities and implementation of agroforestry and CTNPF modules.

#### Mitigation Measure(s)

The project will promote the previous experiences that were successfully implemented and provide the basis for the proposed Modules. The project will engage stakeholders by providing training opportunities, access to new technologies and financial incentives to promote the implementation of the modules with a focus on the areas classified as most vulnerable to climate change. Financial incentives already have a successful history of implementation in Cuba. Producers will be motivated to engage in the project due to the possibility of improving conditions caused by CC in the Project areas. The improvement of living conditions is one of the incentives but not the only one. The idea is to combine the project's models with financial incentives through the National Soil Fund and the Forest Fund, which would combine financial incentives for the farmers in conjunction with the adoption of the modules. Likewise, the material improvements that the project will bring in terms of resources for the implementation of the modules would play a role in the motivation and sustainability of the change, combining it with payments from the aforementioned national funds for the adoption of the modules proposed by the project.

#### Selected Risk Factor 5

Category	Probability	Impact
Technical and operational	Medium	High
Description		





Hurricanes and tropical storms are striking Cuba with increasing frequency and intensity. The intensity and prospective impact on soils and water are unpredictable, with stronger storms doing greater damage overall.

#### Mitigation Measure(s)

As a country, Cuba has a strong civil defense system which when deployed before storms strike, has resulted in reduced numbers of casualties and property damage. Every effort will be made to limit damage to property and loss of life in the project areas if these are struck by hurricanes or tropical storms. The project itself is oriented to creating and strengthening agroecosystems that are resilient to these extreme events; over time, as the agroforestry, silvopastoral and forestry modules increasingly take root and provide greater ground cover, damages from these storms can be expected to decrease proportionately.





#### G. GCF POLICIES AND STANDARDS

#### G.1. Environmental and social risk assessment

- 218.Overall, the cumulative impacts of the project are expected to be positive. The positive impacts of the project are wideranging and include increased resilience of agro-ecosystems to myriad climate change impacts, as well as an increase in carbon capture capacity. Furthermore, the project will also increase connectivity and contribute to recovery of productive capacity of agricultural systems. Project interventions will support regulation of the hydrological cycle by absorbing torrential rains, preventing or reducing soil erosion, and improving the rates of water infiltration in soils across the landscapes to recharge the water table. Extension services will train producers on the integrated rehabilitation of landscapes and on measures to adapt to climate change. Actions will be taken to restore landscapes, which will enrich biodiversity. Positive social impacts will include an improvement in livelihoods with increased sources of employment and the expansion of production. These will lead to greater local food security and accessibility to food. The project will involve women through a Gender Action Plan that ensures the elimination of gender gaps, as well as women's empowerment and equitable incorporation in development processes throughout the Project.
- 219. The project has been classified as Moderate risk (category B) due to the risks associated with the use of herbicides in the control of marabu (Dichrostachys cinerea), a highly invasive species, and the risks related to the controlled use of non-native species for reforestation that can show invasive behavior in unmanaged conditions. The potential negative impacts of the establishment of the six modules of agroforestry and silvopastoral systems are mitigatable and predictable. Some risk is introduced through the use of machinery, which will be used in agricultural work and for the eradication of marabu. This equipment will be acquired in substitution of existing inefficient equipment, providing a more efficient and appropriate solution for marabu removal, currently done with bulldozers.
- 220. Limited amounts of environmental waste will be generated due to the application of slow-release chemical fertilizers. These are to be used only in the initial phase of implementation and then progressively replaced by organic fertilizers, as production capabilities increase. As indicated, herbicides will be used to control regrowth of marabu, following integrated management practices (IPM). These will be applied to a limited extent, in certain areas and only in the initial phase of the project. No highly hazardous pesticides will be used in the project areas. Certain tree species that manifest invasive behavior will be managed under controls that limit risks to biodiversity, while favoring native species as appropriate. It should be noted however that all species used are already present in Cuba, have a long history of use with no significant problems, and no new species will be introduced.
- 221.To mitigate the moderate risks associated with the use of invasive alien species (IAS), several measures will be put in place. Trees will be placed to act as barriers to the expansion of herbaceous IAS, and the behavior of species in and near the implementation areas will be constantly monitored. An Early Warning protocol will be established and included in the management plan to detect, control, and eradicate invasive species. Workers will be trained to identify and manage the IAS. SILLEC and SILSOM module activity calendars will be modified to guarantee adequate planning aimed to minimize risks. The Environmental and Social risk assessment and accompanying mitigation measures are described in the Environmental and Social Management Framework (ESMF) found in Annex 6 to this document.
- 222. To mitigate the risks associated with the use of pesticides, the Project will implement an Integrated Pest Management (IPM) program. A Pest Management Plan will be part of the Project's Social and Environmental Commitments. Producers' health will be safeguarded with training on how to safely perform tasks related to use of the pesticides. The entities that store and handle pesticides will follow their own established management plans. Both environmental and social risks are considered to be moderate, with a limited spatial footprint, of limited temporal duration, and controllable through protocols outlined in the project's Environmental and Social Management Framework.

#### **G.2. GENDER ASSESSMENT AND ACTION PLAN**

- 223.Despite important advances in women's participation and leadership in the economic, social and political spheres over the past 60 years in Cuba, women still face aspects of structural gender inequality related to cultural norms, household responsibilities and in the face of climate change impacts.
- 224. In the areas where the project will be implemented, major gender gaps include sexual division of labor and family and social co-responsibility. In general, women are overrepresented in unpaid domestic work (of the total hours worked by women, 63% are unpaid), and there is no reconciliation between work and family life for women. Of the total hours of unpaid work performed by Cuban citizens overall, it is estimated in the project's Gender Assessment and Action Plan that men perform 9% and women 91%. Finally, there is also evidence of gender-based violence occurring in the project's target communities. Furthermore, women may face additional challenges in the context of work, where they are often placed in a position of





subordination to men and may be at a disadvantage due to lack of education, lack of employment, and insufficient transportation to employment.

- 225.Globally, as well as in the local Cuban context, women are more vulnerable to climate change in the Project regions than men, due to factors related to household responsibility and access to resources. The scarcity and storage of water is a significant problem for women, who are primarily responsible for household water collection. The migration of men for work due to climate change also effectively confines women to remain in communities to care for the elderly, children and the disabled. These vulnerabilities are exacerbated by the impacts of climate change, such as increased pests, drought and hurricanes.
- 226. The project will contribute significantly to obtaining gender equality goals by increasing community resilience to climate change and directly benefiting 3,783 women who are producers in selected agricultural and livestock production entities, in addition to women throughout the communities.
- 227. Actions proposed in the comprehensive Gender Assessment and Action Plan (Annex 8 attached to this document), include the acquisition of production technologies for climate resilience, directly helping women adapt to climate change. These technologies include the installation of water pumps that will help ease the burden of collecting water, as well as biodigestors that will enable more women to cook food using biogas.
- 228. The Project will create jobs for men and women by establishing six production modules couple to the promotion of new and improved existed business models, for example, six new technologically equipped nurseries will employ more than 30 women. The Project also aims to improve gender equality in the workplace; all project work spaces will have at least one bathroom for men and another for women to ensure the comfort and security of female employees. Significantly, gender-sensitive training will be implemented for men and women involved in the project.
- 229. Themes of gender-sensitive policies and communication will be incorporated into all administrative and leadership aspects of the Project throughout its lifetime. Actions will include the promotion of women in leadership positions and the creation of gender committees that monitor the actions of the project. Designated GAP focal points will be identified in the communities, and permanent spaces will be created for reflection, debate and review of project actions with a gender approach. Finally, communication and education about gender equality will be disseminated within the Project regions, making visible the contribution of women toward increasing climate resilience. These actions will not only help foster gender equality throughout the project and its communities, they will also help improve livelihoods, access and availability of better-quality water, as well as increasing local production of food, jobs and income.

#### **G.3. FINANCIAL MANAGEMENT AND PROCUREMENT**

- 230. Financial management and procurement under this project will be guided by relevant FAO rules and regulations, as well as relevant provisions in the Accreditation Master Agreement (AMA) signed by FAO and the GCF. These rules and regulations were reviewed and deemed satisfactory by the GCF Secretariat and Accreditation Panel as part of FAO's accreditation to the GCF.
- 231.In the project execution, GCF resources will be managed directly by FAO in accordance with its rules, regulations, policies and procedures.
- 232.FAO has deployed an Oracle based Enterprise Resource Planning (ERP) system the 'Global Resources Management System' (GRMS). This system provides all FAO employees around the world with travel, human resources, procurement and finance functionalities. Using GRMS improves the flow of financial information, supports financial monitoring and reporting, increases transparency and visibility, and strengthens internal control. FAO maintains a Chart of Accounts which is used by the whole Organization and that allows for a separation of income and expenditure by donor and project and it provides a standardised coding structure that enables data to be recorded, classified and summarised to facilitate internal management and external reporting requirements.
- 233.Direct procurement by FAO is done in accordance with the FAO Manual Section 502, "Procurement of Goods, Works and Services". To sub-contract the delivery of specific activities using Letters of Agreement, FAO operates in accordance with its Manual Section 507, "Letters of Agreement". Such services are managed under the FAO Procurement Service, which provides policy and operational support to FAO offices and staff undertaking these activities to ensure the Organization procures



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goods, works and services based on "Best Value for Money" principles. To sub-contract delivery for agreed results, FAO operates in accordance with its Manual Section 701, "Operational Partners Implementation Modality".

234. The project will be subject to FAO's audit regime, including the external audit and internal audit function. Please see Annex 10 Procurement Plan for further details.

#### G.4. Disclosure of funding proposal

No confidential information: FAO confirms that the funding proposal, including its annexes, may be disclosed in full by the GCF, as no information is being provided in confidence.

- 235. According to both GCF and FAO policies on access to information, all safeguard instruments under this project, including the ESMF and the Gender Action Plan must be disclosed online in English and Spanish at least 30 days prior to GCF board meeting and approval of the project. Access to the documents must be possible for any local people (i.e. it must be disclosed locally in an accessible place) in a form and language understandable to key stakeholders. Such disclosure of relevant project information helps stakeholders effectively participate. FAO is committed to disclosing information in a timely manner and in a way that is accessible and culturally appropriate, placing due attention on the specific needs of community groups which may be affected by project implementation (e.g. literacy, gender, differences in language or accessibility of technical information or connectivity).
- 236. This is a moderate risk project, so FAO will release the applicable information as early as possible, and no later than 30 days prior to project approval. The 30-day period will start only when all relevant information requested from the project has been provided and is available to the public. FAO undertakes disclosure for all moderate risk projects, using a disclosure portal to publicly disclose all of the projects' documentation related to environmental and social safeguards (e.g. Environmental and Social Management Frameworks, Gender Action Plans, Indigenous Peoples Plans, and other relevant documents). The website is: http://www.fao.org/environmental-social-standards/disclosure-portal/en/.
- 237.To ensure the widest dissemination and disclosure of project information, including any details related to applicable environmental and social safeguards, local and accessible disclosure tools including audiovisual materials (e.g. flyers, brochures, community radio broadcasts) will be utilized in addition to the standard portal disclosure tool. Furthermore, particular attention will be paid to farmers, illiterate or technologically illiterate people, people with hearing or visual disabilities, those with limited or no access to internet and other groups with special needs. The dissemination of information among these groups will be carried out with the project counterparts and relevant local actors.





Н.	ANNEXES		
н.	H.1. Mandatory annexes		
$\boxtimes$	Annex 1	NDA No-objection letter	
$\boxtimes$	Annex 2	Feasibility study, including technical annexes	
$\boxtimes$	Annex 3	Economic and/or financial analyses in spreadsheet format	
$\boxtimes$	Annex 4	Detailed budget plan	
$\boxtimes$	Annex 5	Implementation timetable including key project milestones	
	Annex 6	<ul> <li>E&amp;S document corresponding to the E&amp;S category (A, B or C; or I1, I2 or I3):</li> <li>Environmental and Social Impact Assessment (ESIA) or</li> <li>Environmental and Social Management Plan (ESMP) or</li> <li>Environmental and Social Management System (ESMS)</li> <li>Others (please specify – e.g. Resettlement Action Plan, Resettlement Policy Framework, Indigenous People's Plan, Land Acquisition Plan, etc.)</li> </ul>	
$\boxtimes$	Annex 7	Summary of consultations and stakeholder engagement plan	
$\boxtimes$	Annex 8	Gender assessment and project-level action plan	
$\boxtimes$	Annex 9	Legal due diligence (regulation, taxation and insurance)	
$\boxtimes$	Annex 10	Procurement plan	
$\boxtimes$	Annex 11	Monitoring and evaluation plans	
$\boxtimes$	Annex 12	AE fee request	
$\boxtimes$	Annex 13	Co-financing commitment letter, if applicable	
	Annex 14	Term sheet including a detailed disbursement schedule	





H.2. Other annexes as applicable		
$\boxtimes$	Annex 15	Evidence of internal approval
$\boxtimes$	Annex 16	Maps indicating the location of proposed interventions
	Annex 17	Appraisal, due diligence or evaluation report for proposals based on up-scaling or replicating a pilot project
	Annex 18	Procedures for controlling procurement by third parties or executing entities undertaking projects financed by the entity
	Annex 19	First level AML/CFT (KYC) assessment
$\boxtimes$	Annex 20	Operations manual (Operations and maintenance)
	Annex x	Other references