



CEO Approval (CEO) entry – Medium Sized Project – GEF - 7

Realising the potential of native microbes in the agricultural and medical sectors, in accordance with the Nagoya Protocol

Part I: Project Information

GEF ID

10142

Project Type

MSP

Type of Trust Fund

GET

CBIT/NGI

☐ CBIT

☐ NGI

Project Title

Realising the potential of native microbes in the agricultural and medical sectors, in accordance with the Nagoya Protocol

Countries

Panama

Agency(ies)

UNDP

Other Executing Partner(s):

Ministry of Environment

Executing Partner Type

Government

GEF Focal Area

Biodiversity

Taxonomy

Focal Areas, Influencing models, Civil Society, Type of Engagement, Private Sector, Stakeholders, Communications, Gender Equality, Capacity, Knowledge and Research, Biodiversity, Species, Plant Genetic Resources, Protected Areas and Landscapes, Terrestrial Protected Areas, Productive Landscapes, Biomes, Tropical Rain Forests, Supplementary Protocol to the CBD, Access to Genetic Resources Benefit Sharing, Mainstreaming, Agriculture and agrobiodiversity, Climate Change, Strengthen institutional capacity and decision-making, Demonstrate innovative approaches, Beneficiaries, Community Based Organization, Non-Governmental Organization, Academia, Financial intermediaries and market facilitators, Local Communities, Indigenous Peoples, Education, Public Campaigns, Awareness Raising, Information Dissemination, Participation, Partnership, Consultation, Gender Mainstreaming, Women groups, Gender-sensitive indicators, Sex-disaggregated indicators, Gender results areas, Participation and leadership, Access to benefits and services, Capacity Development, Access and control over natural resources, Knowledge Generation and Exchange, Targeted Research, Knowledge Generation, Learning, Adaptive management, Theory of change, Indicators to measure change, Innovation

Rio Markers**Climate Change Mitigation**

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 0

Submission Date

2/5/2020

Expected Implementation Start

7/1/2020

Expected Completion Date

Duration

48in Months

Agency Fee(\$)

82,008

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
BD-3-9	Protocols to CBD (Cartagena and Nagoya) under implementation	GET	863,242	14,535,059
Total Project Cost(\$)			863,242	14,535,059

B. Project description summary

Project Objective

To support the realisation of the potential of native microorganisms to contribute to the agriculture sector while generating global environmental benefits, in accordance with the provisions of the Nagoya Protocol.

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
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Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 1. Development of a product for the crop protection industry	Technical Assistance	<p>1.1 Promising active compounds identified from endophytic fungi, as biological crop protection agents in the agricultural sector, measured by:</p> <ul style="list-style-type: none"> - 200 active extracts and four (4) compounds isolated in order to develop a product for the crop protection industry focused on the coffee sector. <p>1.2 Strengthened research and development of novel biological crop protection agents measured by:</p> <ul style="list-style-type: none"> - Four (4) formulations with potential for crop protection product development, on the basis of field trials of the prioritized formulations 	<p>1.1.1 In vitro active extracts and compounds with potential for the development of a phytosanitary product identified.</p> <p>1.2.1 In vitro trials of candidate biological crop protection agents (endophytic fungi and aqueous extracts).</p> <p>1.2.2 In vivo growth chamber and greenhouse trials to determine the most promising formulations of fungi (e.g. active ingredients, spore concentrations, abiotic conditions and leaf development) for field trials.</p> <p>1.2.3 At least four alternative formulations of selected endophytic fungi evaluated in field trials in coffee</p>	GET	557,600	10,838,904

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 2. Facilitating access, benefit-sharing and biodiversity conservation based on the development of a product for the crop protection industry	Technical Assistance	<p>2.1 Increased capacity to negotiate an ABS agreement by the end of the project, measured by:</p> <ul style="list-style-type: none"> - 150 authorities and technical staff and local stakeholders trained in negotiation of ABS agreements (75 men and 75 women). - One (1) ABS agreement negotiated between the government and users of the crop protection product by project end. <p>2.2 Increased technical capacity for conservation-based biological crop protection in 1,000 ha of coffee farms in the La Amistad National Park (World Heritage Site and Biosphere Reserve) and the Volcán Barú National Park and their buffer zones, with potential to contribute to the conservation status of two globally important microbes (endophytic fungi) and their host ecosystems, measured by:</p> <ul style="list-style-type: none"> - 100 coffee producers who have received training on the use of conservation -based biological crop protection agents (50 men and 50 women). <p>2.3 Increased knowledge and awareness regarding microbe biodiversity, conservation-based biological crop protection and genetic resources, measured by:</p>	<p>2.1.1 Capacity development programme for the negotiation of ABS agreements.</p> <p>2.2.1 Protocols developed and approved for the use and management regimes of conservation-based biological crop protection in coffee production systems.</p> <p>2.2.2 Guidance manuals developed for farmers and extensionists on the use of conservation-based biological crop protection agents in coffee.</p> <p>2.2.3 Demonstration plots and training programmes established in or near the areas of collection of native micro fungi, of the use of conservation-based biological crop protection agents in</p>	GET	156,756	2,325,000

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing(\$)	Confirmed Co-Financing(\$)
Component 3 Monitoring and Evaluation (M&E) with a gender focus	Technical Assistance	3.1. M&E assesses project impact and guides adaptive management, measured by - 100% of the Project Gender Action Plan and M&E Plan implemented.	3.1.1. Project's M&E Plan and Gender Action Plan implemented, ensuring the achievement of the planned goals.	GET	70,410	28,865
Sub Total (\$)					784,766	13,192,769
Project Management Cost (PMC)						
				GET	78,476	1,342,290
Sub Total(\$)					78,476	1,342,290
Total Project Cost(\$)					863,242	14,535,059

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Government	Institute for Scientific Research and High Technology Services (INDICASAT)	Grant	Investment mobilized	10,000,000
Government	Institute for Scientific Research and High Technology Services (INDICASAT)	In-kind	Recurrent expenditures	1,799,544
Government	Ministry of Environment (MiAMBIENTE)	Grant	Investment mobilized	840,000
Government	Ministry of Environment (MiAMBIENTE)	In-kind	Recurrent expenditures	300,000
Government	National Secretariat of Science and Technology (SENACYT)	In-kind	Recurrent expenditures	1,140,000
Others	Think Tank UNACHI	Grant	Investment mobilized	20,000
Private Sector	Advanced Biocontrollers SA	Grant	Investment mobilized	250,000
GEF Agency	UNDP	Grant	Investment mobilized	185,515

Total Co-Financing(\$) **14,535,059**

Describe how any "Investment Mobilized" was identified

a Contributions from the Government of India, MiAMBIENTE, UNDP, and the International Center of Genetic Engineering and Biotechnology, including equipment and support for research activities. b Ecological Trust (FIDECO) and Annual Work Plan of the National System of Protected Areas as support for financing management activities of protected areas. c Think tank annual budget, support from the National Secretariat of Science and Technology (SENACYT) and the Autonomous University of Chiriquí. d Investment to scale a biological crop protection from the laboratory to the field level. e Cash contribution for: a) 87% of Project Coordinator and b) 50% of Project Assistant.

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
UNDP	GET	Panama	Biodiversity	BD STAR Allocation	863,242	82,008
Total Grant Resources(\$)					863,242	82,008

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required

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PPG Amount (\$)

50,000

PPG Agency Fee (\$)

4,750

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
UNDP	GET	Panama	Biodiversity	BD STAR Allocation	50,000	4,750
Total Project Costs(\$)					50,000	4,750

Core Indicators

Indicator 4 Area of landscapes under improved practices (hectares; excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
6000.00	1000.00	0.00	0.00

Indicator 4.1 Area of landscapes under improved management to benefit biodiversity (hectares, qualitative assessment, non-certified)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
6,000.00	1,000.00		

Indicator 4.2 Area of landscapes that meets national or international third party certification that incorporates biodiversity considerations (hectares)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Type/Name of Third Party Certification

Indicator 4.3 Area of landscapes under sustainable land management in production systems

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 4.4 Area of High Conservation Value Forest (HCVF) loss avoided

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Documents (Please upload document(s) that justifies the HCVF)

Title	Submitted			
Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment				
	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	1,800	535		

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Male	1,700	535		
Total	3500	1070	0	0

Part II. Project Justification

1a. Project Description

1a. *Project Description.*

1) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description).

Biodiversity in Panama

1. As the southern-most portion of the Central American bridge between North and South America, Panama is a “biodiversity hotspot” at the centre of the region with the greatest concentration of terrestrial plant species in the world. Such high diversity is due to the extraordinary regional (beta) diversity, which is the result of an unusual mosaic of habitat types. Panama has over 13 life zones that host over 9,520 species of flowering plants. It is the northern-most extent for approximately 4,000 South American species and has around 5,000 Central American species; in addition, endemic species account for 12% of its flora. Given that Panama is as small country, this exceptional terrestrial diversity is highly accessible.

2. The ecosystems of Panama also contain very high levels of microbial biodiversity: studies to date, including those supported by UNDP-GEF NPIF Project 4780 *Promoting the application of the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing in Panama*, indicate that this includes many taxa with the potential to be used in commercially viable applications in the agricultural and health sectors, including endophytic microfungi with the potential to act as biological crop protection agents for common diseases afflicting commercial crops such as coffee.

3. **The capability of endophytic fungi as agents for biological crop protection has not been fully explored.** The use of such fungal agents for biological crop protection potentially offers a cost-effective and environmentally sensitive alternative to physical, cultural and chemical approaches to disease control.

4. These microbial agents have particular potential in the case of coffee, which is widely cultivated throughout Panama and is subject to a number of pests and diseases, such as leaf rust (*Hemileia vastatrix*) and American leaf spot of coffee (*Mycena citricolor*). Coffee leaf rust (CLR), which originates from the centre of diversity of coffee in East Africa, colonises leaves leading to loss of photosynthetic capacity and defoliation, with typical production losses of 20 to 30% when not controlled. Currently, disease control relies on a range of approaches, including quarantine, cultural management, the application of copper-based fungicides and the use of resistant cultivars. These different approaches have varying degrees of effectiveness and collateral impacts. The persistent use of copper-based fungicides, for example, can lead to the accumulation of copper in the soil, resulting in negative environmental impacts on soil biodiversity, water quality and aquatic ecosystems, as well as crop toxicity.

Threats

5. The country is now in a situation in which the value of microorganisms extracted from plants and marine organisms is known, as sources of new compounds for potential biotechnological use (i.e., for the development of anti-cancer drugs or biological crop protection agents), and there is increased awareness among key stakeholders about mechanisms for regulating access to genetic resources. Despite these advances, globally important microbes are still under threat, and there is still little participation of local stakeholders in the sharing of benefits potentially generated from the commercial use of these genetic resources or biodiversity in general.

6. The loss and degradation of terrestrial and marine ecosystems in Panama poses a direct threat to populations of these globally important microbes that inhabit them. While Panama is unique in Central America as having 45% of its land (33,646 km²) still forested, deforestation continues at a rapid rate of 440 km² per year, with an estimated loss of 8.1% between 1990 and 2015. The World Bank recently acknowledged several of Panama's ecosystems as being of global significance for conservation due to the country's extraordinary yet threatened biodiversity; it is considered a "threatened biodiversity hotspot."

7. With a population of 4.4 million, Panama has been one of the fastest growing economies in the world over the past decade, with an average annual growth rate of 5.6% over the last five years (the country ranks as the second fastest growing economy in Latin America and the Caribbean). Panama has made significant progress in reducing poverty in recent years; economic growth and public investment have helped reduce poverty substantially. Despite the gains in poverty reduction, sharp regional disparities remain. Poverty prevails in rural areas, including the coffee production areas, and access to basic services is not universal and remains linked to factors geographic location and income levels of households, among other factors. In addition, sustaining high and inclusive growth over the medium to long term, the education and skills of the country's inhabitants must be improved, as well as the effectiveness of public institutions.

Barriers

8. There is major potential for native species of endophytic fungi to be used in medical and agricultural applications. In agriculture, endophytic fungi have the potential to help control commonly occurring diseases of commercial crops, which are increasingly resistant to the limited range of biological crop protection agents that are currently available in the market. The realisation of this potential would provide an environmentally sustainable alternative to the use of agricultural chemicals, in the vulnerable and globally important protected and production landscapes of Panama. The fair and equitable sharing of the economic benefits generated through the commercial use of these fungi would provide an income flow to local resource managers, including protected areas (PAs) authorities and farmers, thereby motivating and enabling them to continue acting as custodians of these microorganisms in their native landscapes.

9. To date, native microbe biodiversity has only been explored, and its potential utility realised, to a very limited extent; the full realisation of their potential in this regard, however, is limited by the following **two** barriers:

- Inadequate capacities for discovering active compounds from microbes for use in the medical sector: Despite the scientific advances made under the United Nations Development Programme – Global Environment Facility (UNDP-GEF) Project 4780, physical and technical capacities are limited for carrying out this work further and at a larger scale, as would be required as the basis for the eventual formulation of products for practical application in the sector.

- Physical and technical capacities are also limited for the confirmation of the potential of promising microbes in the agricultural sector, for the definition of optimal formulations and for their field testing, which would be necessary for them to be made commercially available and to be included in ABS agreements.

- Conditions and capacities are inadequately developed to allow the negotiation of ABS agreements in accordance with the provisions of the NP, with little provision to-date for involvement of the private sector, consideration of diverse options for channelling benefits to resource custodians and managers, or capacities and awareness among the potential participants in ABS agreements regarding the conservation of the target populations of microbes and the ecosystems in which they are found. On the one hand, users and providers of genetic resources still need to gain experience for the negotiation of ABS agreements which depend on key factors such as the business models of industries that use these resources, research and development procedures, and market demand and supply trends for particular products; while on the other little consideration has yet been given to alternative approaches to conservation including the active use, management and conservation of microbes in farming systems.

2) The baseline scenario and any associated baseline projects.

10. Under the baseline scenario, the Government of Panamá and other institutional partners will be using the limited resources available to continue to raise awareness regarding the provisions of the Nagoya Protocol, and to put into practice the most attainable aspects of biodiversity management in order to allow the country to implement some

elements of the Protocol. The scientific community, meanwhile, would continue to carry out research into microorganisms, but this would not necessarily be adequately related to the Government's development objectives regarding the management and commercial exploitation of genetic resources.

11. Specifically, the baseline scenario for this project can be divided into a medical and agricultural baseline as follows:

Medical baseline

12. Under the previous ABS project (UNDP-GEF NPIF Project 4780 Promoting the application of the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing in Panama) baseline information was obtained on the taxonomic composition of the microbial communities associated with *Coffea arabica* in Panama and the identification of native fungi strains that inhibit coffee rust fungus (*Hemileia vastatrix*) spore germination and native fungi strains that inhibit the mycelial growth of American Leaf Spot of Coffee Fungus (*Mycena citricolor*). Further, extracts were obtained from two strains mentioned in the previous ABS project, and partially purified extracts showed bioactivity remaining in some of the extracts. The compounds in these extracts have not been fully purified, structurally identified, or tested on the coffee pathogens. This is why trials with these strains and their extracts and purified compounds are being proposed in this new ABS project. New nuclear magnetic resonance equipment is being purchased and will be installed in 2020; this investment will be key for compound identification.

13. Under the without project scenario, INDICASAT AIP will invest USD \$1,000,000, in collaboration with the Institute for Agricultural Research of Panama (IDIAP) and the Ministry of Agriculture of Panama (MIDA) and international collaborators, would be running biological assays in plant growth chambers and a small-scale field trial to assess the effectiveness of endophytic fungi that are promising candidates as biological crop protectant of specialty coffee varieties planted in Latin America against coffee rust disease. These activities will be partially funded by the Secretary of Science of Panama (SENACYT) USD \$1,140,000 and the Smithsonian Tropical Research Institute (STRI). This work would however be limited in scale and would not be sufficient to permit the development of a viable crop protection product for inclusion in ABS agreements, which would entail growth chamber and field trials being carried out at a larger scale and under a range of conditions. The estimated values of these baseline investments in research and training during the lifetime of this GEF investment in relation to crop protection in the agricultural sector.

Baseline of access, benefit-sharing and biodiversity conservation

14. Under the without project scenario the Government would continue to invest in the management of the protected areas which contain natural populations of microbes with potential for use in the agricultural sector, with an estimated investment over the project period of USD 4 million by MiAMBIENTE, but this would not specifically take into account the management and conservation requirements of the microbe populations, nor would the commercial benefits resulting from the use of the microbes be fed back in support of their management and conservation.

15. These actions would not be sufficient to ensure the effective conservation of microbe biodiversity or the equitable distribution of benefits generated through their commercial use. To correct this situation, a limited and well-focused investment of GEF funds is required, to allow the acceleration of the development of commercial products based on biodiversity and genetic resources, in accordance with the Nagoya Protocol. This would include, for example, support to the identification of microorganisms with potential to be included in negotiations with private companies for the development of commercial products in a period of three to five years, as examples of the implementation of the Nagoya Protocol.

16. The baseline investments in relation to access benefit-sharing and biodiversity conservation relate principally to the management of protected areas) and biodiversity conservation with a total investment of US\$1,140,000 through FIDECO and programmatic investments of the National System of Protected Areas, including La Amistad National Park (World Heritage Site and Biosphere Reserve) and Volcán Barú National Park.

3) The proposed alternative scenario with a brief description of expected outcomes and components of the project.

17. The project's objective is to support the realisation of the potential of native microorganisms to contribute to the agricultural sector while generating global environmental benefits (GEBs), in accordance with the provisions of the NP. The project will build on the achievements of the UNDP-GEF project 4780 by expanding the previous focus to include microbes with potential for use as biological crop protection agents. This will be achieved through three interrelated components as follows:

18. **Component 1: Development of a product for the crop protection industry.** This project component will support the testing of native microfungi from terrestrial sources for their potential in biological crop protection in the agriculture sector, in particular against CLR fungus and the fungus causing American leaf spot of coffee. Fungi as potential biological crop protection agents will be isolated and their structural determination of their active compounds will be determined in laboratory trials. These initial trials will consist of chemical profiling, the isolation of active principles and spectroscopic studies for the structural determination of approximately 200 extracts. Following the initial isolation and structural determination of four compounds from the selected fungi, they will be subjected to a succession of *in vitro*, *in vivo*, and field trials that will lead to the eventual development of a crop protection product for use against coffee pathogens, which will be the subject of an ABS agreement for which capacities and conditions will be developed as proposed under Component 2.

19. **Component 2: Facilitating access, benefit-sharing, and biodiversity conservation based on the development of a product for the crop protection industry.** This project component will build capacities of the potential beneficiaries to participate in ABS mechanisms and of the government scientific institutions to realize the commercial potential of the target microbes and their derivatives, thereby generating the income that will be distributed amongst users and providers of the genetic resource. Training programs on biological crop protection will be developed and implemented at the local level, with emphasis on conservation-based approaches using two native species of microfungi. The training programs' target populations are farmers covering 1,000 hectares (ha) of coffee farms in La Amistad National Park (World Heritage Site and Biosphere Reserve) and Volcán Barú National Park and their buffer zones (Annex E). Component 2 will also contribute to the delivery of biodiversity benefits of global importance, through raising knowledge and awareness about biodiversity and genetic resources amongst key stakeholders at the institutional and local levels in the areas where the microbes used under Components 1 and 2 were collected, and more broadly.

20. **Component 3: Monitoring and evaluation (M&E) with a gender focus.** This project component will provide the necessary means for M&E of project results to inform adaptive management and improve the implementation of the project. A terminal evaluation (TE) will be conducted by an independent evaluation team and compiled into final project reports. A Gender Action Plan will be implemented with specific activities that will be carried out through annual work plans, based on guidelines from the UNDP and GEF. Best practices and lessons learned resulting from project implementation will be conveyed in GEF Project Implementation Reports (PIR).

The above project strategy differs from the original PIF. As per the GEFSec recommendation, the project was downsized to only include support for the realisation of the potential of native microorganisms to contribute to the agricultural sector; originally the medical sector was also part of the project. Accordingly, Component 1 on the medical sector was eliminated from the project as it would have taken four years to complete the proposed outcomes. Therefore the project will focus on achieving the Component related to crop protection for agricultural sector which is now Component 1, and Component 2 on the application of the crop protection product in the field, scaling up and conservation of biological diversity which can be achieved in 3 years. The development of a crop protection product can be achieved under Component 1 in less than four years because: a) the project will be more focused on one main theme, in the agricultural sector. This implies that the time needed on administration, execution, experimentation, negotiations of the originally proposed biomedical component is excluded and this certainly affects the overall timeframe proposed; and b) the funds originally supposed to be used on the biomedical sector can now be channeled to the components on the agricultural sector; it is consider that this will result in achievement of the goals of the component on developing a product for the crop protection industry, in a more efficient and faster way, for example by hiring the optimum number of personnel for the proposed activities, and speeding up laboratory and field testing. Also, a component was added to reflect the project's M&E strategy. A more detailed description of the project components is provided in Section V: Results and Partnerships of the GEF-UNDP Project Document. In addition, some changes were made to the remaining project's outputs.. These changes are described as follows:

PIF Outcomes/Outputs (Component 2)	CEO Approval Outcomes/Outputs (now Component 1)
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Output 2.1.1 Isolations and structural determinations of active compounds for the development of a crop protection product.	<p>Output 1.1.1 <i>In vitro</i> active extracts and compounds with potential for the development of a phytosanitary product identified.</p> <p>This output was reworded to indicate that the first stage in the identification of fungi as potential biological crop protection agents will be done <i>in vitro</i>. Initial trials will still consist of chemical profiling, isolation of active principals, and spectroscopic studies for the structural determination of the compounds as was established in the PIF.</p>
None	<p>Output 1.2.4 Interinstitutional collaborative research strengthened.</p> <p>This output was added in order to achieve the required interinstitutional collaborative research between INDICASAT, IDIAP, and the Autonomous University of Chiriquí (UNACHI) to strengthen research and development (R&D) of new biological agents for crop protection, including the evaluation of optimal strains under greenhouse conditions in IDIAP's facilities in the Province of Chiriquí, after which field trials of coffee crops can be conducted.</p>
PIF Outcomes/Outputs (Component 3)	CEO Approval Outcomes/Outputs (now Component 2)
3.2 Increased technical capacity for conservation-based biological crop protection in 6,000 ha of coffee farms in the La Amistad National Park and buffer zone, with potential to contribute to the conservation status of two globally important microbes (endophytic fungi) and their host ecosystems.	<p>Outcome 2.3. Increased technical capacity for conservation-based biological crop protection in 1,000 ha of coffee farms in the La Amistad National Park (World Heritage Site and Biosphere Reserve) and the Volcán Barú National Park and their buffer zones, with potential to contribute to the conservation status of two globally important microbes (endophytic fungi) and their host ecosystems.</p> <p>The outcome was revised to indicate that the project will increase the technical capacity or conservation-based biological crop protection in 1,000 ha of coffee farms rather than 6,000 ha of coffee farms, as initially estimated during the PIF. A detailed assessment conducted as part of the PPG indicated that the number of farms in the buffer zone of the La Amistad National Park (World Heritage Site and Biosphere Reserve) is much less than originally estimated. In addition, the project will also work in the buffer zone of the Volcán Barú National Park, which is adjacent to the La Amistad National Park (World Heritage Site and Biosphere Reserve) and where coffee farms are also found and endophytic fungus are collected. Both protected areas are part of the La Amistad Biosphere Reserve.</p>
Output 3.3.1. Equipment and resources for education established in La Amistad National Park and buffer zone (location of endophytic fungus collections).	<p>Output 2.3.1. Communication, education, and public awareness about ABS strengthened in line with the management plans for La Amistad National Park (World Heritage Site and Biosphere Reserve) and Volcán Barú National Park, prioritizing as target audiences communities and stakeholders within the PAs and their buffer zones (locations of endophytic fungus collections).</p> <p>The output was revised to indicate that communication, education, and public awareness about ABS will be the mind focus of the activities under this output. Also to indicate that the project will also work in the Volcán Barú National Park and its buffer zone.</p>

3.3.3 Presentations carried out in colleges, associations, civic groups and NGOs.	2.3.3 Presentations carried out in colleges, associations, civic groups, NGOs, local government institutions, and the private sector. The output was revised to indicate that local government institutions and the private sector will also benefit from presentations to increase local knowledge about R&D activities developed through the project and to raise awareness about uses of microbial biodiversity and genetic resources.
PIF Core Indicators	CEO Approval Core Indicators
Core indicator 1: 207,000 ha of terrestrial protected areas under improved management for conservation and sustainable use	Core indicator 1 was removed from the project as suggested by the GEFSec.
Core indicator 11: 3,500 of direct beneficiaries disaggregated by gender (Female 1,800; Male: 1,700) as co-benefit of GEF investment	Core indicator 11: 1,070 of direct beneficiaries disaggregated by gender (Female 535; Male: 535) as co-benefit of GEF investment The target of this indicator was updated. The majority of direct beneficiaries from the project are coffee producers and local population of two PA buffer zones where native microbes are collected. During the PPG, a detailed assessment was conducted to establish the total number of coffee producers and local population living in these areas in the Province of Chiriquí and the number was much lower than what was estimated during the PIF. Maps with the exact locations of the coffee farms identified are included in Annex E of this CEO Approval request. In addition, the number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment was reduced with the removal of the medical sector component originally considered in the PIF. Accordingly, there was a 70% reduction in the number of direct project beneficiaries.
PIF Cofinancing	CEO Approval Cofinancing
\$15,754,544	\$14,535,059 The reduction of \$1,219,485 in cofinancing was due to the fact that a new government administration assumed office in July of 2019 and the government budget was adjusted, resulting in a deficit with respect to the financial programming at the time of the PIF.

21. The third project component related to gender and M&E, includes a Gender Action Plan that will be implemented based on guidelines from the UNDP and GEF. M&E of the project will be conducted following GEF and UNDP guidelines and according to the M&E plan described in Section VII of the GEF-UNDP Project Document.

4) Alignment with GEF focal area and/or Impact Program strategies.

22. The project will contribute to the Implementing the Nagoya Protocol on ABS entry point under Objective 3 of the GEF Focal Area on Biodiversity. In general, an adequate supportive environment exists in Panama for the implementation of the Nagoya Protocol, in terms of policy, legal, and planning instruments, due in part to the achievements of UNDP-GEF Project 4780; this project will therefore focus principally on the capacity building contemplated under GEFTF support to BD-3-8: *Further*

development of biodiversity policy and institutional frameworks through the Implementation of the Cartagena Protocol on Biosafety, including institutional capacity-building to carry out R&D to add value to genetic resources and capacities amongst stakeholders to negotiate between providers and users of genetic resources.

23. The project will contribute to implementation of Aichi Target 16: *By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation*, by contributing to the sustainable availability of biological crop protection agents. It will also contribute to Target 7: *By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity* by promoting of the use of conservation-based biological crop protection agents in coffee landscapes.

5) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF and co-financing.

24. The incremental/additional cost reasoning of the project, which is summarizes below.

Baseline scenario	Alternatives to be put in place by the project	Global Environmental Benefits
<ul style="list-style-type: none"> · Strong baseline of policy, regulatory and planning instruments, and interinstitutional (as well as public/private) cooperation in support of ABS. · Low scientific base of explorations of microbes for agricultural use as biological crop protection agents. · Achievements have yet to be translated into functioning value chains for microbes and their derivatives in the agricultural sector. 	<ul style="list-style-type: none"> · Development of scientific and technical and policy-based capacities for the realization of the potential of native microfungi biodiversity, from crop protection, and as a source of income for users and providers of genetic resources. · Development of technical capacities among resource managers to use microfungi crop protection agents and so to reduce agrochemical use · Development of negotiation. capacities among stakeholders for participation in satisfactory ABS arrangements that recognize their role as custodians of microfungi biodiversity. 	<ul style="list-style-type: none"> · Fair and equitable sharing of the benefits arising from the utilization of genetic resources (to local communities, resource managers, and PA officials) · Improved conservation of native microfungi biodiversity (20,533 ha of PAs) · Improved conservation of ecosystems and host plants from which microfungi biodiversity is collected · Reductions in the impacts of agricultural chemicals on native biodiversity, due to increases in the use of biological crop protection practices (1,000 ha of coffee landscapes under improved practices) · Increasing awareness of the existence, use, and option values of biological resources among key audiences (1,070 direct beneficiaries) · Contributing to the generation and potential replication of ABS best practices (agreements) · Contributing to national development strategies and economic growth

6) Global environmental benefits (GEFTF)

25. The project will result in the delivery of the following GEBs:

- Fair and equitable sharing of the benefits arising from the utilization of genetic resources (to local communities, resource managers and PA authorities), in the form of financial income, technical support and/or institutional strengthening. The specific nature of the support will be subject to negotiations between providers and beneficiaries, which will be subject to facilitation and capacity development by the project;
- Improved conservation of native microbe biodiversity: activities supported through the previous project (UNDP-GEF project ID 4789) highlighted the high levels of microbe biodiversity in the country, and suggest that there is much scope for further currently unknown taxa to be discovered, the conservation status of which will potentially benefit from the ABS mechanisms to be supported by this new project;
- 20,533 ha of terrestrial protected under improved management for conservation and sustainable use: Improved conservation of ecosystems and host plants from which microbial biodiversity is collected: increased awareness of the levels of currently untapped but potentially very valuable microbe biodiversity present in the natural and managed ecosystems of the country will provide increased motivations for the conservation of these ecosystems, while the proposed ABS mechanisms will permit the strengthening of the capacities of the institutions (such as PA authorities) and resource managers (such as coffee farmers) responsible for their conservation and sustainable management.
- 1,000 ha of landscapes under improved practices: demonstrations of the agronomic potential and the cost-effectiveness of new biological disease control options, able to avoid the risks of resistance associated with some of the currently used agents, will reduce levels of agrichemical applications which currently affect biodiversity on site as well as aquatic ecosystems downstream.
- Gender-responsive benefit sharing schemes are essential to enable an effective participation of both women and men in the design, negotiation, distribution and use of benefits. On the other hand, gender-blind Access and Benefit Sharing schemes, may overlook the vital roles played by women, and fail to preserve and valorise their skills and knowledge.

7) Innovativeness, sustainability and potential for scaling up.

26. *Innovation:* Under this project, innovation will reside in the testing of native microbes as crop protection agents for coffee. This research entails in vitro (Petri dish) trials of candidate biological crop protection agents (endophytic fungi and extracts) under different conditions of temperature, in vivo growth chamber and greenhouse trials to determine the most promising formulations of fungi, and field trials of at least 4 formulations of selected endophytic fungi (and/or their extracts), in coffee crops in five farms. Innovation will also reside in the application of results from research through the promotion of conservation-based biological crop protection in coffee farms that will allow to apply the formulation to the crop, allowing at the same time that the required ecological conditions, such as host plants are maintained in order to ensure the presence and status of the populations of the biological agents and their effectiveness, while promoting the maintenance of high levels of biodiversity in the coffee production systems. Another innovation of this project is the signing of a public-private Memorandum of Understanding/Agreement of Confidentiality between INDICASAT and the company AdvanceBioControllers for the scaling of a coffee crop-protection product and the development of technical data sheets for the handling and application of the product in the field, in line with NP/ABS requirements.

27. *Sustainability:* Panama has been investing financial resources in biodiscovery through the Center for Biodiversity and Drug Discovery of the Institute of Scientific Research and High Technology Services of Panama (INDICASAT) to strengthen research and development in the country. Recently the government updated the national framework to generate agreements with the private sector to develop products from biodiversity in full compliance with the Nagoya Protocol. This new project will add to this national commitment and will further advance ongoing research of native microbes in the agricultural sector with potential for developing ABS products. The sustainability of

this new project also relies on the government's commitment to implementation of the Nagoya Protocol and the partnerships that will be established with multiple stakeholders, including the participation of the private sector for the development of a crop protection agent for the coffee industry.

28. The sustainability of the project activities will also be ensured by the continued availability of training materials and case studies. These materials will be open access, available in electronic form, and disseminated widely. They will provide comprehensive guidance for stakeholders, and will be used in future projects, as well as other countries of the region and beyond. In the case of the agricultural sector, the project will also contribute to ensure the sustainability of outcomes by improving the negotiation capacity of institutions (MiAMBIENTE and INDICASAT) to achieve benefit-sharing agreements addressing a product for the agriculture sector; this agreement will ensure that future monetary and non-monetary benefits derived from the marketing of the product are shared equitably between the users and providers of the genetic resource. The project will however contribute to strengthening the research capacities in SENACYT and INDICASAT that are required for the eventual sustainability of the model once products have been developed and commercialized, for example through the establishment of a solid base of reliable scientific knowledge and scientific capacities. The US\$10 million grant provided by the Indian government to INDICASAT will facilitate sustainability by covering the recurrent costs associated with the R&D activities proposed by this project.

29. *Scaling up:* the project model, based on the realisation of the commercial potential of native biodiversity for the crop-protection industry and the equitable distribution of the resulting benefits to local stakeholders, has major potential for scaling up to other coffee landscapes and other ecosystems in the country where it is likely that similarly high levels of potentially useful genetic resources exist; and to other sectors (such as bananas and fruit crops) where there is a need, to date largely unmet, for sustainable and environmentally-friendly options for pest and disease management. In order to facilitate scaling up, lessons derived from the scientific research and the increase in capacities for ABS negotiations for the crop-protection product will be shared with other scientific groups in Panama and elsewhere, and with other decision makers who participate in the negotiation of ABS contracts.

1b. *Project Map and Geo-Coordinates.* Please provide geo-referenced information and map where the project interventions will take place.

30. Geo-referenced information (source: geonames.org): 8.80917, -82.54148 (N 8°48'33" W 82°32'29), Volcán Barú National Park (Chiriquí Province). The Volcán Barú National Park was established in 1976, with an area of 14,325 ha. Together with the La Amistad National Park, it is a part of the La Amistad Biosphere Reserve, which lies in the foothills and mountains of the Cordillera de Talamanca, between the mountain ranges of Panama and Costa Rica. Please refer to Annex E of this CEO Approval Request for a map where the project's farm-level activities will take place.

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

Map 1. Coffee farms in the project area: District of Boquete, Province of Chiriquí in western Panama.



Map 2. Coffee farms in the project area: District of Renacimiento, Province of Chiriquí in western Panama.



Map 3. Coffee farms in the project area: District of Tierras Altas, Province of Chiriquí in western Panama



Coffee farms in the project area.

District of Boquete, Province of Chiriquí in western Panama			
		Location	
ID	Farm name	X	Y
1	Café Princesa Janca	343114	973773
2	Café Suarez	337272	974085
3	Cafetalera Don Nery	336979	973466
4	Cafetales Don Alfredo - La Milagrosa	345497	970182
5	Damarli State	338519	970082
6	Elida State	336918	974278
7	Finca Casanga	340556	967675
8	Finca D&L	338504	966780
9	Finca Dindos	337411	973732
10	Finca Dos Jefes	339776	972269
11	Finca El Mirador	336302	977942
12	Finca El Velo-Hacienda La Esmeralda	337076	975328
13	Finca Gil Rubio	338307	972569
14	Finca Hacienda La Esmeralda - Palmira	339087	966768
15	Finca Horqueta	339199	976126
16	Finca Lérida	336790	974582
17	Finca Los Lajones	340563	968398
18	Finca Oasis	335998	972699
19	Fincas PSSA-Hacienda La Esmeralda	345832	970503
20	Hacienda La Esmeralda	339377	965913
21	Pam&Mike Finca	339035	969109

22	Panama Espresso EST1999	340668	970543
23	Sendero Culebra	337026	977763
24	Taylor Papa Lalo Coffee	338525	973252
25	Zona de Fincas Cañas Verdes - Hacienda La Esmeralda	335991	968931
District of Renacimiento, Province of Chiriquí in western Panama			
		Location	
ID	Farm name	X	Y
1	Asociación de Productores de Café de Renacimiento	303699	977158
2	Café Della Sera	301056	979050
3	Café Gallardo Zambrano	307315	978555
4	Café La Jabita	295545	979082
5	Cafetal Aguilar Peralta	307363	978646
6	Finca Aguilar Barroso	307145	978651
7	Finca Café de Eleta	306452	982387
8	Finca Café Gallardo	298671	978550
9	Finca Don Bosco	306965	982558
10	Finca Hartmann	306347	978140
11	Finca Herca Internacional	299849	978980
12	Finca La Llorona	308817	979436
13	Finca Las Palmas	299616	978996
14	Finca Momoto-Flia Hartmann	307947	979619
15	Finca Moravia	306356	977168
16	Guarumo Coffee Farms	308704	980742
17	Santos Café	301911	976874
District of Tierras Altas, Province of Chiriquí in western Panama			
		Location	
ID	Farm name	X	Y
1	Café Olé	329603	979172
2	Finca Bajo Grande	312947	973257

3	Finca Café Don Lara	324558	978685
4	Finca Janson	316251	970632
5	Finca La Florentina	320585	975142
6	Finca Lara	324328	978733

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities Yes

Private Sector Entities Yes

If none of the above, please explain why:

Please provide the Stakeholder Engagement Plan or equivalent assessment.

1. The project's Stakeholder Engagement Plan is included in Annex 6 of the GEF-UNDP Project Document, and includes information summarizing the main PPG workshops convened and stakeholder meetings conducted. The successful implementation of the project will largely depend on the effective communication and coordination with the multiple project stakeholders and the implementation of mechanisms to ensure these stakeholders' participation. The key national and sub-national stakeholders include MiAMBIENTE, INDICASAT AIP, SENACYT, IDIAP, the University of Panama, and UNACHI, among others. At the local level, the most relevant stakeholders are coffee farmers who will be involved in conservation-based biological crop protection and are the primary beneficiaries of the project, as they will participate in the key project activities. Other local stakeholders include local communities in buffer zones of the La Amistad National Park (World Heritage Site and Biosphere Reserve) and the Volcán Barú National Park, local organizations, school districts, and municipalities. The private sector includes companies like AdvancedBioControllers, which may be involved in the negotiation of an ABS agreement between the government and users of a crop-protection product.

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement.

The stakeholder consultations and engagement that began during the PPG phase will be continued throughout project implementation. To achieve this, the project will make use of several mechanisms, including: a) Project Inception Workshop: the project will be presented to both direct stakeholders and the public; b) Project Board: comprised of

representatives of the government agencies and representatives of direct project beneficiaries, it will be responsible for approving the work plans, participating in the recruitment processes, and providing overall strategic guidance to the project; c) Project Management Unit (PMU): responsible for the implementation of the stakeholder engagement plan, gender action plan, grievance redress mechanisms, and M&E; d) Communication and Information Management: MIAMBIENTE will be responsible for maintaining fluid communication with the stakeholders through traditional means and new informational technologies. This communication will be duly recorded on a monthly basis in scorecards that indicate the type of communication, the reason, and the responsible parties; e) Governance role for project target groups: project target groups will be represented on the Project Board by the Specialty Coffee Association of Panama (SCAP) and the Gorgas Commemorative Institute for Health Studies (ICGES); f) Gender Action Plan: will secure the involvement of both genders, especially women; a Gender Expert will be hired to review and update the implementation of the Gender Action Plan on a periodic basis; g) Grievance Mechanism: addressing the complaints and grievances will be the responsibility of a team comprising a representative of UNDP, a representative of MIAMBIENTE, a representative of the project technical staff, and a representative of the farms participating in the project. The grievance mechanism will be published so that all stakeholders are aware of its existence, documenting any potential grievances and ensuring they are addressed in a timely manner; h) Opportunities to increase the participation of interested parties at the local level: by facilitating knowledge, awareness-raising, and dissemination of information about biodiversity use and conservation, particularly native microbes; and i) Decentralized M&E: this will include meetings and interviews with direct beneficiaries, and meetings with special groups such as women to verify gender –based indicators.

Select what role civil society will play in the project:

Consulted only;

Member of Advisory Body; Contractor;

Co-financier; Yes

Member of project steering committee or equivalent decision-making body; Yes

Executor or co-executor; Yes

Other (Please explain)

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

1. The Gender Action Plan is management tool that seeks to guide and promote that men and women to have the same opportunities for involving themselves in the activities of the various project components and to benefit from its outcomes. The Plan corresponds to the GEF and UNDP gender policies and guidance and indicates that key aspects regarding the needs, opportunities, priorities, status, and relationships between men and women in relation to the project have been identified and incorporated into the process of design, implementation, monitoring, and evaluation of the project, specifically through the following actions:

- Promote the equal participation of men and women in the project, especially at the decision-making level and in carrying out activities.
- Incorporate into the project document the contributions of women who participated in the activities during the project preparation phase.
- Establish indicators that help to measure the effective execution of the Gender Action Plan during the life of the project.
- Strengthen the capacities of the stakeholders involved in the project, promoting equality among men and women in the research components as well as the extension activities (education/information dissemination).

2. The strategy to mainstream gender into the project is presented below. Indicators have been included related to the following:

- Equal participation by men and women in the processes for raising awareness, training, and environmental education.
- Project benefits for men and women.
- Access of men and women to resources linked to the project.

Gender Action Plan						
Objectives	Actions	Indicators	Target	Baseline	Responsible Party	Estimated Cost (USD)
Ensure that men and women participate equally in decision-making, implementation of activities, and monitoring and evaluation of the project.	-Hold 2 work meetings, with key personnel to assign roles and responsibilities to men and women. -Perform monitoring every 6 months of the equal participation of men and women in the project.	Percent of men and women in key roles related to project activities.	At least 50% are women	0%	MiAMBIENTE, UNDP	26,010 (Salary of Gender Expert)

Strengthen the capacities of women and promote opportunities for equal participation in processes related training and environmental education.	-Carry out training sessions and produce dissemination of information and education material with a gender focus highlighting the importance of the role of women scientists in terms of biodiversity and genetic resources research, and in the case of the stakeholders in the area of study the role of men and women in relation to the importance of the conservation of biodiversity and genetic resources.	-Percent of materials for dissemination and education with a gender focus.	100%	0%	MiAMBIENTE, INDICASAT, University of Panama, Project Team	27,090 (Components 1, 2, and 3)
		-Percent of men and women benefiting from opportunities around raising awareness, training, and environmental education as part of the project.	At least 50% are women.	0%		
		-Percent of men and women actively participating in actions for raising awareness, training, and environmental education.	Between 30% and 50% of the participants are women.	0%		
Ensure the equal participation of men and women in aspects of ABS related to genetic resources at the farm level that are potential beneficiaries of the project.	-Carry out workshops about ABS agreements with the participation of both men and women. -Assess the level of knowledge of men and women at the farm level farms, about access to or use of biodiversity and genetic resources, and the distribution of benefits.	-Percent of men and women involved in discussions about ABS agreements.	At least 50% are women	0%	MiAMBIENTE, INDICASAT, Project Team	2,000 (Component 3)
		-Percent of men and women who, upon project finalization, have been trained in legislation regarding ABS agreements.	Between 40% and 50% of the people trained in ABS are women.	0%		
		-Percent of men and women from the participating farms who have received information about ABS.	Men: 50% Women: 50%	0%		
Raise the awareness of owners and key personnel of the farms participating in the	-Meetings/dialogue with coffee producers to ensure the participation of men and women in training and	-Percent of producers and key staff, men and women, reached by the awareness-raising activities.	Men: 50% Women: 50%	0%	MiAMBIENTE, INDICASAT, Project Team	1,200 (Component 3)

project about the connection between gender and biodiversity issues.	extension activities that will be developed. -Meetings/ dialogue with key staff and workers during visits to the farms participating in the project about the need for men and women to be involved in the conservation and sustainable use of biodiversity, including native microbes.	-Percent of men and women contacted during the field visits.	At least 30% are women.	0%		
Involve men and women in the project's area of study for the preparation and development of extension events to promote knowledge about the use and conservation of biodiversity including native microbes.	-Plan the extension events with the participation of men and women at the institutional level as well as with local stakeholders in the area of study. -Develop a list of potential groups or organizations that could participate in the extension events in which women would play a relevant role. -Identify local allies who could provide support to the extension events with a focus on gender.	-Percent of men and women who participate in the planning processes, according to stakeholder type.	At least 50% are women.	0%	MiAMBIENTE, INDICASAT, Project Team	2,250 (Component 3)
		-Percent of groups or organizations identified with the relevant representation of women.	At least 25% of the groups or organizations participating are led by women.	0%		
		-Percent of men and women who participate in extension events.	At least 50% are women.	0%		
Identify opportunities for the development of future projects linking biodiversity, medical and scientific research, and sustainable agricultural practices, with a focus on gender.	-During the activities for awareness-raising, training, and environmental education, create spaces for dialogue with participants to identify opportunities for men and women to jointly develop future projects related to the conservation of biodiversity	-Percent of men and women participating in the discussion about opportunities for future projects for the conservation of biodiversity and genetic resources with a gender focus.	At least 50% are women.	0%	MiAMBIENTE, INDICASAT, University of Panama, Project Team	Cost included of the budget for training and awareness-raising in project Component 3.

	and genetic resources with a gender focus.	-Number of future projects identified linking the gender component as a key element.	At least one (1).	0		
Total						58,550

- 100 people trained (60 men and 40 women) as part of increased technical research capacity to discover promising extracts and compounds from endophytic fungi, for use in the medical sector.
- 200 people trained (100 men and 100 women) in the use of protocols developed as part of increased technical research capacity to determine the safety and efficacy in the medical sector of at least two known compounds.
- 150 authorities and technical staff and local stakeholders trained in negotiation of ABS agreements (75 men and 75 women).
- 100 coffee producers who have received training on the use of conservation-based biological crop protection agents (50 men and 50 women).
- 700 people who have received education in La Amistad National Park (World Heritage Site and Biosphere Reserve) and in the Volcán Barú National Park on the importance and use of biodiversity and genetic resources, with specific reference to microbes (350 men and 350 women).

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources; Yes

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women Yes

Does the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

1. During the PPG, discussions were held with the company AdvancedBioControllers regarding the potential for entering into benefit-sharing agreements for the commercialization of a agricultural product (i.e., biological crop protection agent). These discussions will be continued during the implementation phase of the project and will include: a) meetings with the AdvanceBioControllers to discuss options for product scaling from the laboratory to field level; b) sign a Memorandum of Understanding / Agreement of Confidentiality between the private company and INDICASAT for product scaling; c) develop technical data sheets for the handling and application of the product in the field; d) scaling the product from the laboratory to the field level through a collaborative effort between INDICASAT and AdvanceBioControllers; and e) monitor and evaluate the results.

5. Risks

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

1. During the PPG, the project risks were updated and mitigation measures were proposed based on UNDP's Social and Environmental Screening Procedure (SESP). The project is considered moderate risk; the project activities are designed to ensure minimal or no risks of adverse social or environmental impacts. The risk assessment and risk mitigation measures considered during the final project design, includes the adoption of project approaches that allow for greater localization of programmed actions, i.e. greater involvement of researchers and a selected number of coffee farmers (including women) in facilitating access, benefit-sharing and biodiversity conservation based on the development of a product for the crop protection industry, and supporting research of active compounds for the medical sector. Risks are fully incorporated into UNDP's Risk Register (included as Annex 5 of the GEF-UNDP Project Document) and risk monitoring mechanisms; as per standard UNDP requirements, the National Technical Coordinator will monitor risks quarterly and report on the status of risks to the UNDP Country Office, which will record progress in the UNDP ATLAS risk register. The SESP is included as Annex 4 of the GEF-UNDP Project Document.

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

1. Institutional arrangements are described in Section IX: Governance and Management Arrangements of the GEF-UNDP Project Document. In addition, an updated description of the coordination with other relevant GEF-financed and other initiatives is included in Section V. Results and Partnerships of the GEF-UNDP Project Document.

7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

1. The project is consistent with the National Biodiversity Strategy and Action Plan (NBSAP) 2018-2050. The NBSAP promotes the implementation of the Nagoya Protocol for biotrade and bioprospecting in Panama, including strengthening human resources, legal frameworks, and institutional capacities to implement the Nagoya Protocol, and support initiatives for bio-discoveries that have potential for commercialization. In addition, the project is in line with the 2017 Strategic Plan of the National System of Protected Areas, which promotes the development and implementation of a strategy for scientific research and communication regarding the ecological and cultural values of protected areas.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

1. The project will constitute a globally important source of lessons on the development of business models for biological crop protection based on native fungi, for the negotiation of ABS agreements and contracts associated with this business model. At the same time, the project will learn from relevant lessons from other initiatives worldwide in relation to the use of microbes for agricultural purposes, and the development of ABS agreements with participation from diverse stakeholders including the public sectors. The principal channel for the interchange of such lessons and knowledge will be the global UNDP/GEF Project: Strengthening human resources, legal frameworks, and institutional capacities to implement the Nagoya Protocol (GEF ID 5731), in which Panama is a participant, Component 4 of which focused on Implementing a Community of Practice and South-South Cooperation Framework on ABS. Knowledge management will be part of the project monitoring and evaluation strategy and will include the effective systematization of lessons learned through this project, and their communication to other practitioners worldwide through global platforms such as the Global ABS Community^[1], a virtual platform oriented to provide support for the implementation of the Nagoya Protocol on ABS developed through the GEF ID 5731 Project, and the Panorama Portal "Solutions for a Healthy Planet"^[2]. The project will develop several knowledge management activities, including: a) relevant knowledge, good practices, and lessons learned are captured annually by the project team and used to inform management decisions; b) Drafting of guidance manual and protocols related to ABS/conservation-based biological crop protection in coffee production systems (Outputs 2.2.1 and 2.2.2); c) sharing of experiences and expertise (e.g., participation in communities of practice, organizing seminars, trainings, and conferences) with relevant stakeholders (Outputs 2.1.1 and 2.2.3); and d) Ensuring coordination in terms of building complementarities, sharing best practices, and generating knowledge products of best practices related to ABS and biodiversity conservation and sustainable use with other ongoing initiatives. In addition, virtual platforms and innovative social media approaches will be considered.

^[1] <https://community.abs-sustainabledevelopment.net>

^[2] <https://panorama.solutions/en>

9. Monitoring and Evaluation

Describe the budgeted M and E plan

1. The projects' M&E strategy is included in Section VIII: Monitoring and Evaluation (M&E) Plan of the GEF-UNDP Project Document. The budgeted M&E plan is presented below.

Monitoring and Evaluation Plan and Budget			
GEF M&E requirements	Responsible Parties	Indicative costs (US\$)	Time frame
Inception Workshop	Implementing Partner PM/Coordinator/ CTA	2,000	Within 60 days of CEO approval of this project.
Inception Report	PM/Coordinator/ CTA	None	Within 90 days of CEO approval of this project.
Monitoring of indicators in project results framework	PM/Coordinator/ CTA	None ^[1] ¹	Annually prior to GEF PIR. This will include GEF core indicators.
GEF Project Implementation Report (PIR)	RTA UNDP Country Office ^[2] ² PM/Coordinator/ CTA	None	Annually typically between June-August
Monitoring all risks (UNDP risk register)	UNDP Country Office PM/Coordinator/ CTA	None ^[3] ³	On-going.
Monitoring of stakeholder engagement plan	National Technical Coordinator	None ^[4] ⁴	On-going.
Monitoring of gender action plan	Project Gender Officer	20,100	On-going.
Supervision missions	UNDP Country Office	None ^[5] ⁵	Annually
Oversight missions	RTA and BPPS/GEF	None ⁸	Troubleshooting as needed
Terminal GEF Core indicators	MiAMBIENTE National Technical Coordinator	None	Before terminal evaluation mission takes place
Independent Terminal Evaluation (TE)	Independent evaluators	28,250	April 2024
TOTAL indicative COST		50,350	

[1] Paid through National Technical Coordinator salary

[2] Or equivalent for regional or global project

[3] Paid through National Technical Coordinator salary

[4] Paid through National Technical Coordinator salary

[5] The costs of UNDP CO and UNDP-GEF Unit's participation and time are charged to the GEF Agency Fee.

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

1. The project has a strong training component that will benefit the following: a) researchers involved in the discovery of promising extracts and compounds from endophytic fungi, for use in the medical sector, as well as staff of institutions involved with the management of biological resources outside the academic community and local students interested in learning about the development and testing of research processes in relation to the use of microbes for medical purposes; b) researchers involved in the use of protocols for *in vivo* testing of promising compounds (Naranjamide and Bastimolide B) for the medical sector; c) technical staff from MiAMBIENTE and local stakeholders directly involved in coffee production trained in negotiations of ABS agreements; d) coffee producers trained on the use of conservation-based biological crop protection agents; and e) local communities in La Amistad National Park (World Heritage Site and Biosphere Reserve) and in the Volcán Barú National Park and buffer zones participating in environmental education about the importance and use of biodiversity and genetic resources, with specific reference to microbes. Research teams (e.g., INDICASAT and the University of Panama) will also benefit from new equipment to be provided by the project, and staff from the La Amistad National Park (World Heritage Site and Biosphere Reserve) and Barú Volcano National Park will be supplied with equipment to conduct environmental education activities locally. In addition, the project may provide monetary and non-monetary benefits derived from the marketing of a crop protection product that will be shared equitably between the users and providers of the genetic resource. The project will directly benefit 1,370 people (685 women; 685 men).

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

This project will contribute to the following Sustainable Development Goal (s): 9 (Industry, Innovation, and Infrastructure) and 15 (life on land)				
This project will contribute to the following country outcome (UNDAF 2016-2020): CPD 3.2: By 2020, the State has strengthened its capacities to design and implement policies, plans and programs that contribute to environmental sustainability, food and nutrition security, adaptation to climate change, disaster risk reduction and resilience build-up CPD Output 3.1: Improved compliance of commitments to international environmental agreements.				
	Objective and Outcome Indicators	Baseline	Mid-term Target	End of Project Target
Project Objective: To support the realization of the potential of native microorganisms to contribute to the agriculture sector while generating global environmental benefits, in accordance with the provisions of the Nagoya Protocol	Mandatory Indicator 1 (GEF Core Indicator 11): # direct project beneficiaries disaggregated by gender (individual people)	- 0	- 465 (165 women; 300 men)	- 1,070 (535 women; 535 men)
	Mandatory Indicator 2 (GEF Core Indicator 4): Area of landscapes under improved practices (excluding protected areas)	- 0	- 500 ha of coffee farms	- 1,000 ha of coffee farms
Project Component 1	Development of a product for the crop protection industry			

Project Outcome 1.1 Promising active compounds identified from endophytic fungi, as biological crop protection agents in the agricultural sector	<u>Indicator 3</u> : Number of active extracts and compounds isolated in order to develop a product for the crop protection industry focused on the coffee sector.	- Extracts: 0 - Compounds: 0	- Extracts: 100 - Compounds: 2	- Extracts: 200 - Compounds: 4
Outputs to achieve Outcome 1.1	1.1.1 In vitro active extracts and compounds with potential for the development of a phytosanitary product identified.			
Project Outcome 1.2 Strengthened research and development of novel biological crop protection agents	<u>Indicator 4</u> : Number of formulations with potential for crop protection product development, on the basis of field trials of the prioritized formulations	- 0 	- 2 	- 4
Outputs to achieve Outcome 1.2	1.2.1 In vitro trials of candidate biological crop protection agents (endophytic fungi and aqueous extracts). 1.2.2 In vivo growth chamber and greenhouse trials to determine the most promising formulations of fungi (e.g. active ingredients, spore concentrations, abiotic conditions and leaf development) for field trials. 1.2.3 At least four alternative formulations of selected endophytic fungi evaluated in field trials in coffee crops. 1.2.4 Interinstitutional collaborative research strengthened.			
Project Component 2	Facilitating access, benefit-sharing and biodiversity conservation based on the development of a product for the crop protection industry			
Project Outcome 2.1 Increased capacity to negotiate an ABS agreement by the end of the project	<u>Indicator 5</u> : Number of authorities and technical staff and local stakeholders practically applying the skills learned in negotiation of ABS agreements, disaggregated by gender	- Men: 0 - Women: 0	- Men: 45 - Women: 30	- Men: 75 - Women: 75
	<u>Indicator 6</u> : Number of ABS agreements negotiated between the government and users of the crop protection product by project end	- 0	- 0	- One (1)

Outputs to achieve Outcome 2.1	2.1.1 Capacity development programme for the negotiation of ABS agreements.			
Project Outcome 2.2 Increased technical capacity for conservation-based biological crop protection in 1,000 ha of coffee farms in the La Amistad National Park (World Heritage Site and Biosphere Reserve) and the Volcán Barú National Park and their and buffer zones, with potential to contribute to the conservation status of two globally important microbes (endophytic fungi) and their host ecosystems	Indicator 7: Number of coffee producers practically applying the skills learned on the use of conservation - based biological crop protection agents, disaggregated by gender.	- Men: 0 - Women: 0	- Men: 30 - Women: 20	- Men: 50 - Women: 50
Outputs to achieve Outcome 2.2	2.2.1 Protocols developed and tested for the use and management regimes of conservation-based biological crop protection in coffee production systems 2.2.2 Guidance manuals developed for farmers and extensionists on the use of conservation-based biological crop protection agents in coffee 2.2.3 Demonstration plots and training programmes established in or near the areas of collection of native micro fungi, on the use of conservation-based biological crop protection agents in coffee			

Project Outcome 2.3 Increased knowledge and awareness regarding microbe biodiversity, conservation-based biological crop protection and genetic resources	Indicator 8: Number of people in La Amistad National Park (World Heritage Site and Biosphere Reserve) and in the Volcán Barú National Park practically applying the skills learned on the importance and use of biodiversity and genetic resources, with specific reference to microbes, disaggregated by gender	- Men: 0 - Women: 0	- Men: 200 - Women: 100	- Men: 350 - Women: 350
Outputs to achieve Outcome 2.3	2.3.1 Communication, education, and public awareness about ABS strengthened in line with the management plans for La Amistad National Park (World Heritage Site and Biosphere Reserve) and Volcán Barú National Park, prioritizing as target audiences communities and stakeholders within the PAs and their buffer zones (locations of endophytic fungus collections). 2.3.2 Dissemination programme implemented, including: -Public media campaign on protection and use of microbe biodiversity and genetic resources, with a gender approach -Community extension presentations explaining the uses of microbe biodiversity and genetic resources 2.3.3 Presentations carried out in colleges, associations, civic groups, NGOs, local government institutions, and the private sector.			
Project Component 3	Monitoring and Evaluation (M&E) with a gender focus			
Outcome 3.1 M&E assesses project impact and guides adaptive management.	Indicator 9: Progress in Project Gender Action Plan and M&E Plan	- M&E Plan: 0% - Gender Action Plan: 0%	- M&E Plan: 50% - Gender Action Plan: 50%	- M&E Plan: 100% - Gender Action Plan: 100%
Outputs to achieve Outcome 3.1	3.1.1 Project's M&E Plan and Gender Action Plan implemented, ensuring the achievement of the planned goals.			

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Comment	Response	Relevant Section of UNDP Project Document and - GEF CEO ER
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2. Is the project structure/ design appropriate to achieve the expected outcomes and outputs as in Table B and described in the project document?

3-29-20

General

1) Please prepare a table with information on the scientific research (including compounds) that this project is using as a baseline, and the proposed interventions to follow. The information appear to be scattered in the text, and this table will facilitate the reading and understanding of the project. The table should allow a non-specialist to understand the trajectory of the proposed research and where the program stands in terms of deliverables. Extracts and identification of compounds were suggested outcomes of the previous project, and are being proposed as outcomes and outputs of this project too.

2) The GEF kindly request to split and merge the proposed activities under Component 3 in the corresponding Component 1 and 2. Not clear why there are activities on crop protection and medical sector separated from the components where these activities are being presented.

Component 1.

2) Outcome 1.1. Can't be delivered with proposed outputs. How can extracts be identified and components tested with Protocols and Training only?

3) Outcome 1.2 What are the "two known compounds" to be tested for safety and efficacy?

4) What medical uses are being tested here specifically? Please narrow down the scope of the work to be done (Cultures of these microorganisms will be undertaken using different culture conditions at both the small and large scales for further confirmation of their potential effects as anti-parasitic, antimicrobial or anticancer and on the central nervous system). What is the focus of the research anyway? It is very difficult to believe that this project can tackle anti-parasitic

Thank you for your comments.

1) Please see the table with information on the scientific research that was included as Annex 10 in the Project Document.

2) The Ministry of Environment kindly requests maintaining the proposed biodiversity conservation and environmental education activities under Component 3 (i.e., now Component 2 in the revised draft) as approved by the GEF Secretariat in the PIF. While these activities are connected to the research undertaken by INDICASAT under Component 2 (i.e, now Component 1 in the revised draft), they will be implemented by the Ministry of Environment in the buffer areas of La Amistad National Park and Volcán Barú National Park, where coffee is cultivated. The Ministry of Environment also requests maintaining these biodiversity conservation and sustainable use activities under Component 3(i.e., now Component two in the revised draft) to facilitate their financial management and operations.

Component 1

Responses to questions 2), 3), 4 and 5) are no longer needed as Component 1 has been eliminated in response to the GEF comment on the need to downsize the scope of the project.

Component 2 (Please note that this is Component 1 in the revised draft)

5) The previous project achieved baseline information on the taxonomic composition of the microbial communities associated with *Coffea arabica* in Panama and the identification of native fungi strains that inhibit coffee rust fungus (*Hemileia vastatrix*) spore germination and native fungi strains that inhibit the mycelial growth of American Leaf Spot of Coffee Fungus (*Mycena citricolor*). Further, extracts were obtained from two strains mentioned in the first ABS project, and partially purified extracts showed bioactivity remaining in some of the extracts. The compounds in these extracts have not been fully purified, structurally identified, or tested on the coffee pathogens. This is why trials with these strains and their extracts and purified compounds are being proposed in this new ABS project. New nuclear magnetic resonance equipment is being purchased and will be installed in 2020; this investment will be key for compound identification.

More preparations are proposed, as there are now more strains identified with antifungal activities and for which extracts are needed, and to select the best possible biocontrol agents or extracts from the available culture collection.

6) As explained above, in the first ABS project extracts were obtained from two strains of microbes. These extracts still must undergo compound purification, be structurally identified, and tested against the pathogens. Further experiments have been carried out on the interaction between the coffee rust fungus and one of the strains using the MALDI-imaging technique and a metabolite profile has been obtained; however, this metabolite profile must be identified. Basically, these experiments have established how many different metabolites are in the

CEO ER, 2) The baseline scenario and any associated baseline projects.

Project Document, Annex 10

<p>4. Are the confirmed expected amounts, sources and types of co-financing adequately documented, with supporting evidence and a description on how the breakdown of co-financing was identified and meets the definition of investment mobilized, and a description of any major changes from PIF, consistent with the requirements of the Co-Financing Policy and Guidelines?</p> <p>3-29-20</p> <p>The LoC from INDICASAT with \$10,000,000 comes from India for a specific purpose. "Testing of natural compounds for a number of diseases such as Alzheimer. The US\$10 million grant of the government of India and US\$175,000 of Esai will cover these activities". If that is the case, the co-financing for the other Components don't add-up. Please explain how the remaining co-financing of \$3.0+ million can be cover the other activities listed under Table B.</p> <p>Please include the LoC for the following two</p>	<p>Since the medical Component (originally Component 1) was eliminated from the project, the US\$10 million from the government of India is co-financing for research activities under the new Component 1 (Development of a product for the crop protection industry). This co-financing will cover salaries, research facilities, and equipment (Outputs 1.1.1, 1.2.1, 1.2.2, 1.2.3, and 1.2.4) as noted in the co-financing letter and on page 34 of the UNDP Project Document. The co-financing letter from the Ministry of Environment is included.</p>	<p>CEO ER, B. Project Description Summary Project Document, IX. Financial Planning And Management, page 34 INDICASAT co-financing letter</p>
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<p>5. Is the financing presented in Table D adequate and does the project demonstrate a cost-effective approach to meet the project objectives?</p> <p>3-29-20</p> <p>The request for GEF \$863,242 appears to be insufficient to achieve the proposed outputs. If Co-financing is for \$13.0+ but \$10M for Component 1 (medical use), that leaves \$3.5M for the rest of the project, with only \$3.0+ in investments for the rest of the project. The project needs to be downsized significantly. This was discussed at PIF stage when the project was proposed to do both medical and crop-protection industry sectors with a limited GEF funding. There are only GEF \$50,000/year x 4 years for Component 1; \$98,000/yer x 4 years for Component 2 and \$48,000/year for Component 3. The GEF strongly suggest to downsized the project SIGNIFICANTLY so it is easier to understand and the resources can deliver the proposed outcomes. As it, it is over-promising and will under-deliver.</p>	<p>In response to this comment Component 1 (medical sector) was eliminated. The US\$10 m of co-financing is going to be used to achieve the proposed outcomes under the new Component 1 (agricultural sector). Also, the project duration has been reduced from 4 to 3 years and this facilitated adjusting the project management costs. The co-financing from the government reflects the importance and commitment given by the country to the project and to INDICASAT's long-term mission to continue investigating the uses of genetic resources. GEF's support of this project will contribute to further the future and success of this important project for the country. We hope that this project will deliver global solutions in terms of a crop-protection product for agriculture.</p>	<p>CEO ER, B. Project Description Summary</p>
<p>6. Is the status and utilization of the PPG reported in Annex C in the document?</p> <p>3-29-20</p> <p>Please indicate where the utilization of the PPG is located, in addition to the information presented on 3.2 (pages 91-92) of the Project Document. Thanks.</p>	<p>Additional to the information presented on 3.2 (pages 91-92), the PPG was used to contract three consultants:</p> <ol style="list-style-type: none"> 1. International Consultant: Consultations (Inception workshop, PRF workshop, and validation workshop), and drafting of Project Document and CEO Endorsement Request 2. Social National Specialist: Interviews, Gender Plan, Engagement Stakeholder Plan (Project Document, page 24; Annex 7; Annex 8); Socioeconomic Analysis of Coffee Activity (Annex 10), and Other Support 3. Biodiversity National Specialist: Legislation and Capacities Baseline (Project Results Framework: training baselines and targets), Interviews, Georeferenced Maps (Project Document, pages 16, 18, 19, 20, 21, 22; Annex 1), securing cofinancing letters 	<p>Project Document, page 24; Annex 1; Annex 7; Annex 8; Annex 10; cofinancing letters</p>

<p>7. Are there changes/ adjustments made in the core indicator targets indicated in Table E? Do they remain realistic?</p> <p>3-29-20</p> <p>Please remove Indicator 1. Level of investment and related activities does justify claiming 270,000 ha of Improved Management.</p>	<p>Thank you, Indicator 1 was removed as suggested.</p>	
<p>2. Is there an elaboration on how the baseline scenario or any associated baseline projects were derived?</p> <p>3-29-20</p> <p>For the Medical- and Crop Protection Industry, please provide a table of the status of the R&D in the form of a table.</p> <p>How is it possible that the baseline for the different "extracts" and "compounds" is "zero" after the initial GEF project on the subject matter? Please list the "extracts", "compounds" and "formulations" that were obtained in the previous GEF project or other projects that serve as Baseline, explain what is expected from the this project and how far is R&D to reach market products. This should be understandable to the non-specialist.</p>	<p>As noted above, the Component 1 on the medical sector was eliminated from the project.</p> <p>As mentioned in the response to question 2, the previous project achieved baseline information on the taxonomic composition of the microbial communities associated with Coffea arabica in Panama and the identification of native fungi strains that inhibit coffee rust fungus (Hemileia vastatrix) spore germination and native fungi strains that inhibit the mycelial growth of American Leaf Spot of Coffee Fungus (Mycena citricolor). Further, extracts were obtained from two strains mentioned in the first ABS project, and partially purified extracts showed bioactivity remaining in some of the extracts. The compounds in these extracts have not been fully purified, structurally identified, or tested on the coffee pathogens. This is why trials with these strains and their extracts and purified compounds are being proposed under this new ABS project. A table with information about the scientific research has been included in Annex 10 in the Project Document. The project baseline was updated to indicate the results obtained in the previous GEF project or other projects that serve as baseline.</p>	<p>CEO ER, 2) The baseline scenario and any associated baseline projects.</p> <p>Project Document, Annex 10</p>

<p>3. Is the proposed alternative scenario as described in PIF/PFD sound and adequate? Is there sufficient clarity on the expected outcomes and components of the project and a description on the project is aiming to achieve them?</p> <p>3-29-20</p> <p>No. Unless there is clarity on what was achieved in the previous GEF project, it is not possible to elaborate on the "alternative scenario". While the description of the components is there, there is no clarity on how these components represent an alternative scenario.</p>	<p>Please see responses to question 2 above.</p>	
<p>6. Is there further and better elaboration on the project's expected contribution to global environmental benefits or adaptation benefits?</p> <p>3-29-20</p> <p>Please add more specific benefits to this table. Information is already scattered through the project. This would allow the reader to see at a glance what this project is supposed to deliver</p>	<p>Thank you for your comments. Presented below are other benefits that will be delivered through the project; the table was updated accordingly:</p> <ul style="list-style-type: none"> • Fair and equitable sharing of the benefits arising from the utilization of genetic resources (to local communities, resource managers, and PA officials) • Improved conservation of native microfungal biodiversity (20,533 hectares [ha] of PAs) • Improved conservation of ecosystems and host plants from which microfungal biodiversity is collected • Reduction in the impacts of agricultural chemicals on native biodiversity, due to increases in the use of biological crop protection practices (1,000 ha of coffee landscapes under improved practices) • Increased awareness of the existence, use, and option values of biological resources among key audiences (1,370 direct beneficiaries) • Contribution to the generation and potential replication of ABS best practices (agreements) • Contribution to national development strategies and economic growth 	<p>Project Document page 9, paragraph 16</p> <p>CEO ER, 5) Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF and co-financing</p>

<p>7. Is there further and better elaboration to show that the project is innovative and sustainable including the potential for scaling up?</p> <p>3-29-20</p> <p>There are serious doubts about the Financial Sustainability of this project. Please elaborate why the previous project was not financially sustainable and had to return to the GEF for additional resources.</p>	<p>The previous project was a first step in the process of biodiscovery, improving human and institutional capacities in the country, and the transfer of equipment and experience to Panama from international projects. In addition, the national legal framework was updated to include all the provisions of the Nagoya Protocol.</p> <p>Panama has been investing financial resources in biodiscovery through the Center for Biodiversity and Drug Discovery of the Institute of Scientific Research and High Technology Services of panama (INDICASAT) to strengthen research and development in the country. Recently the government updated the national framework to generate agreements with the private sector to develop products from biodiversity in full compliance with the Nagoya Protocol. This new project will add to this national commitment and will further advance ongoing research of native microbes in the agricultural sector with potential for developing ABS products.</p> <p>The sustainability of this new project also relies on the government's commitment to implementation of the Nagoya Protocol and the partnerships that will be established with multiple stakeholders, including the participation of the private sector for the development of a crop protection agent for the coffee industry.</p>	<p>CEO ER, 7) Innovativeness, sustainability and potential for scaling up.</p>
<p>Private Sector Engagement</p> <p>If there is a private sector engagement, is there an elaboration of its role as a financier and/or as a stakeholder?</p> <p>3-29-20</p> <p>The engagement of the Private Sector is not clear. Please list the companies in the Stakeholder engagement. If confidentiality issues are a concern, please send an email to the PM to be filed under Confidential Documents.</p>	<p>Thank you for your comment; yes, the project engaged the private sector company Advanced Biocontrollers S.A. Please see the co-financing letter of Advanced Biocontrollers S.A.</p> <p>The project will also promote the negotiation of an ABS agreement between the government and Advanced Biocontrollers S.A. (private sector company) for the crop-protection product developed by national scientists under the new Component 1. Advanced Biocontrollers, S.A. is now explicitly mentioned in the stakeholder engagement section and Stakeholder Engagement Plan.</p>	<p>CEO ER Part II, Private Sector Engagement, paragraph 36, page 17.</p> <p>Project Document, Section V. Results and Partnership; and Annex 7</p>

Coordination

Is the institutional arrangement for project implementation fully described? Is there an elaboration on possible coordination with relevant GEF-financed projects and other bilateral/multilateral initiatives in the project area?

3-29-20

1) Is the "National Technical Coordinator also involved in providing technical support to research of active compounds for the medical sector. (Total cost: \$25,932 over four years -all outputs in component)?

2) Budget items 6c), 6d) and 6D) are not GEF eligible. Use co-financing

3) No work with Mice is GEF eligible. Provide details on the international travel.

4) Reconsider budget items under 8. Are they strictly necessary?

5) Is the National Technical Coordination an expert on "crop protection" in addition to "research of active compounds for the medical sector" (Point 1 in this review). This person needs to be under PMC.

6) Remove incidentals and allocate to specific uses. Is 13) Necessary?

7) Also an expert on ABS?

8) Are all these training events really necessary?

9) Remove and allocate to a specific activity

1. The National Technical Coordinator was removed from the technical components and is now under PMC as Project Coordinator, which will be paid with GEF funds (13%) and co-financing (87%).

2. Budget items 6c), 6d), and 6D) were removed as suggested.

3. In vivo trials with mice were removed.

4. Budget items under 8 were removed.

5. Please refer to the answer to comment 1 above.

6. Line 12 was reallocated as suggested. Line 13: Yes, it is necessary for stakeholder engagement.

7. Please refer to the answer to 1 above.

8. The training events listed are necessary for stakeholder engagement, strengthening skills, and knowledge for public officials, scientists, lawyers, private sector, NGOs, and other stakeholders that are relevant for the implementation of the Nagoya Protocol.

9. Incidental expenses related to project management were reallocated as suggested.

Project Document, Section X. Total Budget and Work Plan, budget notes

<p>Knowledge Management</p> <p>Is the proposed “Knowledge Management Approach” for the project adequately elaborated with a timeline and a set of deliverables?</p> <p>3-29-20</p> <p>KM needs to have activities. They don't need to be numerous, but need to be listed.</p> <p>The following is not acceptable "The cost of the implementation of the project knowledge management strategy is represented in the National Technical Coordinator's salary".</p>	<p>The project will develop several KM activities, including:</p> <ol style="list-style-type: none"> 1. Relevant knowledge, good practices, and lessons learned are captured annually by the project team and used to inform management decisions. 2. Drafting of guidance manual and protocols related to ABS/conservation-based biological crop protection in coffee production systems (Outputs 2.2.1 and 2.2.2). 3. Sharing of experiences and expertise (e.g., participation in communities of practice, organizing seminars, trainings, and conferences) with relevant stakeholders (Outputs 2.1.1 and 2.2.3). 4. Ensuring coordination in terms of building complementarities, sharing best practices, and generating knowledge products of best practices related to ABS and biodiversity conservation and sustainable use with other ongoing initiatives. 5. Virtual platforms and innovative social media approaches will be considered. 	<p>CEO ER Part II, Knowledge Management, paragraph 40, page 18</p>
<p>Status of PPG utilization</p> <p>3-29-20</p> <p>Please point in the direction of the report or include if missing.</p>	<p>Please response above to comment under question 6. Is the status and utilization of the PPG reported in Annex C in the document?</p> <p>Also, please see Annex C of the CEO Endorsement Request document</p>	<p>CEO ER Annex C</p>
<p>Is CEO endorsement recommended? (applies only to projects and child projects)</p> <p>3-29-20</p> <p>No. Please address outstanding issues listed in the windows above. Please work with the OFP and Executing Agencies to DOWNSIZED the project, describe in detail and in simple terms what was achieved in the previous project, and what are the proposed activities in this new project. The GEF is available for consultation.</p>	<p>The project was significantly downsized as suggested; please refer to the B. Project Description Summary and to section 3) The proposed alternative scenario with a brief description of expected outcomes and components of the project in the CEO ER.</p>	<p>CEO ER, B. Project Description Summary, and 3) The proposed alternative scenario with a brief description of expected outcomes and components of the project</p>

ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: 50,000			
Project Preparation Activities Implemented	GETF/LDCF/SCCF Amount (\$)		
	Budgeted Amount	Amount Spent To date	Amount Committed

Project preparation grant to finalize the UNDP-GEF project document for project “Realising the potential of native microbes in the agricultural and medical sectors, in accordance with the Nagoya Protocol”	50,000.00	49,036.71	963.29
Total	50,000.00	49,036.71	963.29

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used)

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/CBIT Trust Funds or to your Agency (and/or revolving fund that will be set up)

N/A

ANNEX E: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

Map 1. Coffee farms in the project area: District of Boquete, Province of Chiriquí in western Panama.



Map 2. Coffee farms in the project area: District of Renacimiento, Province of Chiriquí in western Panama.



Map 3. Coffee farms in the project area: District of Tierras Altas, Province of Chiriquí in western Panama



Coffee farms in the project area.

District of Boquete, Province of Chiriquí in western Panama			
ID	Farm name	Location	
		X	Y

1	Café Princesa Janca	343114	973773
2	Café Suarez	337272	974085
3	Cafetalera Don Nery	336979	973466
4	Cafetales Don Alfredo - La Milagrosa	345497	970182
5	Damarli State	338519	970082
6	Elida State	336918	974278
7	Finca Casanga	340556	967675
8	Finca D&L	338504	966780
9	Finca Dindos	337411	973732
10	Finca Dos Jefes	339776	972269
11	Finca El Mirador	336302	977942
12	Finca El Velo-Hacienda La Esmeralda	337076	975328
13	Finca Gil Rubio	338307	972569
14	Finca Hacienda La Esmeralda - Palmira	339087	966768
15	Finca Horqueta	339199	976126
16	Finca Lérida	336790	974582
17	Finca Los Lajones	340563	968398
18	Finca Oasis	335998	972699
19	Fincas PSSA-Hacienda La Esmeralda	345832	970503
20	Hacienda La Esmeralda	339377	965913
21	Pam&Mike Finca	339035	969109
22	Panama Espresso EST1999	340668	970543
23	Sendero Culebra	337026	977763
24	Taylor Papa Lalo Coffee	338525	973252
25	Zona de Fincas Cañas Verdes - Hacienda La Esmeralda	335991	968931
District of Renacimiento, Province of Chiriquí in western Panama			
		Location	
ID	Farm name	X	Y
1	Asociación de Productores de Café de Renacimiento	303699	977158

2	Café Della Sera	301056	979050
3	Café Gallardo Zambrano	307315	978555
4	Café La Jabita	295545	979082
5	Cafetal Aguilar Peralta	307363	978646
6	Finca Aguilar Barroso	307145	978651
7	Finca Café de Eleta	306452	982387
8	Finca Café Gallardo	298671	978550
9	Finca Don Bosco	306965	982558
10	Finca Hartmann	306347	978140
11	Finca Herca Internacional	299849	978980
12	Finca La Llorona	308817	979436
13	Finca Las Palmas	299616	978996
14	Finca Momoto-Flia Hartmann	307947	979619
15	Finca Moravia	306356	977168
16	Guarumo Coffee Farms	308704	980742
17	Santos Café	301911	976874
District of Tierras Altas, Province of Chiriquí in western Panama			
		Location	
ID	Farm name	X	Y
1	Café Olé	329603	979172
2	Finca Bajo Grande	312947	973257
3	Finca Café Don Lara	324558	978685
4	Finca Janson	316251	970632
5	Finca La Florentina	320585	975142
6	Finca Lara	324328	978733



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