AFB/PPRC.26.a-26.b/48
19 March 2020

Adaptation Fund Board
Project and Programme Review Committee

PROPOSAL FOR INNOVATION SMALL GRANT FOR DOMINICAN REPUBLIC

Background

1. At its thirtieth meeting, having considered document AFB/B.30/5/Rev.1, the Adaptation Fund Board decided:

> *(a) To adopt the medium-term strategy as amended by the Board, as contained in the Annex 1 of the document AFB/B.30/5/Rev.1 (the MTS); and*
>
> *(b) To request the secretariat:*
>
> *(i) To broadly disseminate the MTS and work with key stakeholders to build understanding and support;*
>
> *(ii) To prepare, under the supervision of the MTS task force, a draft implementation plan for operationalizing the MTS, containing a draft budget and addressing key assumptions and risks, including but not limited to funding and political risks, for consideration by the Board at its thirty-first meeting; and*
>
> *(iii) To draft, as part of the implementation plan, the updates/modifications to the operational policies and guidelines of the Adaptation Fund needed to facilitate implementation of the MTS, for consideration by the Board at its thirty-first meeting.*
>
> *(Decision B.30/42)*

2. Pursuant to decision B.30/42, subparagraph b (ii), the secretariat prepared a draft implementation plan for the MTS, including an assessment of assumptions and risks. The secretariat shared a version of the draft with the MTS task force for comments.

3. The draft implementation plan also contains suggestions for specific funding windows that might be opened under the MTS in complement of the Fund's existing funding windows for single-country and regional adaptation projects and readiness support projects. Following the approval of the implementation plan, the secretariat would present specific proposed details for each new funding window at subsequent meetings of the Board for its consideration, in accordance with the timeline contained in the implementation plan.

4. At its thirty-first meeting, the Adaptation Fund Board discussed the draft implementation plan for the MTS, and members of the Board proposed amendments to the document. The secretariat then presented a revised draft, in document AFB/B.31/5/Rev.1. Having considered that document, the Board decided:

> *(a) To approve the implementation plan for the medium-term strategy for the Fund for 2018–2022 contained in the Annex I to document AFB/B.31/5/Rev.1 (the plan);*
>
> *(b) To request the secretariat:*
>
> *[…]*
>
> *(iii) To prepare, for each proposed new type of grant and funding window, a specific document containing objectives, review criteria, expected grant*

sizes, implementation modalities, review process and other relevant features and submit it to the Board for its consideration in accordance with the tentative timeline contained in Annex I to document AFB/B.31/5/Rev.1, with input from the Board's committees;

(iv) Following consideration of the new types of support mentioned in subparagraph (b)(iii), to propose, as necessary, amendments to the Fund's operational policies and guidelines Fund to better facilitate the implementation of such new types of support; and

[…]

(Decision B.31/32)

5. At its thirty-second meeting, the Board considered document AFB/PPRC.23/4/Rev.2, *Program on Innovation: Small Grants Projects through Direct Access Modality*, and the Board decided:

(a) To approve the process for providing funding for innovation through small grants to National Implementing Entities (NIEs), as described in document AFB/PPRC.23/4/Rev.2, including the proposed objectives, review criteria, expected grant sizes, implementation modalities, review process and other relevant features as described in the document; and

(b) To request the secretariat to prepare the first request for proposals to NIEs for US$ 2 million, to be launched at the twenty-fourth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change in December 2018.

(Decision B.32/4)

6. Subsequently, the first request for proposals to NIEs for US$ 2 million was launched at the UNFCCC Conference of the Parties in December 2018.

7. Pursuant to decision B.17/15, the secretariat is submitting to the PPRC the final technical review of the project prepared by the secretariat, along with the final submission of the proposal in the following section. In accordance with decision B.25/15, the proposal is submitted with changes between the initial submission and the revised version highlighted.

ADAPTATION FUND

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Innovation Small Grant

Country/Region: **Dominican Republic/ Latin America and Caribbean**
Project Title: **Strengthening of a Replicable Micro Ecosystem of Accelerated Technological Innovation for Adaptation and Mitigation to Climate Change in Dominican Republic through the Development of a Pilot Thermo Solar Desalination Appropriate Technology**
Thematic Focal Area: **Water management**
Implementing Entity: **Instituto Dominicano de Desarrollo Integral (IDDI)**
AF Project ID: **DOM/NIE/Water/2020/1/Innovation**
IE Project ID: Requested Financing from Adaptation Fund (US Dollars): **249,929**
Reviewer and contact person: **Bianka Kretschmer** Co-reviewer(s): **Saliha Dobardzic**
IE Contact Person:

Technical Summary	The overall objective of the project "Strengthening of a Replicable Micro Ecosystem of Accelerated Technological Innovation for Adaptation and Mitigation to Climate Change in Dominican Republic through the Development of a Pilot Thermo Solar Desalination Appropriate Technology" is the acceleration of the use of innovative technologies for adaptation to climate change of vulnerable marine-coastal areas. This will be done through the three components below: Project/Programme Background and Context: The water resources and water supply systems of the Dominican Republic are highly vulnerable to current and anticipated climate change impacts including droughts, storms and floods, impacting the productive sectors (agriculture, forestry, etc.) that sustain the livelihoods of the majority of the population, especially in rural areas. At the same time, there is low technological innovation and private sector engagement hindering the uptake of innovative climate adaptation technologies in Small Island Developing States such as Dominican Republic. Component 1: Accelerated Development of an appropriate desalination technology including the prototype for testing at a Dominican Republic University (USD 40,800) Component 2: Design and establishment of a process to test adaptation technologies in marginalized coastal communities, including the training of these communities for the management and operation of adaptation

	technologies (USD 159,195) Component 3: Knowledge management to capture and disseminate lessons learned (USD 26,950) Requested financing overview: Project/Programme Execution Cost: USD 3,404 Total Project/Programme Cost: USD 230,349 Implementing Fee: USD 19,580 Financing Requested: USD 249,929 The initial technical review finds that the proposal aims to develop and pilot technology for addressing a major vulnerability in in Dominican Republic and other coastal communities around the world. While there is high potential for innovation and scaling up of a new desalination technology, the technology has not yet been fully developed. Further potential for innovation lies in the process of co-creation and co-financing of technological development with the private sector in a small island developing state. The review raises some issues with regard to the full cost of adaptation reasoning and the co-financing included in the project budget, as discussed in a number of Clarification Requests (CRs). The final technical review finds that the requests for clarification have been sufficiently addressed. Project activities and the related budget have been revised to achieve project outcomes independently from co-financing from the private sector, in line with the full cost of adaptation reasoning. The private sector will be engaged to enable scaling up of the technology once tested, contributing to the cost-effectiveness of the AF funded intervention. The revised project components are appropriate in the context of the objective of the small grants for innovation. The goal is the accelerated development and scaling up of an urgently required adaptation technology that would be appropriate for small, marginalised communities in tropical contexts, based on a concept that has been developed specifically for this context. There is high potential for scaling up of such a technology to other affected coastal communities. Lastly, the selected project site in Montecristo seems well suited for the pilot testing.
Date:	February 28, 2020

Review Criteria	Questions	Comments 6 February 2020	Comments 28 February 2020

Country Eligibility	1. Is the country party to the Kyoto Protocol?	Yes.	
Project Eligibility	2. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	Yes, the endorsement letter is dated January 14, 2020.	
	3. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?	Yes, the climate adaptation reasoning and vulnerability is evident in the proposal. The water resources and water supply systems of the Dominican Republic are highly vulnerable to current anticipated extreme weather events, including storms, hurricanes, droughts and floods. Sea-level rise further causes saltwater intrusion of groundwater. These climate change impacts pose special challenges to water and food security, in particular in rural and marginalized communities. All the components appear to have concrete adaptation potential. Especially the largest component 2 on Pilot testing the new and disruptive adaptation technology of a solar thermal desalination plant, including training of the coastal community would provide tangible benefits related to increased water and food security. However, this component seems to be dependent on the success of component	

		1, where the private sector would be expected to finance the early stages of technological development and prototypes of the selected technology would be developed and tested in the United States. The proposal states that this "international innovation micro ecosystem" has already been established. While this proposed approach of joint development or co-creation of technologies for adaptation with involvement of the private sector has high potential for innovation, it raises questions with regard to the Adaptation Fund's full cost of adaptation reasoning[1], especially since the AF-funded project components and budget include activities that will not be financed by the AF but by the private sector. **CR1:** Kindly clarify which the full cost of adaptation rationale and whether AF resources would be used for activities for which the budget indicates "co-financed by the private sector". Perhaps consider, if possible, to revise the budget to include AF-funded activities only. To what extent will activities financed by the AF be dependent on the outcomes of activities to be financed by other actors such as the private sector? What would be the risks	**CR1: Addressed.** Project activities and the related budget has been revised so that activities financed by AF will not depend on the outcomes of activities to be financed by other actors such as the private sector.

[1] Instructions for preparing a request for small innovation grant, section G justification for funding requested/ full cost of adaptation reasoning: "Therefore, the proposal should demonstrate that the project/programme activities are relevant in addressing its adaptation objectives and that, taken solely, without additional funding from other donors, they will help achieve these objectives. Although co-financing is not required, it is possible and often cost-effective to implement Adaptation Fund projects in parallel with projects funded from other sources. In such a situation, the Adaptation Fund project should be able to deliver its outcomes and outputs regardless of the success of the other project(s)."

		and implications for components 2 and 3, if component 1 will not be successful in leveraging co-financing from the private sector for the R&D element of developing early stages of technology?	
	4. Does the project encourage or accelerate development of innovative adaptation practices, tools and technologies?	Yes, the aim of the project is to demonstrate that it is possible to accelerate the joint development or co-creation of technologies for adaptation to climate change in an appropriate scale and in a volume that has an impact in coastal communities in small island countries of the Caribbean and around the world. The proposed innovation includes an innovative adaptation technology ("the first on disruptive solar thermal desalination"), as well as an innovative method for leveraging financing for technology development from the private sector. The proposal can be read as being focused on R&D rather than developing a prototype of an existing solution for piloting in the Dominican Republic. While the potential for innovation is overall well justified, the proposal could benefit from more clarity on the technology to be piloted and how it was selected, and the link between AF-funded activities and activities funded by other funders (see CR1). **CR2:** Kindly clarify to what extent the project objective is R&D or the	**CR2: Addressed.** Based on the project revisions and justification provided, the objective is the accelerated development and scaling up of an urgently required adaptation technology that would be appropriate for small, marginal communities in tropical contexts. A concept for such a technology has been developed. The aim is to test that technology first in a lab environment and then in a real coastal community environment. The R&D component of the project is only 16 per cent of the total budget.

		development of a first prototype of an existing solution in the Dominican Republic.	
	5. Does the project help generate evidence base of effective, efficient adaptation practices, products or technologies, as a basis for potential scaling up?	Yes, if components 1 and 2 are successful, component 3 on KM will have high potential to disseminate lessons learned to other NIEs with similar challenges. Provided, these components are successful, there will also be high potential for scaling up of the tested solar thermal desalination technology "to thousands of desalination machines over the next five years, generating potable water at a similar or lower cost than the current best alternative (Reverse Osmosis), but with a much lower initial investment" (page 17).	
	6. Does the project engage, empower and/or benefit the most vulnerable communities and social groups?	Yes, the proposal targets a low-income and marginalised coastal community in the highly-vulnerable Montecristi region. However the proposal lacks information on how the community will be selected and how the project benefits the different marginalized and vulnerable social groups identified in the project context ("This population includes women and men who are heads of household, small farmers, landless peasants, microentrepreneurs, small merchants, agricultural workers and workers of rural service providers. These groups are particularly vulnerable, and not only suffer	**CR3: Addressed.** Information on the selected project location and benefits to this coastal community are clear. The project location has over 300 cooperatives, including women-led cooperatives. Activity 2.3 "Selection of the specific site in the coastal community" will select cooperatives, with emphasis on women-led cooperatives.

		from low income and poor living conditions, but also from social exclusion. In all these groups, women (heads of household) and children are the most vulnerable, due to the lack of targeted opportunities and because they are not beneficiaries of many types of social assistance programs" (page 4). **CR3:** Kindly provide more information on how the low-income coastal community will be selected, and how the identified social groups will benefit from the project.	
	7. Does the project advance gender equality and the empowerment of women and girls?	Yes, the project is committed to empowering women and girls by the following elements: - training the women of cooperatives so that they are the ones who manage and operate the desalination plants. - establishment of a disruptive mechanism to transfer a % of royalties generated by the sales of the technology worldwide to a women led organization - removing barriers to equal access such as selection and decision-making criteria that exclude women **CR4:** Kindly provide an estimated number of direct and indirect beneficiaries by gender.	**CR4: Addressed.**

Resource Availability	1. Is the requested project funding within the parameters for small grants set by the Board?	Yes.	Yes.
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project budget before the fee?	Yes. The IE fee is at 8.5 per cent.	Yes, in the revised budget too the IE fee remains at 8.5 per cent.
Implementation Arrangements	1. Is the project submitted through a National Implementing Entity accredited by the Board?	Yes. Instituto Dominicano de Desarrollo Integral (IDDI) is an NIE accredited with the Adaptation Fund.	
	2. Is the timeframe for the proposed activities adequate?	The proposed duration from project start to project closure is 11 months. **CR5:** Kindly clarify the feasibility of project activities in this rather short project period, given that the project includes the building of a prototype, testing of the prototype in a costal community, and dissemination of lessons learned.	**CR5: Partially addressed.** The project duration has been revised to 16 months in addition to narrowing the scope of project activities. However, the disbursement schedule contains three tranches (including two tranches in one year), which does not align with the AF's practice of issuing tranches annually upon clearance of the Project Performance Reports.
	3. Is a summary breakdown of the budget for the proposed activities included?	Yes.	

PROGRAMME ON INNOVATION:
SMALL GRANTS PROJECTS THROUGH DIRECT ACCESS MODALITY

REQUEST FOR PROJECT FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project must be fully prepared when the request is submitted.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN P4-400
Washington, D.C., 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: afbsec@adaptation-fund.org

PROGRAMME ON INNOVATION: SMALL GRANT PROJECT PROPOSAL

PART I: PROJECT INFORMATION

Country:	Dominican Republic
Title of Project:	Strengthening of a Replicable Micro Ecosystem of Accelerated Technological Innovation for Adaptation and Mitigation to Climate Change in Dominican Republic through the Development of a Pilot Thermo Solar Desalination Appropriate Technology
National Implementing Entity:	Instituto Dominicano de Desarrollo Integral (IDDI)
Executing Entity/ies:	IDDI;
Amount of Financing Requested:	US$249,929 ~~US$249,560~~

Project Background and Context:

Countries, especially island countries such as the Dominican Republic, are facing diverse impacts of climate change, such as increased temperature, changes in rainfall patterns leading to increase droughts and floods, sea level rise, and increased intensity and frequency of extreme weather events. These effects are seriously impacting all social and economic aspects of society, including the availability of natural resources and the security of livelihoods, threatening agricultural production, food systems, the availability of water, as well as peoples' health and safety. Solutions to cope with climate change and to adapt to its negative effects are therefore inseparable from socio-economic issues and the achievement of the Sustainable Development Goals (SDGs) in all developing countries.

The 2018 Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5ºC underscores the challenges ahead as climate change intensifies. It details how climate variability and extreme events will escalate with increased global temperatures and indicates that many impacts will be irreversible, particularly on ecosystems and biodiversity, or difficult to manage above 1.5ºC. Key messages of 'high confidence' are that:

- Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels;
- Future climate change risks depend on rate, peak and duration of warming;
- Temperature extremes on land are projected to warm more than global mean surface temperature with the highest increases felt in the tropics;
- Sea level rise will continue beyond 2100 even if global warming is limited to 1.5ºC;
- Coral reefs are projected to decline by a further 70 to 90 percent at 1.5ºC with losses of 99 percent at 2ºC; the risk of irreversible loss of many marine and coastal ecosystems increases with global warming at 2ºC;
- Global warming of 1.5ºC is projected to increase the damage to ecosystems and drive the loss of coastal resources and reduce the productivity of fisheries and aquaculture at 1.5ºC; and

- Some vulnerable regions, including small islands and Least Developed Countries are projected to experience high multiple interrelated climate risks even at global warming of 1.5ºC.

The latest IPCC report[2] identifies a wide range of adaptation options that are available to reduce the risks to natural and managed ecosystems (e.g., ecosystem-based adaptation, ecosystem restoration and avoided degradation and deforestation, biodiversity management, sustainable aquaculture, and local knowledge and indigenous knowledge), the risks of sea level rise (e.g., coastal defense and hardening), and risks to health, livelihoods, food, water, and economic growth, especially in rural landscapes (e.g., efficient irrigation, social safety nets, disaster risk management, risk spreading and sharing, and community-based adaptation), and urban areas (e.g., green infrastructure, sustainable land use and planning, and sustainable water management).

In order to implement these options, the IPCC report identifies the need for widespread adoption of new and possibly disruptive technologies and practices and enhanced climate-driven innovation. These imply enhanced technological innovation capabilities, including in industry and finance.

The Dominican Republic has an estimated population of 10.03 million, with a population growth rate of approximately 1.2% (ONE, 2018). 50.2% are women, however, inequalities in access to public services, employment and other opportunities are evident. Also, gender violence, child marriage and teenage pregnancies pose major problems for the country's development.

According to recent official figures, almost 50% of the country's households live in poverty and more than 10% live in extreme poverty. In rural areas, the poor population exceeds 60% (Morillo P., 2014). This population includes women and men who are heads of household, small farmers, landless peasants, microentrepreneurs, small merchants, agricultural workers and workers of rural service providers. These groups are particularly vulnerable, and not only suffer from low income and poor living conditions, but also from social exclusion. In all these groups, women (heads of household) and children are the most vulnerable, due to the lack of targeted opportunities and because they are not beneficiaries of many types of social assistance programs (Berigüete, 2015).

The main economic activities of the country are tourism, free zones, remittances, agriculture, services and, more recently, mining. After services and industry, the agricultural sector is the most demanding workforce and is based, in large part, on subsistence farming, centered on rice, fruits, coffee, cocoa, vegetables and cattle raising. The agricultural sector occupies 14% of the economically active population and presents 5.6% of GDP (Central Bank, 2016). The industry is very important in the economy and focuses on the production of sugar, mining, textiles and tobacco, among many others.

Two of the four main areas of the 2030 National Development Strategy focus on: c) a sustainable, inclusive and competitive economy; and d) an environmentally sustainable production and consumption society that adapts to climate change.

The Dominican Republic, like most island countries, especially SIDS, is particularly vulnerable to climatic phenomena. As the country is in the Caribbean, it is affected by the variable recurrence of climatic phenomena and, seasonally and frequently, it is affected by extreme hydrometeorological events (i.e. storms, hurricanes and droughts). This climate vulnerability is exacerbated by a combination of human and socio-economic factors: such as the presence of

[2] Global Warming of 1.5 ºC, October 2018, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf

populations in areas prone to flooding and landslides, eroded by subsistence agriculture and poorly managed settlements (World Bank, 2011).

Therefore, IDDI has created a National Council of Resilient Cities, to address the vulnerabilities induced by the impacts of climate change through cooperation between different councils such as a platform and a network to work on adaptation measures at the local level and national. In its 2016 version, the Climate Risk Index, a global analysis based on one of the most reliable data sets available, in relation to the impacts of extreme weather events and associated socio-economic data, classifies the Dominican Republic as the Tenth country most vulnerable to the impacts of climate change (Germanwatch, 2016). According to the same source, Haiti is the second nation in the same classification, which means that the island of Hispaniola will be affected by climate change in the short, medium and long term; and that a complete and integral adaptation is not only necessary, but urgent. Agricultural production is affected by natural disasters, so food sovereignty is vulnerable, mainly in rural and vulnerable communities.

Climate change presents societies with a variety of new challenges, especially in the poorest areas, as changes in average temperature affect food productivity and water availability, causing another burden of malnutrition, diarrheal diseases and other infections transmitted through water and air (Huq, 2014). The water resources and water supply systems of the Dominican Republic are vulnerable to current weather patterns, their variability and anticipated droughts and floods. Drinking water consumption has been growing rapidly. In the last 20 years, being the extraction of water from rivers, ravines and wells the main source of supply is more contaminated by the use of chemicals for agricultural activity and poor drainage systems. Water-related health problems affect the majority of the poor population who cannot buy drinking water. In relation to this, IDDI has implemented different projects on access and water management and we have the support and good relations with INAPA, the National Institute of Potable Water and Sewerage. Similarly, the productive sectors (agriculture, forestry, etc.) that sustain the livelihoods of the majority of the population, especially in rural areas, are also severely affected by climatic patterns that affect water resources and supply.

Failures in the innovation ecosystem for generating appropriate technologies for adaptation to climate change

Of the various reasons and causes related to low technological innovation in non-industrialized countries and regions, there are four that are very important:

- The current process of technology development is seen as a process based on linear scientific research (it is not);
- Total disconnection between economic development policies and industrial property policies related to technological development in non-industrialized countries;
- The lack of understanding of the process of technology development by the majority of innovators and entrepreneurs who tend to have a vision of local markets; and
- Wrong view that technological innovation occurs in universities.

Of the various reasons and causes related to the low generation of appropriate technologies for adaptation and mitigation of climate change, are the following:

- The private sector in industrialized countries that generates technologies and that have the capacity to dedicate substantial financial resources for the research and development of technologies, look for very large markets with economies of scale, and not distributed markets such as SIDS;

- Bilateral and multilateral organizations seek, with good intentions, mainly technology transfer, but their different missions and interests are not necessarily oriented towards an accelerated development of new adaptation technologies (this would involve a strong commitment of the private sector);

- The financing of multilateral banks in technological innovation is highly concentrated in technologies derived from scientific processes, managed by ministries of science and technology and closely tied to the financing of projects in public universities.

Here is the interesting thing about the new approach to innovation that the Adaptation Fund is making through its “Innovation Grants” program. This program is contributing to a shift from low innovation to a more accelerate innovation for adaptation to climate change, especially of marginal communities (appropriate technologies).

Need to involve the private sector, especially at a global level

There is a great opportunity to develop new modular technologies for the adaptation and mitigation of climate change, of appropriate sizes and costs for coastal communities in the small island countries of the Caribbean and around the world.

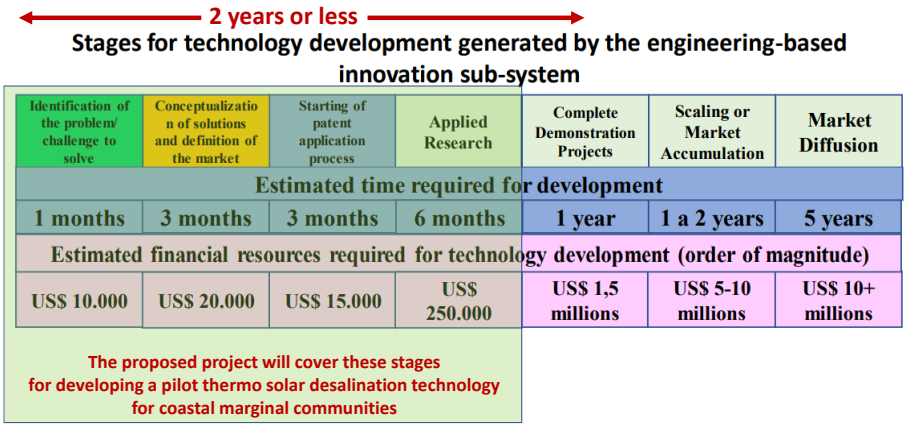
These technologies, easy to conceptualize and prototype, once developed, could have an immediate market within the Caribbean and through small island developing states (SIDS). Also, they can be sold to industrialized countries.

For the private sector to contribute in an efficiently and accelerated manner in the development and commercialization of technologies for climate change adaptation, these technologies must be profitable. One of the most important requirements in guaranteeing the commercialization of technologies worldwide is its industrial protection (through patents) worldwide. Patents not only guarantee access to initial markets (especially for new technologies), but they are also a basic requirement for private investors to invest in such technologies.

In a disruptive way, these technologies can be developed through a process of co-creation between Dominican private companies and small and medium-sized companies in the United States, including those with Dominican partners residing or citizens of the US.

It is important to mention that any technological development that has an impact worldwide is relatively expensive. A typical process of developing new technologies, especially engineering technologies aimed at adapting to climate change, is presented in Figure 1. As you can see, the first four stages of development can be in the order of US $ 300,000.

Figure 1



This co-creation of technologies between companies in the Dominican Republic, and the United States, would enable future access to federal and private US funds for the development of the ~~first five stages~~fifth stage of technology development, ~~especially~~ the funds required for full demonstration projects to real scale in real environments. The proposed project considers of importance two key processes for an accelerated development of new technologies for adaptation to climate change: a) an effective process of identification, idealization, conceptualization of new technologies, including the development of their patents, proof of concepts and development of prototypes and minimum viable products; and b) a structural process for the effective leverage of the financial resources necessary to cover all the stages of the development of new technologies (in the order of US $ 1 to 2 million the first 24 months).

The access of the private sector to amounts in the order mentioned above for the first stages of the development of new technologies occurs only in few countries of the world, being the United States the country with the greatest amount of federal aid and adventure capital oriented to innovation and directed to the private sector. That is why a strategic alliance is proposed in this project, between a Dominican technology development company and a small or medium-sized company in the United States. In this way, access to the financing required for the development of technologies in a structural manner would be enabled.

The overall objective of the project is the acceleration of the development of climate change adaptation and mitigation technologies in marine-coastal areas, especially island countries (large and SIDS), through the strengthening of an international micro ecosystem of accelerated technological co-creation that It is already in formation. This ecosystem has already identified a set of specific technologies that, when developed, will have a significant impact on the communities to be used and in both an accelerated productive adaptation, and mitigation of greenhouse gases once commercialized globally. Simplified schemes of the accelerated technological innovation micro ecosystem to be strengthened in the proposed project is presented in Figures 2 and 3.

Figure 2

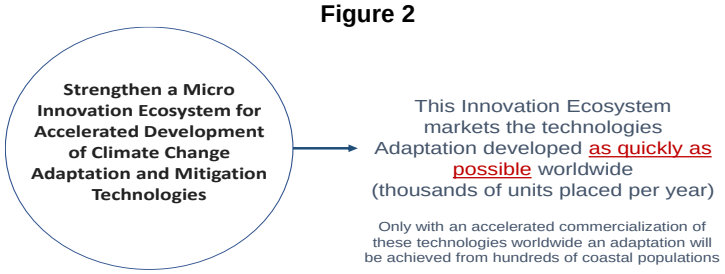
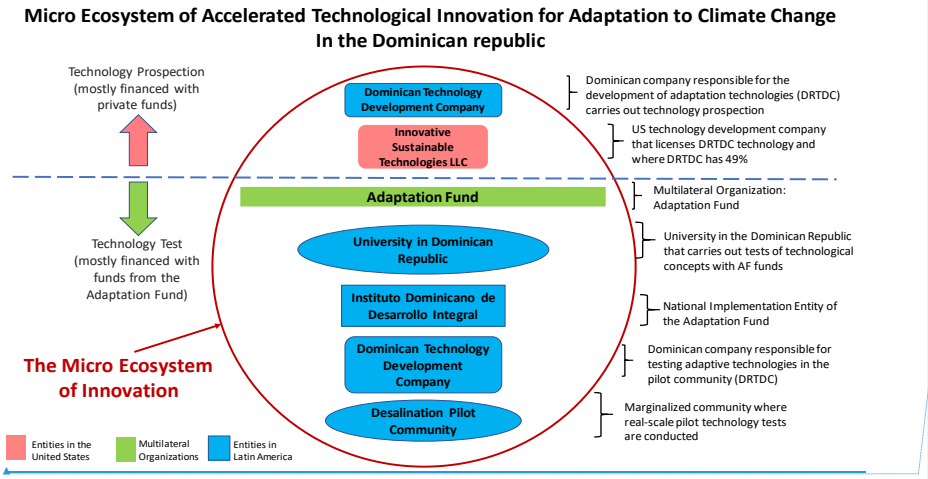


Figure 3



~~Figure 3~~

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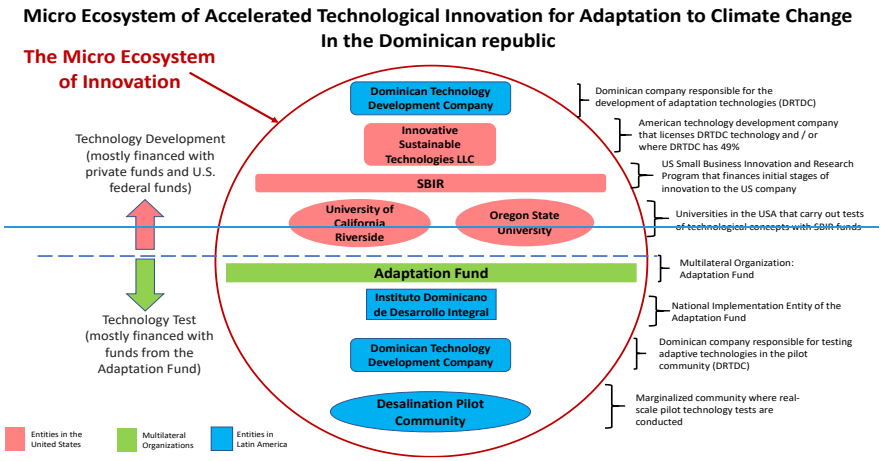
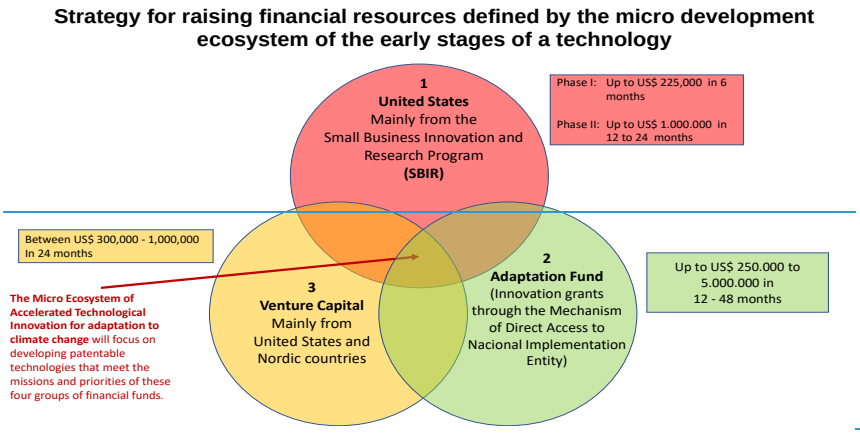
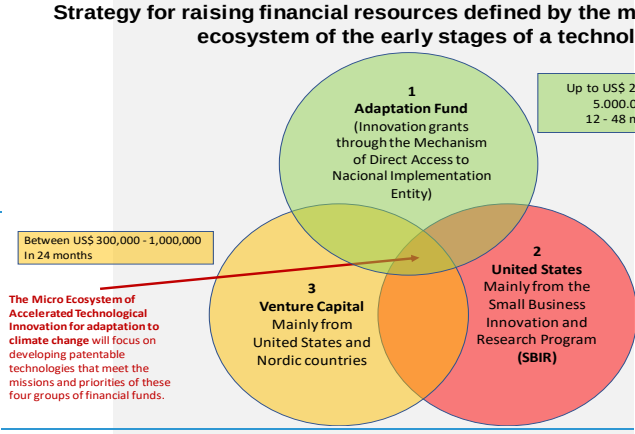


For financing the first five stages of the development of new technologies presented in Figure 1 (the first 24 months), the innovation micro ecosystem will focus on the following sources of financing:

Figure 4

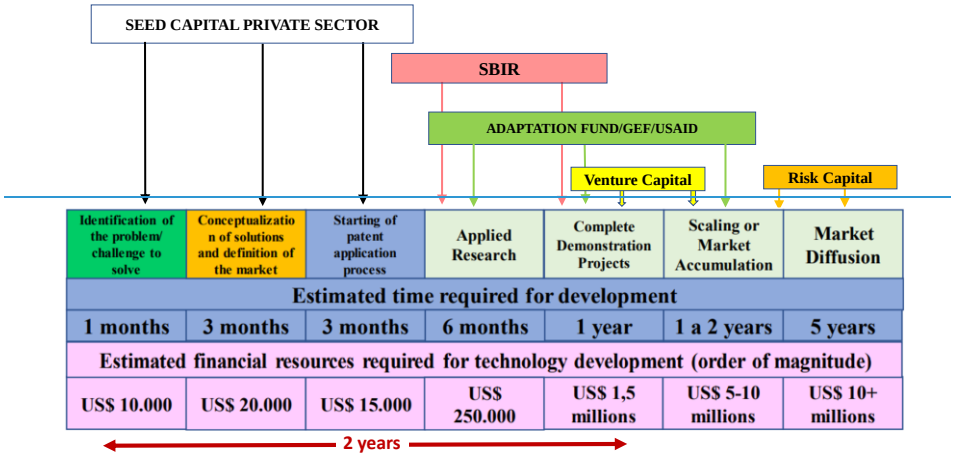




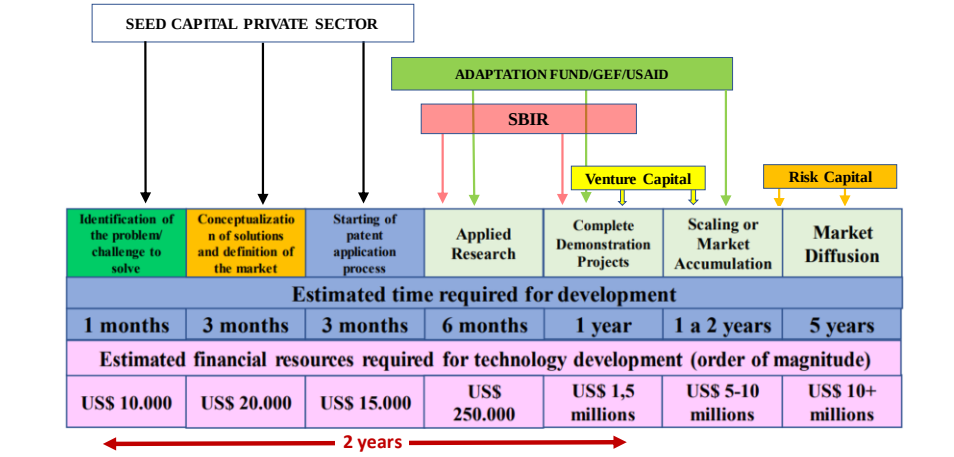
The financing strategy of the technological development stages using the sources mentioned above and others, is presented in Figure 5.

Figure 5

Stages of the financing strategy promoted by the Micro Innovation Ecosystem for the accelerated development of adaptation technologies



Stages of the financing strategy promoted by the Micro Innovation Ecosystem for the accelerated development of adaptation technologies



To develop these technologies in an accelerated manner, the newly formed micro innovation ecosystem also considers an efficient technical process or technology development methodology. The main characteristics of the new climate change adaptation technologies that the micro ecosystem will develop will be their modularity, their low cost and their ability to be placed in a distributed manner. Technologies that have a worldwide demand in hundreds of thousands of units will be considered.

To identify appropriate technologies that have a large international market and a commercial potential that guarantees their worldwide scaling, technological prospecting is used to prioritize

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technologies to be developed (proof of concepts and minimum viable products) at an appropriate scale that allows for fast manufacturing, marketing and distribution.

Initially, the accelerated technological innovation micro ecosystem has already identified two technologies to develop, including:

- Modular systems for distributed generation of drinking water based on thermo solar desalination (with capacities of 1 to 20 m^3 per day per unit); and

- Modular dynamic floating breakwaters for coastal protection, especially to mitigate the risks of erosion and damage during hurricanes, storms and cam sea (hundreds of linear meters of breakwaters can be installed or removed within hours).

Based on a technological prospection and taking into account the experience of the Dominican Institute of Integral Development (IDDI) in climate change projects in the Dominican Republic, it was decided to proceed with the development and testing of a pilot system of distributed generation of drinking water based on thermo solar desalination. The floating dynamic breakwater is already being developed by other members of the ecosystem using the same scheme outlined at the top of the circle in Figure 3.

For the test of an initial prototype or minimum viable product of a pilot system of distributed generation of drinking water based on thermo solar desalination, it has been decided to identify a community in Montecristi in the northwest of the Dominican Republic. This mainly for two reasons: a) this region is very arid and requires water both for human consumption and for agricultural activities; and b) as in Montecristi there is an artisanal salt industry, with multiple cooperatives and micro salt producers, the proposed solar thermal desalination technology would help improve salt production and diversify the economic activities of cooperatives through the sale of drinking water and use of water generated for agricultural activities, including modular hydroponics.

The study of critical points for vulnerability to climate variability and change in the Dominican Republic and its adaptation to it, which analyzes climate vulnerability based on exposure, sensitivity and adaptive capacity in priority sectors (tourism, drinking water , agriculture, protected areas, energy and human settlements), provides the first map of multidimensional vulnerability to climate change in the country and for each province (Izzo et al., 2012).

The ecosystems and species of Montecristi National Protected Areas (NPPA-M) suffer direct pressure and degradation, both within protected areas and in surrounding landscapes. In these areas, the degradation caused by human activities is exacerbated by climate change (CC). The functionality of all current coastal-marine ecosystems (dunes, mangroves, seagrasses, wetlands and coral reefs) is compromised. Tourism, fishing, infrastructure development and the increase of the coastal population have caused massive losses of vegetation cover and soil erosion, generating large sediment loads that, in turn, have degraded coral reefs.

Mangrove losses are decreasing the productivity of fish stocks, affecting the food security of communities. Approximately 9,000 people of NPPA-M depend on fishery resources. Most commercial species depend on coral reefs and the health of mangroves. Many wetlands have been drained and filled, losing their functionality. Loss of vegetation cover reduced the ability of coastal ecosystems to retain carbon, exposing all coasts to greater CC vulnerability (i.e., damage from more severe storms, sea level rise, coastal losses, increased intrusion saline). Most of the government's efforts are focused on promoting tourism models based on large hotels.

Project Objectives:

The overall objective of the project is the acceleration of the development of technologies for adaptation to climate change of marine-coastal areas, especially in island countries (large and SIDS).

This general objective will be achieved through three specific objectives:

a) a) The development of an appropriate desalination technology including the prototype for testing at a Dominican Republic University and the~~The~~ strengthening of an international innovation micro ecosystem (already established) for the accelerated development of climate change adaptation technologies. This ecosystem involves the design and establishment of an innovative system for financing the early stages in technological development. Also, the ecosystem is knowledgeable about processes and methodologies for the idealization and accelerated conceptualization of patentable technologies.

b) The design and establishment of a process to test adaptation technologies in marginalized coastal communities, including the selection and awareness of pilot communities, and the training of these communities for the management and operation of adaptation technologies. This component includes the definition and establishment of a disruptive mechanism to transfer a % of royalties generated by the sales of the technology worldwide to a women led organization established; and

c) The design and establishment of a knowledge management process to capture and disseminate the lessons learned.

The three specific objectives above will be tested and validated through the development of a first pilot adaptation technology: a disruptive technology for the distributed generation of drinking water based on novel thermo solar desalination process (in the process of being patented).

Once the previous objectives have been validated, the ecosystem has already identified a set of specific technologies that, when developed, will have a significant impact on coastal communities in an accelerated productive adaptation.

Project Components and Financing:

Project Components	Expected Concrete Outputs	Expected Outcomes	Budget (US$)
COMPONENT 1 - Development of the Technology including the Prototype for Testing at a Dominican Republic University ~~COMPONENT 1 - Strengthening of~~	**Activity 1.1:** Design of a prototype to be tested at a Dominican Republic University. **Outputs**: a) Design of the prototype concluded.~~Activity 1.1: Alliance forging meetings for accelerated technological innovation in the Dominican Republic and establishment of an Alliance with a Small Business Enterprise in the USA. Outputs: 9. Signing of an adaptation technology licensing agreement; 10. Acquisition of 49% of the US company by the Dominican technology development company.~~	Accelerated development of appropriate size adaptation technologies. Innovative financing mechanism for the accelerated development adaptation technologies is established and validated. Incorporation of the private sector from the beginning in both the	5,450~~Co-financed by the private sector~~

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~~the International Micro Ecosystem for Accelerated Technology Development~~	**Activity 1.2:** Construction of a prototype to be tested at a Dominican Republic University. **Outputs**: a) Prototype built.~~**Activity 1.2:** Technological prospecting meeting to select the adaptation technology to develop and develop the patent portfolio in the Dominican Republic. **Outputs**:~~ ~~(k) Selected technology to be developed (Distributed Solar Thermal Desalination Plant);~~ ~~(l) Two provisional patent applications in the United States;~~ ~~(m) Two formal patent applications in the United States;~~ ~~(n) Two international patent applications via PCT with protection in 151 additional countries.~~	design of technologies and the leverage of funds for the development of the early stages of technology~~Establishment of an Innovation Ecosystem for Accelerated Development of Technologies for Adaptation to Climate Change very efficient. Accelerated development of appropriate size adaptation technologies. Innovative financing mechanism for the accelerated development adaptation technologies of established and validated. Incorporation of the private sector from the beginning in both the design of technologies and the leverage of funds for the development of the early stages of technology.~~	16,850~~Co-financed by the private sector~~
	Activity 1.3: Performing the first prototype test at a Dominican Republic University. **Outputs:** a) Prototype tested at a Dominican Republic University.~~**Activity 1.3:** Preparation and presentation of a "Pitch Project" to request funds in the United States. **Outputs**:~~ ~~5. Project Pitch submitted for US $ 225,000;~~ ~~6. Project Pitch approved by the SBIR.~~		18,500~~Co-financed by the private sector~~
TOTAL COMPONENT 1			**40,800~~17,600~~**
COMPONENT 2 - Pilot test of prioritized adaptation technology in a selected community in Dominican Republic~~COMPONENT 2 - Pilot test of prioritized adaptation technology in a selected community in Dominican Republic~~	**Activity 2.1:** Selection of the coastal community to test the new pilot adaptation technology. **Outputs**: a) Community to test the prototitpe (Minimum Viable Product) selected~~**Activity 2.1:** Selection of the coastal community to test the new pilot adaptation technology. **Outputs**: Community to test the prototitpe (Minimum Viable Product) selected~~	Adaptation technology developed and tested. Pilot community with access to drinking water in a distributed manner from the desalination of seawater. Pilot community with the possibility of diversifying its economic activities using the potable water generated by the disruptive adaptation technology. Mechanism of involving marginalized communities in the development of appropriate technologies established and	14,515~~9,920~~
	Activity 2.2: Consultation and awareness and training of the coastal community where new pilot adaptation technology will be tested. **Outputs**: a) Community selected for testing the minimum viable product of the technology consulted and sensitized; b) Community selected trained; and c) A disruptive mechanism to transfer a % of royalties generated by the sales of the technology worldwide to a women led organization established~~Consultation and awareness and training of the coastal community~~		12,~~2~~70~~12~~,400

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	~~where new pilot adaptation technology will be tested.~~ **~~Outputs~~**~~:~~ ~~B. Community selected for testing the minimum viable product of the technology consulted and sensitized;~~ ~~C. Community selected trained; and~~ ~~D. A disruptive mechanism to transfer a % of royalties generated by the sales of the technology worldwide to a women led organization established~~	validated. Women trained for the management and operation of adaptive technologies. A disruptive mechanism to transfer royalties generated by the sales of the technology worldwide to a women led organization established ~~Adaptation technology developed and tested. Pilot community with access to drinking water in a distributed manner from the desalination of seawater. Pilot community with the possibility of diversifying its economic activities using the potable water generated by the disruptive adaptation technology. Mechanism of involving marginalized communities in the development of appropriate technologies established and validated. Women trained for the management and operation of adaptive technologies. A disruptive mechanism to transfer royalties generated by the sales of the technology worldwide to a women led organization established~~	
	Activity 2.3: Selection of the site in the coastal community where the new pilot adaptation technology will be tested. **Outputs:** a) Site selected; b) Agreements with the owners of the site to carry out the test established.~~**Activity 2.3:** Selection of the site in the coastal community where the new pilot adaptation technology will be tested.~~ **~~Outputs~~**~~:~~ ~~• Site selected;~~ ~~• Agreements with the owners of the site to carry out the test established.~~		7,650~~5,100~~
	Activity 2.4: Design of the modified prototype to be tested at the coastal community. **Outputs**: a) Prototype/minimum viable product (MVP) designed.~~Construction of the modified prototype to be tested at the coastal community.~~ **~~Outputs~~**~~: Prototype/minimum viable product (MVP) built~~		5,200~~94,200~~
	Activity 2.5: Construction of the modified prototype to be tested at the coastal community. **Outputs**: a) Prototype/minimum viable product (MVP) built~~Performing all the necessary tests of the prototype in the selected community, including the operational procedures of technology placement.~~ **~~Outputs~~**~~:~~ ~~• MVP transported, placed at the specific site and put into operation;~~ ~~• Report of the results of the test developed.~~		80,680 ~~34,350~~
	Activity 2.6: Performing all the necessary tests of the prototype in the selected community, including the operational procedures of technology placement. **Outputs**: a) MVP transported, placed at the specific site and put into operation; b) Report of the results of the test developed.~~Development of a preliminary operating manual.~~ **~~Outputs~~**~~: Manual developed~~		22,610 ~~9,750~~
	Activity 2.7: Development of a preliminary operating manual. **Outputs**: a) Manual developed~~Development of final research and development reports.~~ **~~Outputs~~**~~: Final reports developed~~		6,000 ~~18,540~~
	Activity 2.8: Development of final research and development reports. **Outputs:** a) Final reports		10,270

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	developed		
TOTAL COMPONENT 2			**159,195184,260**
COMPONENT 3 - Knowledge management to capture and disseminate lessons learned~~COMPONENT 3 - Knowledge management to capture and disseminate lessons learned~~	**Activity 3.1:** Workshop to disseminate lessons learned for NIEs and focal points of the Adaptation Fund in the Caribbean Islands. **Outputs:** a) At least 15 National Implementation Entities and Focal Points of the Adaptation Fund in 15 Caribbean island countries sensitized and trained on the results of the adaptation project; b) Partnerships established for Phase II of the project; c) Possible request for funds for Phase II of the project developed for the Adaptation Fund and / or request for Full Size Regional Project for the GEF.~~**Activity 3.1:** Workshop to disseminate lessons learned for NIEs and focal points of the Adaptation Fund in the Caribbean Islands. **Outputs**:~~ ~~**B.** At least 15 National Implementation Entities and Focal Points of the Adaptation Fund in 15 Caribbean island countries sensitized and trained on the results of the adaptation project;~~ ~~**C.** Partnerships established for Phase II of the project;~~ ~~**D.** Possible request for funds for Phase II of the project developed for the Adaptation Fund and / or request for Full Size Regional Project for the GEF.~~	Strategy to replicate the project in other Caribbean islands initiated. Different entities of adaptation to climate change are incorporated into replica projects in their countries. Possibility to request multilateral funds together several countries~~Strategy to replicate the project in other Caribbean islands initiated. Different entities of adaptation to climate change are incorporated into replica projects in their countries. Possibility to request multilateral funds together several countries~~	26,95024~~,750~~
TOTAL COMPONENT 3			**26,95024~~,750~~**
3. Executing cost fee by IDDI (1,5%)			3,404~~3,399~~
4. Total cost of the Project			**230,349~~230,009~~**
5. Implementation fee (8,5%)			19,580~~19,551~~
Amount of financing requested			**249,929~~249,560~~**

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Projected Calendar:

Milestones	Expected Dates
Beginning of Project implementation	May 2020
Project closure	September 2021~~March 2021~~
Terminal evaluation	December 2021~~July 2021~~

PART II: PROJECT JUSTIFICATION

A. Describe the project components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience.

To develop these technologies in an accelerated way, the newly formed micro innovation ecosystems not only considers an efficient technical process or methodology for the development of technologies, but also the process of structured leverage of financial resources to be able to carry out said technological development in an accelerated manner and joint between companies in the Dominican Republic and small and medium enterprises in the United States.

To demonstrate that it is possible to accelerate the joint development or co-creation of technologies for adaptation to climate change in an appropriate scale and in a volume that has an impact, a three-component project / program is outlined:

COMPONENT 1 - **Development Development of the Technology including the prototype for Testing at a Dominican Republic University~~Strengthening of the International Micro Ecosystem for Accelerated Technology Development~~**

This component will develop and test, at a laboratory level, an appropriate technology for adaptation to climate change of coastal communities (a thermo solar desalination technology). Since the prospection and conceptualization of the technology has been carried out between Dominican Republic and US private entities, the result of the component also will strengthen an ~~Strengthening of the~~ existing international micro-ecosystem of accelerated technological co-creation to test an innovative mechanism for financing the early stages of technological development. This micro ecosystem includes the linking of creative private companies in the Dominican Republic and small and medium enterprises in the United States, with public organizations specializing in the financing of early stages of technological development, and bilateral and multilateral partners for the financing of proof of concepts and minimum viable products. Also, it includes the definition of a strategy to replicate the accelerated innovation co-creation model at a global level.

For the execution of this component, the following activities will be carried out:

~~**Activity 1.1:** Alliance forging meetings for accelerated technological innovation in the Dominican Republic and establishment of an Alliance with a Small Business Enterprise in the USA~~

~~**Activity 1.2:** Technological prospecting meeting to select the adaptation technology to develop and develop the patent portfolio in the Dominican Republic~~

~~**Activity 1.3:** Preparation and presentation of a "Pitch Project" to request funds in the United States~~

~~**Activity 1.4:** Preparation and presentation of a proposal Phase I SBIR NSF to request funds in the United States~~

Activity 1.~~5~~1: Design of a prototype to be tested at Dominican Republic University~~a university in the United States~~

Activity 1.~~2~~6: Construction of a prototype to be tested at a Dominican Republic University~~university in the United States~~

Activity 1.~~7~~3: Performing the first prototype test at a Dominican Republic University~~university of the United States~~

COMPONENT 2 - Pilot test of prioritized adaptation technology in a selected community in Dominican Republic

Activity 2.1: Selection of the coastal community to test the new pilot adaptation technology

Activity 2.2: Consultation and awareness and training of the coastal community where new pilot adaptation technology will be tested

Activity 2.3: Selection of the site in the coastal community where the new pilot adaptation technology will be tested

Activity 2.4: Design of the modified prototype to be tested at the coastal community

Activity 2.~~5~~4: Construction of the modified prototype to be tested at the coastal community

Activity 2.~~6~~5: Performing all the necessary tests of the prototype in the selected community, including the operational procedures of technology placement

Activity 2.~~7~~6: Development of a preliminary operating manual

Activity 2.~~7~~.8: Development of final research and development reports

COMPONENT 3 - Knowledge management to capture and disseminate lessons learned

Activity 3.1: Workshop to disseminate lessons learned for NIEs and focal points of the Adaptation Fund in the Caribbean Islands

B. Describe how the project provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project will avoid or mitigate negative impacts, in line with the Environmental and Social Policy of the Adaptation Fund.

For the private sector, the technology will generate revenue through international licenses (royalties) and exports.

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Communities served with adaptive technology, starting with the pilot community to be selected in Montecristi, will solve their problems associated with lack of access to drinking water, increase salt efficiency and productivity and diversify their economic inputs through the sale of water generated by the solar thermal desalination plant. Also, they will be able to explore the possibility of diversifying their business towards agricultural activity, and in particular hydroponics.

The project does not contemplate negative environmental and / or social impacts. It is the intention of the project promoters to train the women of the cooperatives so that they are the ones who manage and operate the desalination plants.

C. Describe how the project encourages or accelerates development of innovative adaptation practices, tools or technologies and/or describe how the project helps generate evidence base of effective, efficient adaptation practices, products or technologies, as a basis for potential scaling up

The strengthening of the international micro ecosystem of innovation for the accelerated development of climate change adaptation technologies considered in the proposed project is unique, not only because it focuses on adaptation to climate change but because for the first time it approaches the development of appropriate technologies to through a co-creation process, where the prioritization of what technologies to develop and their conceptualization is mainly carried out by companies in developing countries (Dominican Republic in this case) and the leverage of resources is combined with private sector resources from States United and multilateral resources from multilateral funds such as the Adaptation Fund. If the leverage of resources from the Small Business Innovation and Research Program the United States (SBIR) is established and strengthened, a permanent source of financing to the private sector of the risks associated with the early stages of technological development is guaranteed. All the technologies to be developed by the micro ecosystem will be modular and of appropriate size for island countries. They will be designed for easy transport, assembly and operation by local communities.

D. Please confirm whether the project meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and is in line with the Environmental and Social Policy of the Adaptation Fund.

The Program is aligned with the National Development Strategy, which states that the DR "fairly and effectively manages the risks and protection of the environment and natural resources and promotes adequate adaptation to climate change" as one of its four pillars. Among the 29 actions mentioned in this pillar, fresh water receives particular attention (FIN, 2012). In addition, the project is aligned with the 2030 Development Agenda of the Nations. Likewise, the Program is consistent with both the National Environment Policy and the National Climate Change Policy. All these policies point to the implementation of several strategies, such as the restoration of protective ecosystems, the custody and management of water resources and the achievement of universal access to water (Dominican Republic, 2010). On the other hand, the project seeks to support the development of strategic sectors of the region (Agriculture, Salt Production, and Tourism, among others), prioritized in the Provincial Development Plan prepared by MEPyD in 2017. In addition, the Program includes the main PNACC-RD recommendations:

- The vulnerability of poor communities and vulnerable groups will be a priority for the country, due to threats of climate change in human settlements and infrastructure.
- Institutional and community capacities will be strengthened to provide adequate responses to climate change problems and increase resilience.

- It is essential to promote partnerships that include the private sector and civil society to address climate change in areas with limited or low income; and
- Addressing climate change and its impacts needs to mobilize additional financial resources and capital to manage risks and promote technologies and innovation.

One of the key aspects of the Program is the development of community management approaches and the management of innovative pilot projects related to water resources, which do not have significant environmental impacts normally associated with the development of large infrastructure. Infrastructure investment is expected to be made as part of government and community programs to improve agricultural productivity and food and water security. The project is in line with the Environmental and Social Policy of the Adaptation Fund.

E. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned

As the technologies to be generated by the proposed ecosystem, including the first on disruptive solar thermal desalination, and its modularity and dimensions are oriented to island countries, it is considered to have a two-day workshop with about 15 NIEs and Focal Points of the Adaptation Fund from of Caribbean islands. In this workshop, not only will the results of an accelerated development of appropriate technologies be presented, but alliances and partners will be established for the design and implementation of Phase II of the project, which would involve scaling in three to four Caribbean islands. The workshop will also present a draft request for funds for Phase II, which the GEF will consider necessary, apart from the Adaptation Fund.

F. Provide an overview of the environmental and social impacts and risks identified as being relevant to the project. Describe how the project will engage, empower and/or benefit the most vulnerable communities and social groups, including gender considerations, in line with the Environmental and Social Policy of the Adaptation Fund.

Checklist of environmental and social principles	**No further assessment required for compliance**	**Potential impacts and risks – further assessment and management required for compliance**
Compliance with the Law	The program complies with the relevant national laws, regulations and policies; and complies with the country's relevant legal framework for water management and use, environmental protection and local rural development.	**Very low:** no current or potential risks related to compliance with the law were found during the implementation of the Environmental and Social Impact Assessment (EIAS).
Access and equity	The intervention logic of the project is to provide benefits in the most vulnerable communities, with fair and equitable access to activities, equipment, resources and training throughout the planning and execution phases. All individuals or groups that request participation will have the same opportunity to benefit from the adaptation activities proposed by the project. The eligibility criteria of the program are clear and transparent and defined together with the relevant stakeholders. The interventions of the project plan to remove barriers such as: difficulty of access to job opportunities; vulnerability in terms of food security; social vulnerability; and selection and decision-making criteria that exclude women. Through these criteria, the project will ensure the participation of less empowered	**Very low:** project interventions guarantee access and equity to sensitive groups, especially women (heads of household or single mothers) and young people.

	groups, including women, minorities and especially vulnerable groups.	
Marginalized and vulnerable groups	The program focuses on marginalized and vulnerable groups (poorest rural communities) and aims to help them improve their living conditions and quality of life, which are already compromised by poor local development, poverty, lack of access to opportunities, deficit infrastructure and Climate change. The project will include all members of the community and will be careful not to exclude (by action or omission) Dominicans of Haitian descent and Haitian immigrants (especially those with questionable immigration status) and their families. The program does not have a negative impact on these groups.	**Low:** the project has observed the appropriate environmental and social safeguards. These include: Community detection; environmental and social impact assessment, including needs and conflicts; Open, free and informed consultations with key stakeholder groups. It is considered to prepare a contingency plan if applicable.
Human rights	The Program respects the fundamental rights of people in the areas subject to intervention: it does not affect their freedom, nor does it discriminate the participation or benefits for people regardless of their condition, age, sex, political or religious affiliation, etc. In addition, the Program does not integrate any activity contrary to the laws or traditions of the people. Participation in the program will be voluntary and free for all people.	**Very Low**: all program activities and interventions have been developed and designed within the framework of international and national human rights. Through participatory approaches, people and communities will be consulted to avoid any impact on human rights.

G. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

According to the United Nations Organization, that by 2025, almost 1800 million people worldwide will be under severe water shortages[3]. Seawater desalination can be used to meet this demand.

The island countries are the most affected countries in the world in terms of intrusion of saline groundwater. In the near future, rising sea levels will cause greater saltwater intrusion into water resources, while an increasing number of water control structures will increase the salinity of the river, threatening fresh water supplies for drinking and livelihoods, which will irreversibly affect people's lives and livelihoods. Desalination technologies generally require high energy inputs, as well as specialized maintenance procedures, to function in a sustainable manner, which makes them inappropriate for water production in low-income areas.

The Project aims to test a new and disruptive modular solar thermal desalination technology in a low-income community in the Dominican Republic, where a minimum viable product prototype will be tested. To do this, it is requesting US $ 249,929 ~~249,560~~ from the Adaptation Fund. However, if the test is successful, an escalation to thousands of desalination machines is expected over the next five years, generating potable water at a similar or lower cost than the current best alternative (Reverse Osmosis), but with a much lower initial investment. Reverse Osmosis is expensive for the typical volumes of drinking water consumption of marginalized coastal communities. The investment of the Adaptation Fund is contributing to create a global market of thermo solar desalination plants oriented to be placed in a distributed manner and with little maintenance and operating costs.

[3] H. Sharon, K.S. Reddy, A review of solar energy driven desalination technologies, Renew. Sustain. Energy Rev. 41 (2015) 1080–1118.

PART III: IMPLEMENTATION ARRANGEMENTS

~~E.~~A. Describe the arrangements for project / programme implementation.

The project will be executed by the Dominican Institute of Integral Development (IDDI) with the help of a micro ecosystem of international innovation with the following members or partners: A patentable technological development company in the Dominican Republic; a small technology development company in Florida, United States; a Dominican Republic ~~an American~~ university, and a low-income community to select in Montecristi. All of them coordinated by the IDDI that serves as the implementing and executing entity. The Dominican company will own 49% of the small business in the United States. The US company will request funds in the future ~~It will be the US company that will request funds~~ from the Small Business Innovation and Research Program of the United States (SBIR), to push for the scaling up of the technology.~~.~~

~~F.~~B. Describe the measures for financial and project / programme risk management.

The project has been modified incorporating the comments from the technical review of the proposal originally submitted the 20th of January 2020. This modification has lowered the risks of the financing of the first four stages of the technology development process for the appropriate thermo solar desalination technology to be developed in the project (see Figure 1). This is because the financing of all activities considered in the project, especially Component 1, will come from Adaptation Fund resources and will not depend on the obtention of private financing. The modification of the project moves the financing from the US private partner (through the Small Business Innovation Research Program of the National Science Foundation (SBIR NSF) to the scaling up of the technology. ~~Financing to accelerate the technological innovation of small and medium sized companies in the United States through the Small Business Innovation Research Program of the National Science Foundation (SBIR NSF).~~ The SBIR NSF is a very stable program (it has been running for 40 years) that finances about 300 high-risk technology projects at the open window per year. The SBIR NSF can provide a second phase financing of US $ 750,000 per project to scale up new technologies that have been tested.~~The SBIR NSF provides US $ 225,000 per project to be executed generally in six months. The SBIR allows the same company to request up to 4 project pitches per year. The SBIR responds to the Project pitch in three weeks. If a Project pitch is rejected, the partner company in the United States would immediately introduce a following Project pitch~~.

~~G.~~C. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

M&E Arrangements: The results of Monitoring and Evaluation (M&E) will be to provide project updates, risk assessments and any Program change required. In summary, M&E will provide answers, in a systematic way, on the progress and success of the Program and its partners in achieving the desired outcomes and outputs. This includes community's progress on climate adaptation. Given the nature of the Program, PMU will contract the services of a M&E officer to be responsible for data collection, compilation, and project monitoring and reporting, as well as operational support and additional assistance in the design and implementation throughout the Program, adjusting projects outcomes and activities according to a changing context. It is important to remain flexible to and learn from inevitable unforeseen in the operational landscape using an adaptive management approach. Reporting will take place on a quarterly basis in accordance with AF standards. The monitoring and reporting plan involves an iterative approach to collecting data and improving the Program design and its proposed interventions. The Program will start following and inception workshop with key stakeholders, IDDI, PMU and M&E

officer assigning and clarifying the Program purpose, roles and responsibilities, and addressing any outstanding barriers. There are specific budget lines dedicated for M&E to ensure that the necessary resources are allocated to execute the M&E framework. The Program comprehensive M&E framework will meet the Adaptation Fund's policy and drawing on the IDDI safeguards formalized under the Accreditation process.

M&E Budget: The costs associated to implement the M&E system are detailed below.

Table 1: Costs Associated with Implementing M&E

Type of M&E Activity	Budget (USD) (Excluding PMU time)	Timeframe
Initiation Workshop and report	US 1.000	Within the first 2 months.
Means of verification of Program expected results.		Start, mid and end of Program (during evaluation cycle).
Periodic status/progress reports	US$ 500	Quarterly
Mid-term Evaluation	US 1.000	At the mid-point of Program implementation.
Final evaluation	US 1.000	At least 3 months before the end of Program.
Program terminal report	US 1.000	At least 3 months before the end of Program.
Audit		
Visits to field sites		Program lifespan.
ESTIMATED TOTAL (USD)	US$ 4.500	

D. Include a simple results framework for the project proposal, including milestones, targets and indicators.

~~(c)~~

Project Components	Milestones	Tarjets	Indicators
COMPONENT 1 – Development of the Technology including the Prototype for Testing at a Dominican Republic University~~COMPONENT 1 – Strengthening of the International Micro Ecosystem for Accelerated Technology Development~~	**Activity 1.1:** Design of a prototype to be tested at a university in Dominican Republic. Outputs: a) Design of the prototype concluded.~~**Activity 1.1:** Alliance forging meetings for accelerated technological innovation in the Dominican Republic and establishment of an Alliance with a Small Business Enterprise in the USA.~~	Design, construction and prototype test of thermo solar desalination technology in university laboratory ~~Establishment of a partnership (49% would be of the Dominican company) with a small company in~~	a) Design of prototype completed.~~a) Signing of an adaptation technology licensing agreement; b) Statutes of the US company where the acquisition of 49% of the US company by the Dominican technology development company is reflected.~~

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	Activity 1.2: Construction of a prototype to be tested at a Dominican Republic university. Outputs: a) Prototype built.~~**Activity 1.2:** Technological prospecting meeting to select the adaptation technology to develop and develop the patent portfolio in the Dominican Republic.~~	~~the United States to be eligible to apply for federal funds for technological innovation~~ Select and register intellectual property internationally for the solar thermal desalination technology	b) Prototype built~~a) Two provisional patent applications in the United States; a) Two formal patent applications in the United States; da) Two international patent applications via PCT with protection in 151 additional countries.~~
	Activity 1.3: Performing the first prototype test at a Dominican Republic university.~~**Activity 1.3:** Preparation and presentation of a "Pitch Project" to request funds in the United States.~~	~~Leverage seed funds for the development of the early stages of the technology to be created~~	c) Laboratory report with the results of the tested Prototype.~~a) Project Pitch submitted for US $ 225,000; b) Project Pitch approved by the SBIR~~
COMPONENT 2 - Pilot test of prioritized adaptation technology in a selected community in Dominican Republic~~**COMPONENT 2 - Pilot test of prioritized adaptation technology in a selected community in Dominican Republic~~**	**Activity 2.1:** Selection of the coastal community to test the new pilot adaptation technology.~~**Activity 2.1:** Selection of the coastal community to test the new pilot adaptation technology.~~	Selection of the specific site in the coastal community selected where the solar thermal desalination plant will be tested in the Dominican Republic.~~Selection of the specific site in the coastal community selected where the solar thermal desalination plant will be tested in the Dominican Republic.~~	a) Presentation of the selection report, sensitization of the pilot community where the minimum viable product and the specific placement and operation site will be tested.~~Presentación del reporte de selección, sensibilización de la comunidad piloto donde se probará el producto mínimo viable y el sitio específico de colocación y operación.~~
	Activity 2.2: Consultation and awareness and training of the coastal community where new pilot adaptation technology will be tested.~~**Activity 2.2:** Consultation and awareness and training of the coastal community where new pilot adaptation technology will be tested.~~		
	Activity 2.3: Selection of the site in the coastal community where the new pilot adaptation technology will be tested.~~Selection of the site in the coastal community where the new pilot adaptation technology~~		

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	~~will be tested.~~		
	Activity 2.4: Design of the modified prototype to be tested at the coastal community.~~Construction of the modified prototype to be tested at the coastal community.~~	Design, construction and prototype test of thermo solar desalination technology in the coastal community of Montecristi, Dominican Republic~~Design, construction and prototype test of thermo solar desalination technology in the coastal community of Montecristi, Dominican Republic~~	a) Design of prototype completed.~~Design of prototype completed.~~
	Activity 2.5: Construction of the modified prototype to be tested at the coastal community.~~Performing all the necessary tests of the prototype in the selected community, including the operational procedures of technology placement.~~		~~b) Prototyte built, installed and operated~~ b) Prototyte built
	Activity 2.6: Performing all the necessary tests of the prototype in the selected community, including the operational procedures of technology placement.~~Development of a preliminary operating manual.~~		c) Prototyte installed and operated~~c) Report with the results of the tested Prototype in the selected community; d) Preliminary Operating Manual~~
	Activity 2.7: Development of a preliminary operating manual.~~Development of final research and development reports.~~		d) Report with the results of the tested Prototype in the selected community; e) Preliminary Operating Manual~~e) Final project reports~~
	Activity 2.8: Development of final research and development reports.		e) Final project reports
COMPONENT 3 - Knowledge management to capture and disseminate lessons learned~~COMPONENT 3 Knowledge management to capture and disseminate lessons learned~~	**Activity 3.1:** Workshop to disseminate lessons learned for NIEs and focal points of the Adaptation Fund in the Caribbean Islands.~~Workshop to disseminate lessons learned for NIEs and focal points of the Adaptation Fund in the Caribbean Islands.~~	Lessons learned disseminated among the NIEs and Focal Points of the Adaptation Fund in the Caribbean Islands~~Lessons learned disseminated among the NIEs and Focal Points~~	a) Workshop attended by at least 15 National Implementation Entities and Focal Points of the Adaptation Fund in 15 Caribbean island countries; b) Partnerships established for Phase II of the project; c) request for funds for Phase II of the project developed for the Adaptation Fund and / or request for Full Size

		~~of the Adaptation Fund in the Caribbean Islands~~	Regional Project for the GEF.~~a) Workshop attended by at least 15 National Implementation Entities and Focal Points of the Adaptation Fund in 15 Caribbean island countries; b) Partnerships established for Phase II of the project; c) request for funds for Phase II of the project developed for the Adaptation Fund and / or request for Full Size Regional Project for the GEF.~~

~~J.~~E. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

The project is expected to contribute to the following "Expected Results of Strategic Focus 2: Innovation" of the Adaptation Fund:

- ER1: successful innovations implemented. Innovative adaptation practices, tools and technologies that have proven successful in a country extended to new countries / regions.
- ER3: new innovations encouraged and accelerated. Development of innovative adaptation practices, tools and technologies encouraged and accelerated.
- ER4 - Base of evidence generated. Evidence of effective and efficient adaptation practices, products and technologies generated as a basis for the implementation of entities and other funds to assess the expansion

~~K.~~F. Include a budget, including a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Proposal for the Strengthening of a Replicable Micro Ecosystem for Accelerated Development of Technologies for Climate Change Adaptation of the Dominican Republic - Phase I - Thermo Solar Disalination Technology

Components/Activities	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15	Month 16	Costs to be Financed by AF (US$)
COMPONENT 1 - Development of the Technology including the Prototype for Testing at a Dominican Republic University																	
Activity 1.1: Design of a prototype to be tested at a Dominican Republic University																	5,450
Activity 1.2: Construction of a prototype to be tested at a Dominican Republic University																	16,850
Activity 1.3: Performing the first prototype test at a Dominican Republic University																	18,500
COMPONENT 2 - Pilot test of prioritized adaptation technology in a selected community in Dominican Republic																	
Activity 2.1: Selection of the coastal community to test the new pilot adaptation technology																	14,515
Activity 2.2: Consultation and awareness and training of the coastal community where new pilot adaptation technology will be tested																	12,270
Activity 2.3: Selection of the site in the coastal community where the new pilot adaptation technology will be tested																	7,650
Activity 2.4: Design of the modified prototype to be tested at the coastal community																	5,200
Activity 2.5: Construction of the modified prototype to be tested at the coastal community																	80,680
Activity 2.6: Performing all the necessary tests of the prototype in the selected community, including the operational procedures of technology placement																	22,610
Activity 2.7: Development of a preliminary operating manual																	6,000
Activity 2.8: Development of final research and development reports																	10,270
COMPONENT 3 - Knowledge management to capture and disseminate lessons learned																	
Activity 3.1: Workshop to disseminate lessons learned for NIEs and focal points of the Adaptation Fund in the Caribbean Islands																	26,950
Total sin costos de implementación y ejecución																	**226,945**
IDDI Execution Fee (1.5%)																	3,404
Total Cost of the Project																	230,349
IDDI Implementación Fee (8,5%)																	19,580
																	249,929

Components/Activities	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Total Cost (US$)	Costs to be Financed by AF (US$)	Costs to be Financed by the Private Sector Privado (US$)
COMPONENT 1 - Strengthening of the International Micro Ecosystem for Accelerated Technology Development																	
Activity 1.1: Alliance forging meetings for accelerated technological innovation in the Dominican Republic and establishment of an Alliance with a Small Business Enterprise in the USA															3,300		3,300
Activity 1.2: Technological prospecting meeting to select the adaptation technology to develop and develop the patent portfolio in the Dominican Republic															19,850		19,850
Activity 1.3: Preparation and presentation of a "Pitch Project" to request funds in the United States															3,200		3,200
Activity 1.4: Preparation and presentation of a proposal Phase I SBIR NSF to request funds in the United States															16,000		16,000
Activity 1.5: Design of a prototype to be tested at a university in the United States															9,780	5,500	4,280
Activity 1.6: Construction of a prototype to be tested at a university in the United States															32,618	3,850	28,768
Activity 1.7: Performing the first prototype test at a university of the United States															36,550	8,250	28,300
COMPONENT 2 - Pilot test of prioritized adaptation technology in a selected community in Dominican Republic																	
Activity 2.1: Selection of the coastal community to test the new pilot adaptation technology															9,920	9,920	
Activity 2.2: Consultation and awareness and training of the coastal community where new pilot adaptation technology will be tested															12,400	12,400	
Activity 2.3: Selection of the site in the coastal community where the new pilot adaptation technology will be tested															5,100	5,100	

~~I.~~G. Include a disbursement schedule with time-bound milestones

	Upon signature of Agreement	1st Disbursement	2nd Disbursement	3rd Disbursement	Total (US$)
Schedule date	may-20		sep-20	jun-21	
Program funds		41,412	161,583	27,354	230,349
Implementing Entity Fee		3,520	13,735	2,325	19,580
Total	**0.00**	**44,932**	**175,317**	**29,679**	**249,929**

~~-~~	~~Upon signature of Agreement~~	~~1st Disbursement~~	~~2nd Disbursement~~	~~Total~~
~~Schedule date~~	~~may-20~~		~~nov-20~~	~~-~~
~~Program funds~~	~~-~~	~~141,293~~	~~88,716~~	~~230,009~~
~~Implementing Entity Fee~~		~~11,926~~	~~7,625~~	~~19,551~~
~~**Total**~~	~~**0.00**~~	~~**153,219**~~	~~**96,340**~~	~~**249,560**~~

Milestones of the project:

a) Presentation of the statutes and documents of the company in the United States where the Dominican company of technological development has 49%;
b) Filing of the two provisional applications for patents in the United States (the USPTO);
c) Presentation of the Project Pitch approved by the United States SBIR Program;
d) Presentation of the application submitted to the SBIR by the partner in the United States for US $ 225,000;
e) Presentation of the results of the desalination prototype test laboratory at the University of the United States;
f) Presentation of the selection report, sensitization of the pilot community where the minimum viable product and the specific placement and operation site will be tested;
g) Presentation of the results of the desalination prototype test in the selected community;
h) Presentation of the Preliminary Operation Manual of the desalination plant; and
i) Presentation of final reports and report the workshop to disseminate lessons learned for NIEs and focal points of the Adaptation Fund in the Caribbean Islands.

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

~~E.~~A. Record of endorsement on behalf of the government

(Enter Name, Position, Ministry) *Pedro Garcia, National Designated Authority, Director of Climate Change, Ministry of Environment, Dom. Rep.*	Date*: (January 14, 2020)*

~~F.~~B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (National Development Strategy, National Communications to UNFCCC, National Policy on Climate Change, and Dominican Republic's National Action Plan for Climate Change Adaptation) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.
 *David Luther, Executive Director, Dominican Institute of Integral Development -IDDI* Implementing Entity Coordinator
Date: *(January, 19, 2020)* | Tel. and email: +18095341077/ dluther@iddi.org
Project Contact Person: David Luther (Executive Director)
Tel. And Email: +18095341077/ dluther@iddi.org