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
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Washington, D.C., 20433
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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
National Implementing Entity:	Instituto Dominicano de Desarrollo Integral (IDDI)
Executing Entity/ies:	IDDI;
Amount of Financing Requested:	**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[1] 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 populations in areas prone to flooding and landslides, eroded by subsistence agriculture and poorly managed settlements (World Bank, 2011).

[1] 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

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.

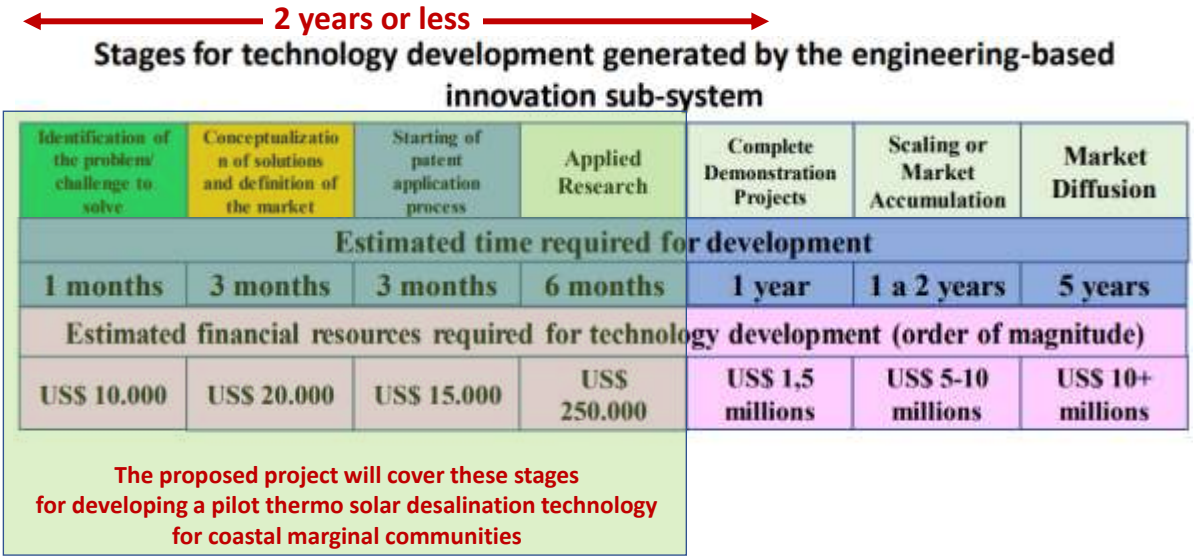
These technologies, easy to conceptualize and prototype, once developed, could have an immediate market within the Caribbean and through small island developing states (SIDS). Also, they can be sold to industrialized countries.

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 access to federal and private US funds for the development of the first five stages 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

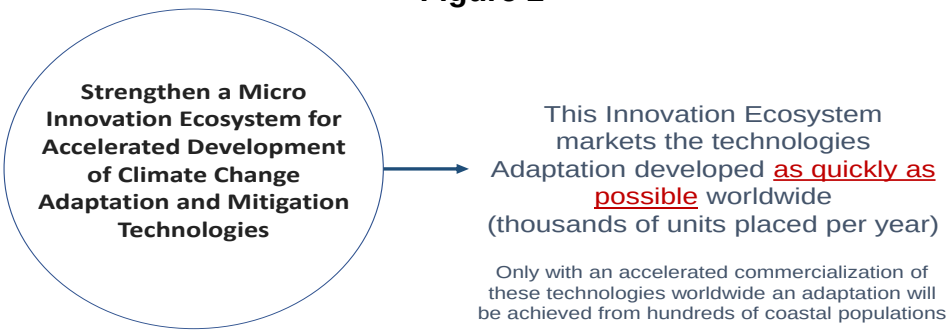
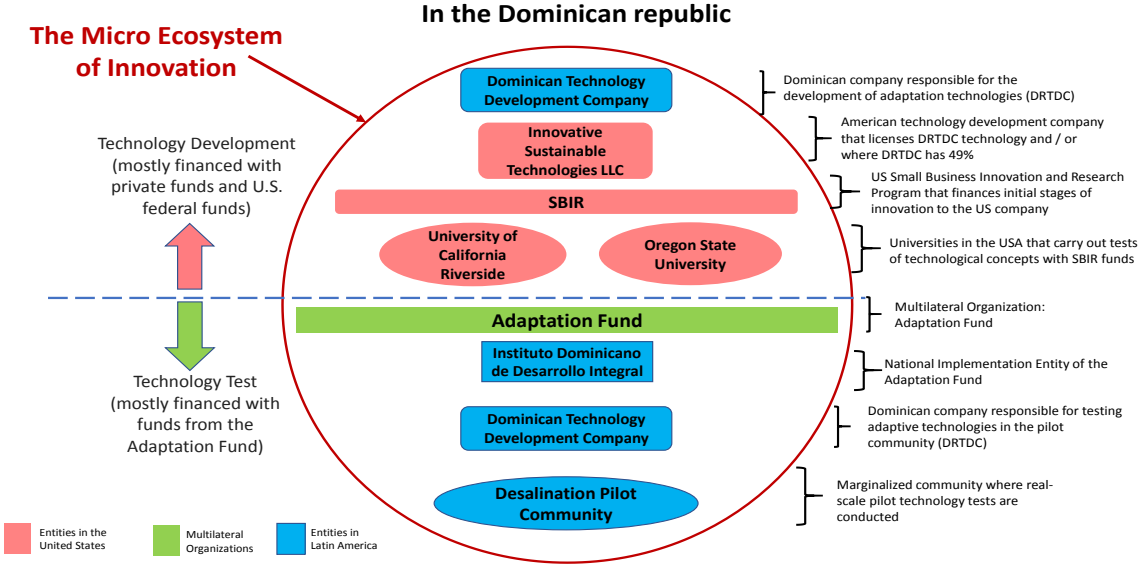


Figure 3

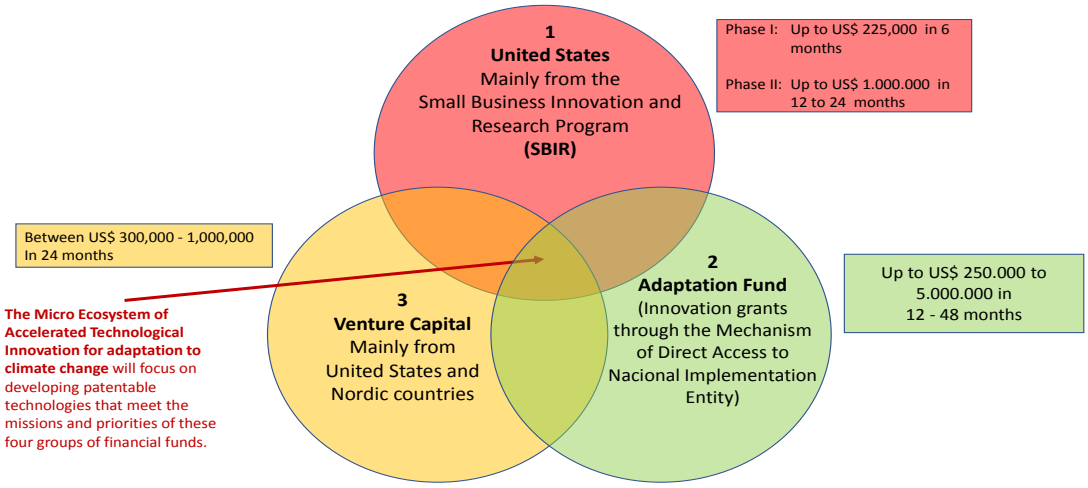
Micro Ecosystem of Accelerated Technological Innovation for Adaptation to Climate Change In the Dominican republic



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

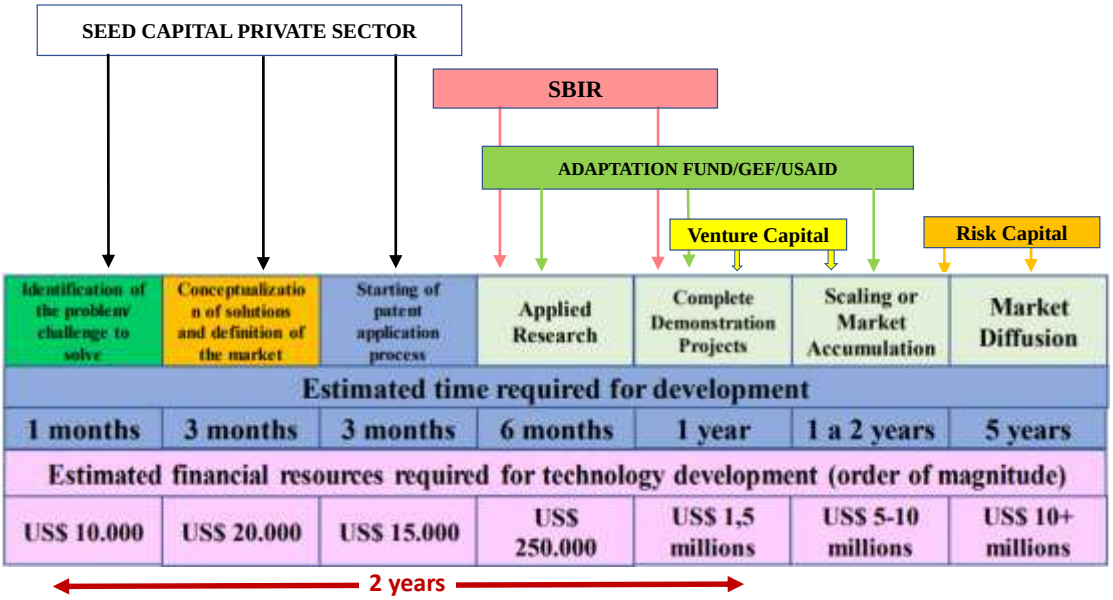
Strategy for raising financial resources defined by the micro development ecosystem of the early stages of a technology



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



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 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) 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 - 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. **Outputs:** - Signing of an adaptation technology licensing agreement; - Acquisition of 49% of the US company by the Dominican technology development company.	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.	Co-financed by the private sector
	Activity 1.2: Technological prospecting meeting to select the adaptation technology to develop and develop the patent portfolio in the Dominican Republic. **Outputs**: - Selected technology to be developed (Distributed Solar Thermal Desalination Plant); - Two provisional patent applications in the United States; - Two formal patent applications in the United States; - Two international patent applications via PCT with protection in 151 additional countries.		Co-financed by the private sector
	Activity 1.3: Preparation and presentation of a "Pitch Project" to request funds in the United States. **Outputs**: - Project Pitch submitted for US $ 225,000; - Project Pitch approved by the SBIR.		Co-financed by the private sector

	Activity 1.4: Preparation and presentation of a proposal Phase I SBIR NSF to request funds in the United States. **Outputs**: - Detailed proposal submitted for US $ 225,000; - Proposal approved by the SBIR.		Co-financed by the private sector
	Activity 1.5: Design of a prototype to be tested at a university in the United States. **Outputs**: Design of the prototype concluded.		5,500
	Activity 1.6: Construction of a prototype to be tested at a university in the United States. **Outputs**: Prototype built.		3,850
	Activity 1.7: Performing the first prototype test at a university of the United States. **Outputs**: Prototype tested at an US university.		8,250
TOTAL COMPONENT 1			**17,600**
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**: 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 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	9,920
	Activity 2.2: Consultation and awareness and training of the coastal community where new pilot adaptation technology will be tested. **Outputs**: - Community selected for testing the minimum viable product of the technology consulted and sensitized; - Community selected trained; and - A disruptive mechanism to transfer a % of royalties generated by the sales of the technology worldwide to a women led organization established		12,400
	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.		5,100
	Activity 2.4: Construction of the modified prototype to be tested at the coastal community. **Outputs**: Prototype/minimum viable product (MVP) built		94,200
	Activity 2.5: 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.		34,350
	Activity 2.6: Development of a preliminary operating manual. **Outputs**: Manual developed		9,750
	Activity 2.7: Development of final research and development reports. **Outputs**: Final reports developed		18,540

TOTAL COMPONENT 2			**184,260**
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**: - 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; - Partnerships established for Phase II of the project; - 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	24,750
TOTAL COMPONENT 3			**24,750**
3. Executing cost fee by IDDI (1,5%)			3,399
4. Total cost of the Project			**230,009**
5. Implementation fee (8,5%)			19,551
Amount of financing requested			**249,560**

Projected Calendar:

Milestones	Expected Dates
Beginning of Project implementation	May 2020
Project closure	March 2021
Terminal evaluation	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 - Strengthening of the International Micro Ecosystem for Accelerated Technology Development

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: Design of a prototype to be tested at a university in the United States

Activity 1.6: Construction of a prototype to be tested at a university in the United States

Activity 1.7: Performing the first prototype test at a 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: Construction of the modified prototype to be tested at the coastal community

Activity 2.5: Performing all the necessary tests of the prototype in the selected community, including the operational procedures of technology placement

Activity 2.6: Development of a preliminary operating manual

Activity 2.7: 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.

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 groups, including women, minorities and especially vulnerable groups.	**Very low:** project interventions guarantee access and equity to sensitive groups, especially women (heads of household or single mothers) and young people.
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)	**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

	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.	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[2]. 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 $ 249,560 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.

PART III: IMPLEMENTATION ARRANGEMENTS

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; 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. It will be the US company that will request funds from the Small Business Innovation and Research Program of the United States (SBIR).

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

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

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 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.

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.

Project Components	Milestones	Tarjets	Indicators
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.	Establishment of a partnership (49% would be of the Dominican company) with a small company in the United States to be eligible to apply for federal funds for technological innovation	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.
	Activity 1.2: Technological prospecting meeting to select the adaptation technology to develop and develop the patent portfolio in the Dominican Republic.	Select and register intellectual property internationally for the solar thermal desalination technology	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: 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	a) Project Pitch submitted for US $ 225,000; b) Project Pitch approved by the SBIR
	Activity 1.4: Preparation and presentation of a proposal Phase I SBIR NSF to request funds in the United States.		a) Detailed request for Phase I funds of SBIR NSF for US $ 225,000 prepared; b) Request of US $ 225,000 approved by the SBIR
	Activity 1.5: Design of a prototype to be tested at a university in the United States.	Design, construction and prototype test of thermo solar desalination technology in university laboratory	a) Design of prototype completed.
	Activity 1.6: Construction of a prototype to be tested at a university in the United States.		b) Prototyte built
	Activity 1.7: Performing the first prototype test at a university of the United States.		b) Laboratory report with the results of the tested Prototype.
COMPONENT 2 - Pilot test of prioritized adaptation	**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	a) Presentación del reporte de selección, sensibilización de la comunidad piloto donde se probará el producto mínimo viable y el sitio

technology in a selected community in Dominican Republic	**Activity 2.2:** Consultation and awareness and training of the coastal community where new pilot adaptation technology will be tested.	solar thermal desalination plant will be tested in the Dominican Republic.	específico de colocación y operación.
	Activity 2.3: Selection of the site in the coastal community where the new pilot adaptation technology will be tested.		
	Activity 2.4: 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	a) Design of prototype completed.
	Activity 2.5: 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
	Activity 2.6: Development of a preliminary operating manual.		c) Report with the results of the tested Prototype in the selected community; d) Preliminary Operating Manual
	Activity 2.7: Development of final research and development reports.		e) Final project 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.	Lessons learned disseminated among the NIEs and Focal Points of the Adaptation Fund in the Caribbean Islands	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.

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

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

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	
Activity 2.4: Construction of the modified prototype to be tested at the coastal community															94,200	94,200	
Activity 2.5: Performing all the necessary tests of the prototype in the selected community, including the operational procedures of technology placement															34,350	34,350	
Activity 2.6: Development of a preliminary operating manual															9,750	9,750	
Activity 2.7: Development of final research and development reports															18,540	18,540	
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															24,750	24,750	
															TOTAL COMPONENTS	226,610	103,698
															IDDI Execution Fee (1.5%)	3,399	
To be financed by AF															***TOTAL COST OF PROJECT***	230,009	
															IDDI Implementation Fee (8,5%)	19,551	
To be financed by the private sector															**Total requested Adaptation Fund**	**249,560**	

G. Include a disbursement schedule with time-bound milestones

	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

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)*

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	

ADAPTATION FUND

Dominican Republic

January 14, 2020

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Strengthening of a replicable Micro Ecosystem of Accelerated Technological Innovation for Adaptation and Mitigation to Climate Change in Dominican Republic.

In my capacity as designated authority for the Adaptation Fund in Dominican Republic, I confirm that the above national grant proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Dominican Republic.

Accordingly, I am pleased to endorse the above grant proposal with support from the Adaptation Fund. If approved, the project will be implemented by Dominican Institute of Integral Development and executed by the Ministry of Environment and Natural Resources; and community-based NGOs.

Sincerely,

Ing. Pedro García Brito, M.Sc
Director of Climate Change and CDM
Ministry of Environment and Natural Resources