



ADAPTATION FUND

**REQUEST FOR PROGRAMME
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/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

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ADAPTATION FUND

PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROGRAMME INFORMATION

Programme Category:	Regular Project
Country/ies:	Dominican Republic
Title of Programme:	Enhancing climate resilience in San Cristóbal Province, Dominican Republic - Integrated Water Resources Management and Rural Development Programme
Type of Implementing Entity:	National
Implementing Entity:	Dominican Institute of Integral Development
Executing Entity/ies:	Ministry of Environment and Natural Resources; National Institute for Water Supply and Sewerage; Community-based NGOs
Amount of Financing Requested:	9,954,000 (in U.S Dollars Equivalent)

Programme Background and Context:

Provide brief information on the problem the proposed programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

Geographic, Environmental and Socioeconomic Context

- *Geographic and Environmental Context*

Located on the Caribbean region, the Dominican Republic shares with Haiti the island of Hispaniola. Total land area is 48,442 km². Country’s topography and geomorphology are very much diversified, including coastal plains, mountain ranges and valleys. The elevation ranges between -46 m (*Lago Enriquillo*) to *Pico Duarte* (3,098 m), the highest.

Surface water covers 0.7% of total area of the country. The three major river systems are the Yaque del Norte System, Yaque del Sur System, and Yuna System. Yaque del Norte, with 296 km, it is the longest river of the Dominican Republic. Its watershed has an area of 7,044 km². Yuna River has 209 km long, and its watershed has an area of 5,498 km². Yaque del Sur has 183 km long and its watershed has an area of 4,972 km².

Dominican Republic is home to a rich variety of plants and animals (over 6,000 species of amphibian, birds, mammal, reptiles, and vascular plants). As 23% of country’s land is protected, Dominican Republic presents a significant percentage of protected areas in comparison with the rest of the world (developing world average is 13%, and developed world is 8%) (Ministerio de Medio Ambiente y Recursos Naturales, 2012; World Bank, 2014).

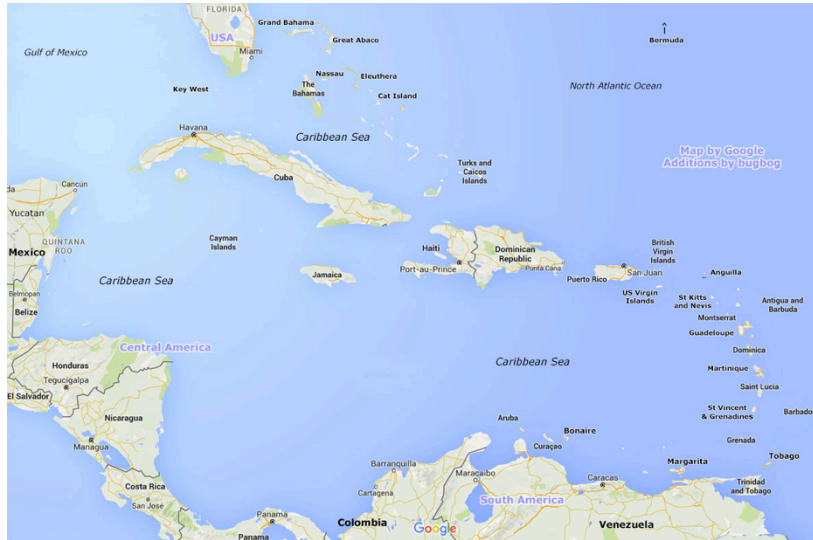


Fig. 1: Map of the Caribbean showing the location of Dominican Republic

- Socioeconomic and Development Context

The Dominican Republic has a population estimated to 10.08 million, with a population growth rate of about 1.2%. The country is organized into National District and 32 provinces; which further divide into Municipalities and Municipal Districts in decreasing levels of administration. Population density is 197 habitants per km². Despite high urbanization in recent years still about 25% of the population lives in rural areas. Santo Domingo (Province of Santo Domingo and Distrito Nacional) is the capital of the Country and main administrative center, with almost 35% of the population living there.

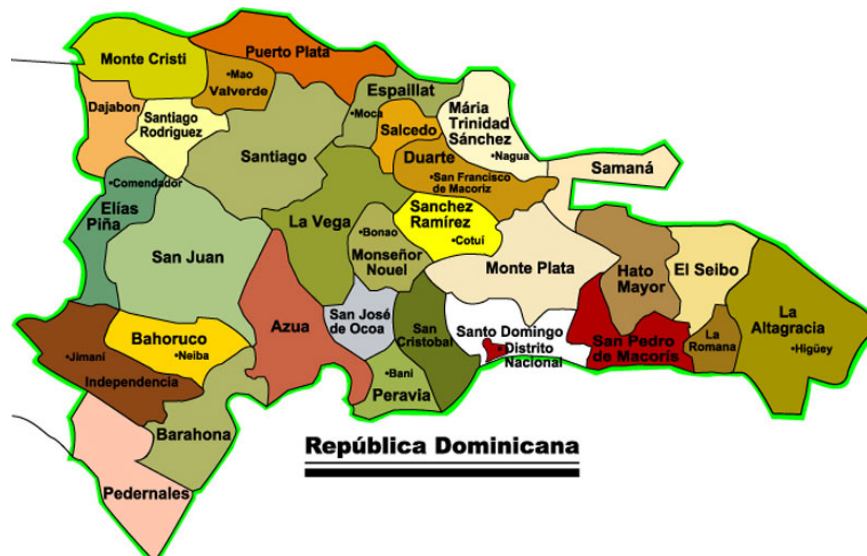


Fig. 2: Political Map of the Dominican Republic

Major economic activities in the country lie in the tourism, free zones, agriculture and services, and more recently remittances and mining extraction. After service and industry, agriculture sector is the most labour demanding activity in Dominican Republic, and it is largely based on subsistence farming focusing on rice, fruits, coffee, cacao, legumes, vegetables and livestock. Agriculture sector uses 14% of active population and presents 5.6% of GDP (Banco Central, 2016). Industry is high in weight to the economy and focuses on sugar, mining, textiles, and tobacco, among many others.

According to the latest official poverty data, almost 50% of country households lives in poverty, and over 10% are living in extreme poverty. In rural areas poor people surpass 60% of the population (Morillo P., 2014). Such poor rural people include women and men who are heads of households, small-scale farmers, landless farmers, micro-entrepreneurs, small merchants, agricultural workers and labourers for rural service operators. They are particularly vulnerable, and they suffer not only from low income and poor living conditions but also from social exclusion. In all groups, women (heads of households) and children are extremely vulnerable due the lack of focused opportunities and not benefitting from most types of social assistance programmes (Berigüete, 2015).

The increase in population is resulting in an increase in the demand for food, energy and water resources for both livelihoods and economic development over the short-term. Accessibility to water is limited in most areas. Agricultural production is mainly rain-fed, and the increase in output is largely linked to the lateral expansion of cultivated lands not on productivity over a unit area, thus, at the expense of other ecosystems such as forests. Extensive cropping and livestock aims to land degradation and put more stress over water resources, reduce soil capacity and increase the need for agrochemicals.

- Country's Key Development Challenges

As is stated in the National Development Strategy, the Dominican Republic is committed to be prosperous, living with dignity, attached to ethical values and respect a participatory democracy country, that guarantees the social and democratic rule of law and promotes equity, equal opportunities, social justice, and that manages and uses its resources to develop economically in an innovative, sustainable manner, and that is competitively integrated into the global economy.

The strategy is focused in four strategic lines: a) being a social democratic state based on laws; b) to be a society with equal rights and opportunities, c) to reach a more sustainable, inclusive and competitive economy; and d) become a society of environmentally sustainable production and consumption that is adapted to climate change. Beside these issues, the country's most urgent problems are related to:

- Poverty, extreme poverty, and the overall reduced capacity to create new jobs and to increase the income for vulnerable population;

- Agriculture, livestock, forestry and fisheries lacks of modernization, resulting in low yields, unsustainability, a minimal growth, and less jobs;
- Little territorial cohesion resulting in an unbalanced regional development in terms of infrastructure, services and capacities;
- Ensure adequate and timely supply of drinking water and access to sanitation needs to be in place in vulnerable populations;
- High dependence on imported fossil fuels and the lack of a reliable, efficient and environmentally sustainable power supply;
- Public administration lacks of efficiency, transparency and results-oriented logics and is not based on the rule of law, democracy and citizenship;
- Lack of epidemiological and nutrition surveillance and education systems as a fundamental instrument for food security of the population;
- Lack of necessary risk management mechanisms to minimize human, economic and environmental losses, adequate for climate change adaptation;
- Regional integration (mostly with the Caribbean) has seen -traditionally- poor managed resulting in loss of trade opportunities;
- Many existing public policies, do not incorporate elements of sustainability, gender, territorial cohesion, social participation, IT and institutional responsibility.

Climate Vulnerability and Impacts

- *Current climate variability*

Dominican Republic experiences the year-round warm and humid conditions associated the Tropics. Seasonal temperatures range from 20-25°C in the cooler months of December to February, to 25-27°C in warmer seasons (June to November). Wet season occurs through May to November, during which most regions receive 100-200 mm per month.

As many other Caribbean nations, Dominican Republic Inter-annual climate variability is strongly influenced by *El Niño*. *El Niño* episodes bring warmer and drier than average conditions between June and August and *La Niña* bring colder and wetter conditions at this time. Dominican Republic also lies in the heart of the Atlantic hurricane belt, where cyclones and hurricanes occur throughout August to October. Heavy rainfall associated with cyclones and hurricanes contributes significantly to wet season rainfall totals. The occurrence of hurricanes is strongly linked to *El Niño*, with more frequent hurricane activity associated with *La Niña* events, and less frequent events in *El Niño* years.

A recent study about recent climate trends in Dominican Republic from 1960 to 2003 (McSweeney et al., 2010) concludes that:

- Annual temperature has increased by around 0.45°C, at an average rate of 0.1°C per decade. This warming is most rapid in the warmest seasons.
- The frequency of “hot days” and “hot nights” increased significantly, annually in all seasons: average number of hot days per year increased by 63 (17.4% of days); and average number of hot nights per year increased by 48 (13.2% of nights).
- The frequency of “cold days” and “cold nights” decreased significantly, annually in all seasons: average number of cold days per year decreased by 30 (8.3% of days); and average number of cold nights per year decreased by 31 (8.6% of nights).
- Average rainfall over the Dominican Republic has decreased by 5.0mm per month (4.5%) per decade. This decrease is mainly due to decreases in rainfall, of 7.5 and 5.4 mm per month (6.4% and 3.7%) per decade respectively.
- Expected Climate Change Impacts

Several models about long-term temperature in the Dominican Republic points to:

- The mean annual temperature is projected to increase by 0.5 to 2.3°C by the 2060, and 1.1 to 3.6°C by 2090. The range of projections by 2090 under any emissions scenario is around 1 to 1.5°C (being warming projected rate most rapid in winter).
- Substantial increases in the frequency of days and nights that are considered “hot” in current climate. Hot days will occur on 29-72% of days by 2060, and 32-98% of days by 2090. Days considered hot by current standards for their season are projected to increase even more rapidly, occurring on 100% of days in the season.
- Nights that are considered “hot” for the annual climate of 1970-99 are projected to occur on 33-68% of nights by 2060 and 39-98% of nights by 2090. Nights considered hot by current climate standards for their season are projected to increase even more rapidly, occurring on 100% of days in the season.

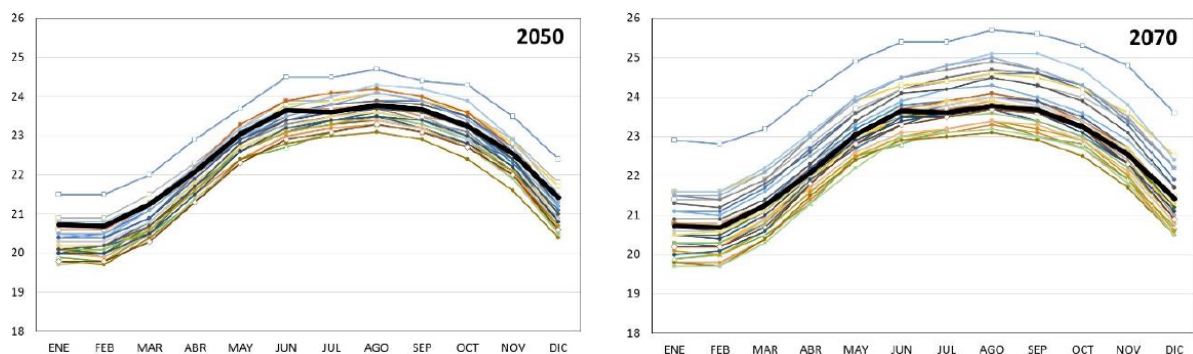


Fig. 3: Expected Changes in Minimal Temperature in 2050 (left) and 2070 (right)

Source: (Ministerio de Medio Ambiente y Recursos Naturales, 2016).

All projections indicate decreases in the frequency of days and nights that are considered cold in current climate. These events are expected to become exceedingly rare, not occurring at all in most projections, meaning warming increases are inevitable.

Regarding precipitation, consulted models about long-term rainfall points to:

- Projections of mean annual rainfall from different models are broadly consistent in indicating decreases in rainfall for the Dominican Republic, largely due to decreases in wet season rainfall. Projected changes in rainfall vary from (-78 to +21%) by the 2090. Annual changes range from -55 to +20%.
- The proportion of total rainfall that falls in heavy events is projected to decrease by most models, with changes ranging from -29% to +8% by the 2090.
- Maximum 1- and 5-day rainfalls tend to decrease in projections, particularly in wet seasons when the largest reductions in total rainfall are projected.

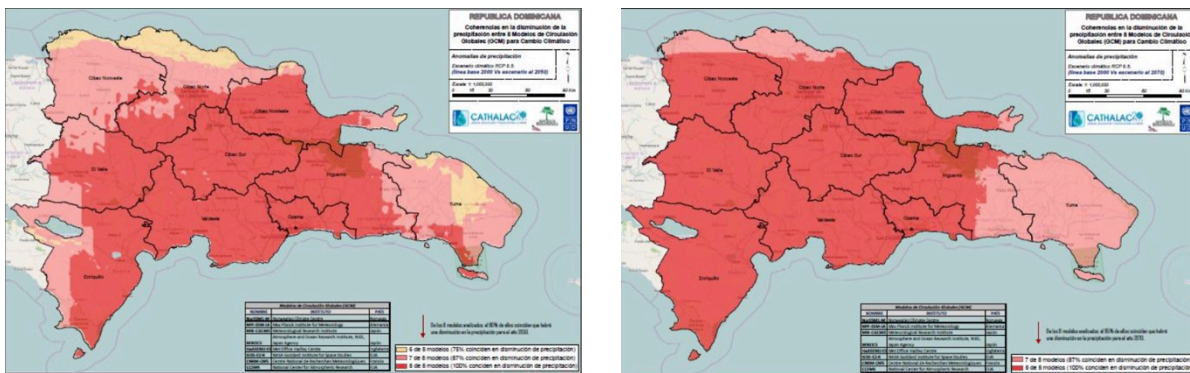


Fig. 4: Expected Reduction in Yearly Rainfall in 2050 (left) and 2070 (right)

Source: (Ministerio de Medio Ambiente y Recursos Naturales, 2016).

Due the climate change, the Dominican Republic can suffer from combined impacts over the mid and long term (Christensen et al., 2007). Such impacts are, among others:

- Tropical cyclones are likely to become, on the whole, more intense under a warmer climate as a result of higher sea surface temperatures. There is great uncertainty in changes in frequency, and changes to storm tracks and their interactions with other features of climate variability (i.e., El Niño) that introduces more uncertainty.
- Potential changes in cyclones, storms and hurricanes occurrence contributes to uncertainties in future wet season rainfall. Potential increases in summer rainfall associated with tropical cyclone activity, which may not be captured in current projections, may counteract the projected decreases in rainfall.

- As with all Caribbean Islands, the Dominican Republic is highly vulnerable to sea-level rise. Sea-level in the Caribbean region is projected to rise by the following levels by 2090 (relative to 1980-1999 sea-level): 0.13 to 0.43 m (SRES B1); 0.16 to 0.53 m (SRES A1B); and 0.18 to 0.56 m (SRES A2).

The Ministry of Environment and Natural Resources has made a special effort to contribute to the scientific documentation that supports the decision-making process regarding climate change within *National Communications to UNFCCC*¹.

- *Climate Vulnerability and Exposure*

The Dominican Republic is particularly vulnerable to extreme weather events. As the country is located in the Caribbean Sea basin, it is affected with variable recurrence of climatic phenomena and seasonally and frequently affected by hydrometeorological situations (as storms, hurricanes and droughts). The Country's climate vulnerability is exacerbated due to a combination of human and socioeconomic factors. This vulnerability has to do with the presence of populations in zones that are prone to floods and unstable lands, eroded by subsistence farming and poorly planned settlements (World Bank, 2011).

Several vulnerability studies have been performed regarding the country's coastal zone, water resources, agriculture, tourism and energy, within the previously mentioned National Communications, as well as for the third one, currently in progress. These studies show how extreme hydrometeorological conditions have caused damages, disasters and diseases in different sectors, and make some projections based on long-term climate scenarios.

The *Climate Risk Index*, a global overview based on one of the most reliable datasets available on the impacts of extreme weather events and associated socio-economic data, ranks the Dominican Republic as the eleventh country most vulnerable to climate change impacts (Germanwatch, 2016). According the same source, Haiti is the third nation in the same ranking, meaning the island of Hispaniola will be affected by climate change in the long term and a comprehensive and integral adaptation is necessary.



Fig. 5: Effects of Olga and Noel (2007, left) and Impacts of Sandy (2012, right)

¹ So far the Dominican Republic has submitted national communications for 2003 and 2009. Such these documents are available at UNFCCC website: http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php.

According to latest *Natural Disaster Hotspot*, which presents a global view of disaster risks associated with major natural hazards (as drought, floods, cyclones, earthquakes, etc.), the Dominican Republic is the world's third most exposed country to multiple hazards (World Bank, 2016). According to the report, a total of 97.3% of the total land area and 96.8% of the total population is exposed to two or more hazards. The report also places the country in the second position of the countries having the highest probability of experiencing economic risks as a result of a greater exposure to two or more hazards. Moreover, it is estimated that 90.7% of Dominican population and 92.1% of the Gross Domestic Product (GDP) of the country reside in areas at risks. A similar panorama is reported regarding risks of experiencing three or more hazards.

From 1961 to 2014, Dominican Republic experienced 56 hydrometeorological events (those with greater recurrence, causing significant losses), representing 96% of extreme events from such period. Such events were floods (41%), droughts (2%), and storms (50%). Storms were responsible by almost all economic damages (96%) in such period. For 1979-2007, country experienced losses for a total of USD 5,220.1 MM (of 2005) just by 5 events (David, Federico, Georges, Jeanne, Olga and Noel) (World Bank, 2015).

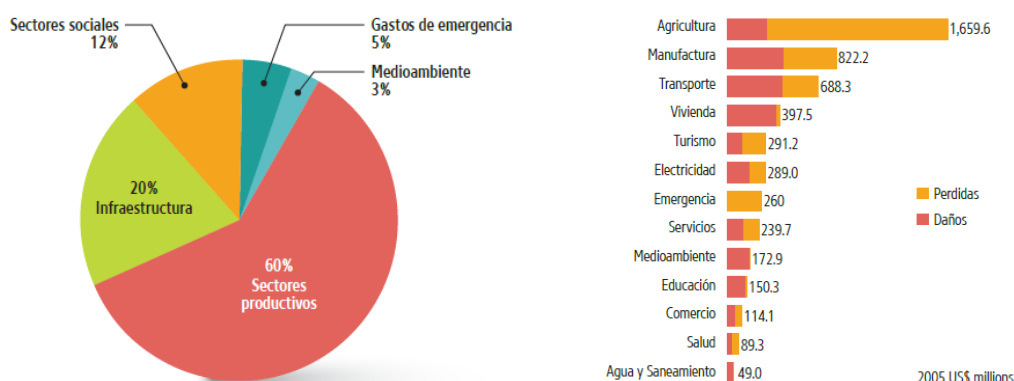


Fig. 6: Damage Caused by Sector for David, Federico, Georges, Jeanne and Noel

Source: (World Bank, 2015).

Currently the economic impact of hydrometeorological extreme events are estimated on USD 420 MM per year (an average from 1961-2014 period). In hurricanes cases, such these damages may exceed USD 1,997 MM (3.3% of GDP) (World Bank, 2015). The agricultural sector has been one of the most severely affected due to its high vulnerability to weather-related events. From 1979 to 2007, the sector has lost USD 1,659.6 MM as a result of the impact of extreme events -about 32% of the total loss from this period- and USD 220 MM from 2007 to 2012 (Ministerio de Agricultura, 2015).

Table 1: Damages to Agriculture by Storms and Hurricanes (2007-2012)

Year	Event	Economic Impact (DOP millions)	% Agricultural GDP	% Total GDP
2007	Noel and Olga	5,829	7.18%	0.43%
2011	Irene	413	0.35%	0.02%
2012	Excessive rains	86	0.07%	0.00%
2012	Isaac	929	0.71%	0.04%
2012	Sandy	993	0.76%	0.40%

Source: Ministerio de Agricultura, 2015

In terms of food security, it is important to mention that countries located in the tropics share the feature that most food crops are in the upper limit of the optimal production temperature, which means that little increases in the average temperature will result in a high decline in crop yields. As well, extreme rains reduce productive capacity of soils.

Water is recognized as a crosscutting resource underlying the National Development Strategy (República Dominicana, 2012) with direct linkages to Sustainable Development Goals. The consumptive demand for water resources is projected to increase 13% by 2030. The lack of potable water through incidences of extreme climate events such as droughts and floods, increase the exposure of people especially women and children to waterborne and other hygiene related diseases such as diarrhoea, amoeba, etc.

On the other hand, water resources in Dominican Republic play different key functions for the country's development: hydroelectric power generation (15% of total energy consumed), drinking water, irrigation and drainage, among others, have been affected by extreme events. (Berigüete, 2015) Additionally, the occurrence of plagues and diseases (as dengue, cholera, malaria, etc.) and modification of biophysical conditions (changes in temperature, humidity, rainfall, wind, etc.) are also consequences of climate changes that are affecting the water resources availability (Hatfield and Prueger, 2015).

Given the multiple uses of water, addressing problems of adaptation to the challenges that climate change poses cannot be achieved by those responsible for only managing water and acting in isolation, so multi-sectoral and multi-disciplinary collaborative responses are needed. However, given that a substantial proportion of population directly depend on agriculture for their livelihoods, it is particularly important that the relationship between water resources management and land management is cultivated.

It is also important to treat water resources as a natural resource in tandem with forestry and direct land uses, rather than a commodity, as this undermines its judicious use. Not only does the availability of water resources affect socio-economic conditions, but also its variations and especially the extremes (i.e., floods and droughts) present a serious hazard and threat to national growth and development (i.e. increased production costs).

- *Socioeconomic Vulnerability*

The Dominican Republic Human Development Index (HDI) for 2014 is 0.715, which puts the country in the high development (ranked 101). However, despite country's progress, the 2015 Report indicates that when the value is discounted for inequality, the HDI falls to 0.546. As well, climate threats may eclipse the achievements reached by the country in its current trends of development (United Nations Development Programme, 2015).

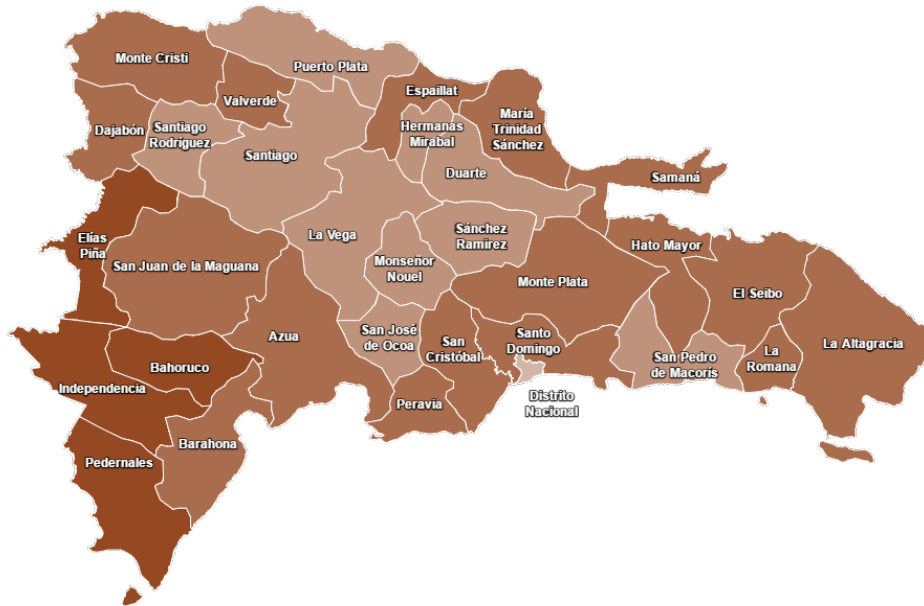


Fig. 7: Human Development Index by Province
 Source: (United Nations Development Programme, 2015).

An analysis included in the technical report “*The economics of climate change in Latin America and the Caribbean: Paradoxes and challenges of sustainable development*”, states that for the small Caribbean islands, the climate change challenge is particularly formidable because of their geographic, biological and socioeconomic characteristics. For example, some of these islands are in the paths typically taken by hurricanes, and a large portion of the population and their economic activities are located in coastal areas.

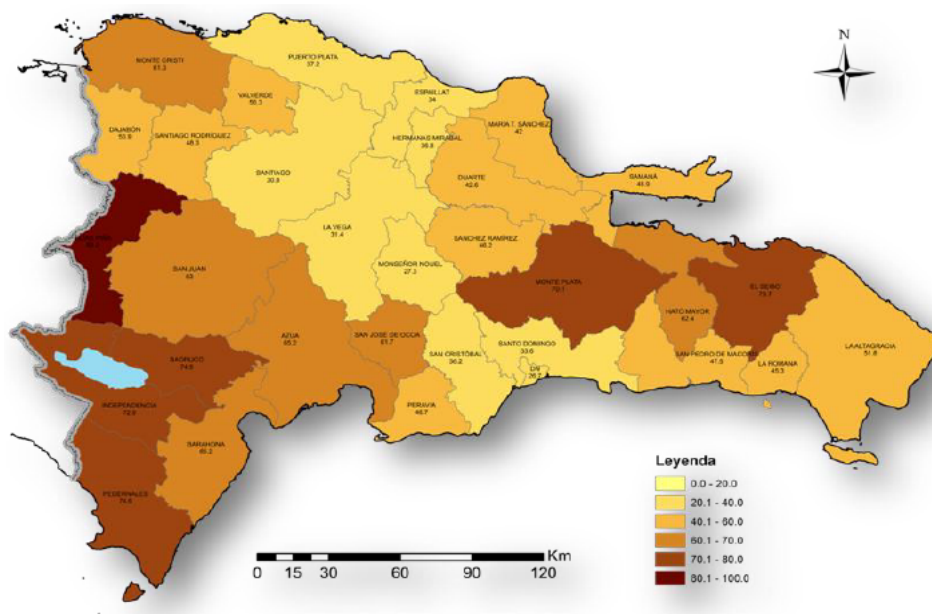


Fig. 8: Share of Households in Poverty by Province
 Source: (Morillo P., 2014).

In addition, the region is highly dependent on just a few types of economic activities, such as tourism and agriculture, which are particularly sensitive to climate conditions (Economic Commission for Latin America and the Caribbean, 2015). As almost 50% of households lives in poverty, climate vulnerability is significant development challenge. Studies on the interrelation between climate change and poverty shows that among 100 countries at greater risk due to climate change, Dominican Republic ranks 33 (Yohe et al., 2006).

- Adaptation Challenges

For the Dominican Republic, the top country priorities are related to attain an appropriate and efficient adaptation (Dominican Republic, 2012). In this context, the *Dominican Republic's National Action Plan for Climate Change Adaptation* (National Adaptation Programme of Action or NAPA or PANA-RD) identified the water resources, agricultural and food security, and public health as most vulnerable to climate change (Secretaría de Estado de Medio Ambiente y Recursos Naturales, 2008).

The evidence suggests that health impacts of climate change are transmitted through various mechanisms, such as heat waves, natural disasters triggered by extreme weather events and infectious diseases. The application of a predictive model shows that climate change drives up the number of cases of malaria, dengue, leptospirosis, zika and gastroenteritis relative to the baseline (Economic Commission for Latin America and the Caribbean, 2013c). This generates a variety of economic costs as productivity losses, hospitalization and medicines. These costs can, however, be lowered by implementing measures that focus on improving primary health care, water quality and sanitation.

Farming is particularly sensitive to weather and hydrological conditions. The results of analyses conducted for specific products vary a great deal and are associated with a high degree of uncertainty, with rice yields, for example, ranging from a 3% drop to a 2% increase by 2050, depending on the climate change scenario used. Declines of between 1% and 30% are expected for crops as cassava, bananas, sweet potatoes and tomatoes by 2050, again depending on the climate scenario on which the projections are based (Economic Commission for Latin America and the Caribbean, 2013d).

These decreases in yields will also have negative implications for employment in the agricultural sector and regional food security, as well as potentially driving up prices, which would, of course, have a disproportionate impact on the poor, and heightening the imbalance in the external sector. A number of different adaptation strategies have been proposed (e.g., water conservation schemes and early warning systems) that would have other positive side effects as well (Vergara et al., 2013).

Decreases experienced in the duration of the rainy season (5 months in last 36 months) and the overall volume of rain have led to a decline in production often associated with water shortage. Acute droughts are identified as the most significant risk over the mid and long-term (Arenas, 2016). 2014-2015 drought has caused damage to be

calculated². Due the accumulated impact on climate change on poor populations, it's reasonable to conclude that immediate adaptation shall be focused in water, agriculture and health.

Problem Statement: The Climate Change-induced Problem

- *Scope of Intervention*

There is a high degree of agreement in all national and regional scale analyses of vulnerability by various sources including government commissioned reports, studies of international organizations and independent scholastic research, that water resources and food security are especially most vulnerable to climate change. Adaptive capacity of many communities and regions are significantly higher nationwide due to low socioeconomic development on rural areas and heavy dependence of local economies and livelihoods on rain-fed systems such as agriculture and forestry.

Decreasing annual rainfall and increasingly erratic rainfall patterns due climate change, are adversely affecting rural livelihoods in almost all Dominican Republic's provinces especially agricultural and pastoral practices. Such decreases in rainfall and erratic patterns are also expressed as drought and flooding, posing enormous challenges to local communities to deal with such extreme events. Thus, against this backdrop, the problem statement, therefore, is that the livelihoods of communities are being affected to water-related impacts of climate change, such as reduction in water availability, increasingly erratic rainfall patterns and increased frequency of high intensity events.

Agriculture is a major driver of the Dominican Republic's economy, consistently contributing in 5.6% of GDP and employing 14% of the economically active population. The agricultural sector's contribution to national development is highly linked to its potential for poverty reduction. In almost all provinces much of the agriculture is rain fed and on a subsistence scale. Food crops are cultivated mostly in only one season. In addition, since the agricultural practice is dependent upon the availability and distribution of the rainfall over the rainy season months, farmers suffer significant losses when these rains fail.

The water storage potential of the agricultural landscape is not at its full potential, which restricts agricultural production potential. Land degradation, high rates of erosion and high intensity rainfall contribute significant volumes of sediment to the existing dams, reducing their water holding capacity (Berigüete, 2015). Efforts to reduce erosion such as re-afforestation and riparian zone management, coupled with efforts to de-silt and repair infrastructure will be necessary in order reduce the vulnerability of agriculture to increasing rainfall reductions and variability. In addition, a predicted overall reduction in rainfall, coupled with greater rainfall irregularity will have negative implications for the important hydropower component of Dominican Republic's energy sources.

² A comprehensive analysis of such drought and its impacts is included in “*Drought Boosts Science in Dominican Republic*”. Available at: <http://www.ipsnews.net/2016/01/drought-boosts-science-in-dominican-republic/>.

Non-sustainable forest management and high rate of deforestation is amplifying climate change impacts, manifested in the form of: scarcity of freshwater, desertification, loss of soil fertility, loss of agricultural productivity, and increased sensitivity to human and natural hazards (Secretaría de Estado de Medio Ambiente y Recursos Naturales, 2008).

- Programme Targeted Area

The study *Critical Points of the Vulnerability to Climate Change and the Variability in the Dominican Republic*, which analyses the climate vulnerability as a function of exposure, sensitivity and adaptive capacity in priority sectors: tourism, drinking water, agriculture, protected areas, energy and human settlements, provide the Country's first map of multidimensional vulnerability to climate change by Province (Izzo et al., 2012). From such maps (and other sources), following data is analysed for San Cristóbal Province:

Table 2: Critical Points Related Climate Change for San Cristóbal Province

Global Vulnerability		Poverty	DHI	Vulnerability by Sector					
Current	Future			Agriculture	Coastal	Tourism	Energy	Settlements	Water
High	Very high	36.2%	0.441	Very High	High	Mid	Very high	High	Very high

Based on Oficina Nacional de Estadísticas, 2014; Izzo et al., 2012.

As a result of an analysis of the vulnerability reported in this study, as well as expected climate changes and overall adaptive capacity, Water Management is selected for this proposal. As water is a mainstream and cross-cutting sector, other synergies can be potentially created.

Similar to other provinces of Dominican Republic, in general terms San Cristóbal has a mid-to-high degree of exposure to climate variability and climate change characterized by increasing temperatures and decreasing and erratic rainfall, which, when coupled with low socio-economic development, produce as higher vulnerability to climate change and high opportunities areas for climate change adaptation, mainly in the water sector.

EXPOSICIÓN, SENSIBILIDAD y CAPACIDAD DE ADAPTACIÓN

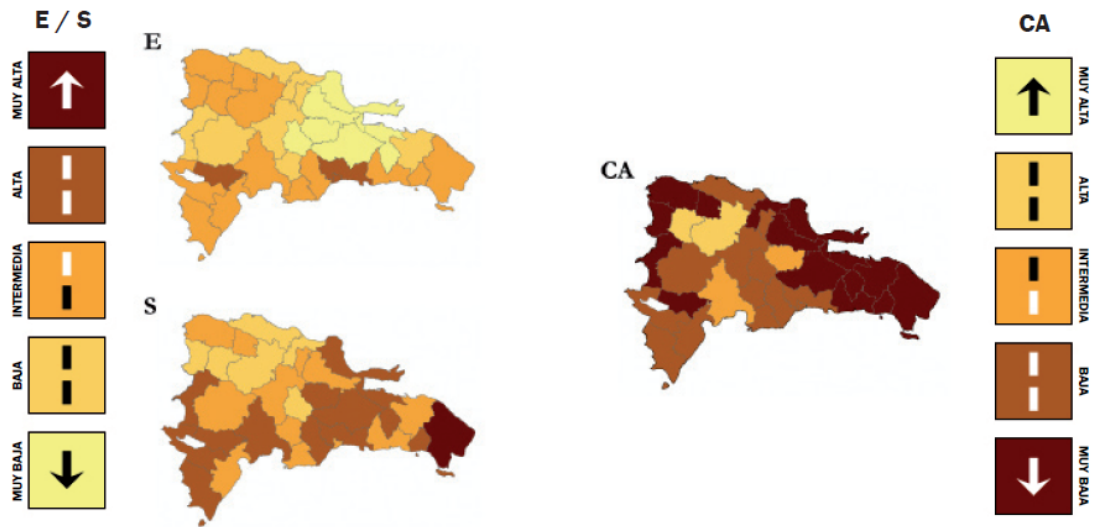


Fig. 9: Vulnerability of Hydric Resources by Province

Source: (Izzo et al., 2012)

- Targeted Area Context

San Cristóbal has a population of 0.57 million. According to last National Homes Survey of Multiple Purposes, 36.2% of the population has an income below the upper poverty line, while 6.4% is below the extreme poverty (Oficina Nacional de Estadísticas, 2014). Poverty is predominantly severe in rural areas accounting for more than 82% of poor. In six out of the fourteen municipalities, more than 50% of the population live in poverty.

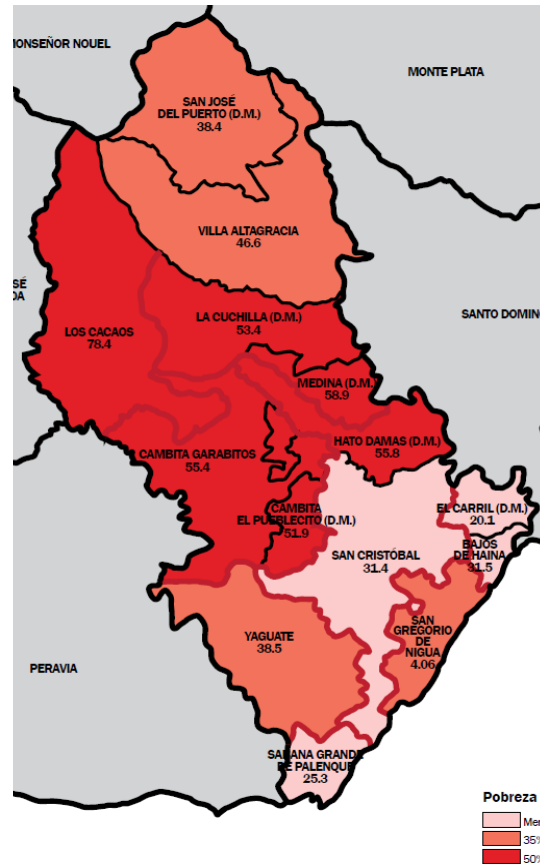


Fig. 9a: Poverty by Municipality in San Cristóbal Province

Source: Oficina Nacional de Estadísticas, 2014

Comparatively, San Cristóbal shows higher school attendance rates for all ages, which demonstrates a high turnover of capacity development through formal educational programmes. This constitutes an important factor in the adaptive capacity to climate change. According to most recent official statistics, 88% of population is literate.

The dominance of men over women, in terms of land’s ownership and other assets, access to and control of resources, and in decision-making, is overwhelming. Together with the low access of women to land ownership, women also have limited access to formal employs in non-agriculture activities (43.3%). All of these impose time constraints on women and tend to limit their awareness about opportunities, participation and development in general

The current situation in San Cristóbal’s ecological belts can be described, in terms of resource endowments (agriculture, water, mineral resources and energy), as affecting risks and vulnerability. The state of agriculture in the Province is characterized by a number of factors including the availability of land, comparative advantage in production of particular crops and untapped potential for livestock production. Despite showing some indication towards commercialization, subsistence agriculture remains prevalent.

San Cristóbal territory is about 1,265.77 km², representing 2.6% percent of national land area. Agricultural land currently under usage is 671.5 km² and there are 25,000 m² (2012) dedicated to agriculture under controlled environment. Average land holdings are 44 tares (5.8 hectares). Forest coverage is significant accounting for 554.2 km² (2012).

A significant proportion of arable land has soils with poor physical properties and low content of organic matter. Relatively good soils are ground water laterites, which tend to be limited in depth by hardpan. Soils are highly susceptible to erosion because of the thin vegetative coverage and torrential nature of poorly distributed rainfall. There is limited use of soil management practices (i.e., use of fertilizers, water management). This results, under these poor conditions, in low productivity in both crops and livestock.

San Cristóbal has received significant public investment in recent years. However, the Province still has a wealth of under-utilized resources to support an intensified agriculture modernization programme. These include a network of river basins with highly fertile areas (i.e., *Haina*, *Nigua* and *Nizao* rivers). These areas can become major agricultural production zones for different more-resilient crops, which can also be produced and marketed competitively over longer seasons than current crops.

In 2010, the percentage of households owning livestock ranges from a 51% percent (pigs, goats, cattle, poultries, etc.). Although generally higher than the rest of the country, livestock numbers per household are modest compared to agriculture land.

There is a visible developmental gap between urban and rural areas of the Province with the rural harbouring significantly higher levels of poverty. Almost all rural communities do not account with adequate water and sanitation systems and their economies depended heavily of agriculture (Oficina Nacional de Estadísticas, 2012).

- *Climate Change Impacts in the Target Area*

In terms of climate change vulnerability and adaptation needs, water availability is the single most important production and livelihoods sector for San Cristóbal. There is thus a clearly articulated need to counteract the negative impacts of climate change on water resources-reliant development and livelihoods. It is also necessary to look at the efficiency of water use. Likewise, the ability of water management to cope with floods and droughts is necessary in order to protect people, livelihoods and development.

According future climate scenarios, all regions of the Dominican Republic are expected to witness the widest range of temperature variability. One of the greatest influences of climate change on the environment has been desertification. According to the Ministry of Environment and Natural Resources (Ministerio de Medio Ambiente y Recursos Naturales, 2007), out of the 70% (~34,000 km²) of the Dominican Republic's total land area prone to desertification, 40% (~20,000 km²) is in the southwest region, which tends to increase, as recent assessments shows a diminishing precipitation (UNCCD, 2012).

Climate change is expected to have an impact on agricultural production by increasing pressure on water resources. Agriculture in the San Cristóbal province is predominantly rain-fed with less of 30% of irrigation potential developed. About 80% of the rainfall is received between May-June, August and October, and soil moisture surplus is found during these periods. Both the onset and the cessation of the rains are irregular and the temporal and spatial variability is high. Even within the regular humidity through the year, 14 to 17 days of dry spells are common from November to April (ONAMET, 2016). Potential evaporation is in the range of 1600 mm per year. In most areas, most of the soils have a mid-to-low water holding capacity due to their textured nature and organic matter content³. High surface runoff rates during the rainy months result in silting up of water storage facilities, such as small dams and community retention ponds. High evaporation rates in the dry and hot season, a siltation driven by erosion and land clearing, contributes to reduced water holding capacity, and rapid drying up of these retention ponds.

On the other hand, flood events are relevant for southern municipalities of San Cristóbal (which are coastal areas), partly due to the impacts of climate change in the form of extreme rainfall. Flooding results in a loss of crops, waterborne diseases and loss of life.

In this context, the proposed Programme will assist existing efforts (and promote and motivate the development of others) supporting communities to rehabilitate and to improve storage tanks, reservoirs, small dams and retention ponds infrastructure, to increase availability of water for agricultural and domestic use. Re-forestation programmes will also be supported to reduce siltation in small retention ponds and dams by reducing erosion.

Climate Change Trends in Targeted Area

- ***Climate Impacts on Water Resources***

Climate change is expected to exacerbate the current situation due to its impact on water resources and thus also on programmes and activities of water-dependent sectors such as agriculture. According to relatively recent studies from World Bank and FAO, which include information related to climate change scenarios for water resources states for *Haina*, *Nizao*, and *Nigua* (representative basins of San Cristóbal) points to:

- Runoff or discharges in all three basins are sensitive to changes in precipitation and temperature and thus to climate change. A 15% change in precipitation or a 1°C rise in temperature could cause a reduction in runoff bigger than 35%⁴;
- Simulations using climate change scenarios indicated reductions in flows between 14-24 percent and 32-46% for 2020 and 2050 respectively;

³ *National Action Programme to Combat the Desertification and National Strategy for Sustainable Management of Soils in the Dominican Republic*. Ministerio de Medio Ambiente y Recursos Naturales (2015).

⁴ This impact is significantly bigger than the expected –under same premises– for other significant basins of the Dominican Republic, like as *Yaque del Norte* or *Yuna*, which decreasing potential could range among 18 to 22%.

- Climate change could cause reduction in groundwater recharge between 8 and 15% by 2030 (reductions for 2070 are projected to be between 29 and 32%, but this last value has not been clearly confirmed in the Third National Communication's draft);
- Irrigation water demand could be affected considerably by climate change as well. Personnel from INDRHI and Ministry of Agriculture, consider increases in irrigation water demand about 40 to 60% for 2030, and up to 85 to 95% to 2050;
- The climatic scenarios included in Second and Third National Communication shows that the three basin were marginally vulnerable in 1990, vulnerable (water stressed) in 2030, and extremely vulnerable (water scarcity) in 2050 to 2070.

Expected climate change impacts in San Cristóbal (and other provinces of the southwest of the Dominican Republic) will severely impact the livelihoods of rural communities following their high dependence on climate-impacted sectors like agriculture, livestock production, etc. There is, therefore, the need to minimize impact of climate change on traditional livelihoods through providing alternatives and diversification. Under the proposed programme, some resources from AF will be invested to implement a component of livelihoods diversification from the traditional ones (particularly rain-fed agriculture) and that are capable of creating independent, profitable and more resilient sources of incomes for the local communities. This is crucial as forest/ agriculture safety nets are lost following the rapid loss of forest cover and other poverty related drivers.

Though San Cristóbal has a comparatively high literacy rate (88% of the population), the Province still lags behind many other provinces in terms of educational indicators. This impacts negatively on the local capacity to adapt to climate change. According to the most recent Dominican Republic's National Household Survey for Multiple Purposes (ENHOGAR), the Province have a household size of 5.6, one the highest of the entire country (Oficina Nacional de Estadísticas, 2016).

About 33% of households in San Cristóbal have access to pipe-borne water. In rural areas, the majority of households get their water from wells or natural sources (rivers, streams, rainwater, dugouts, ponds, dams, etc.). This demonstrates the vulnerability of household water supply to climate change impacts as temperature increases and rainfall amount reduces. With regards to other social amenities in the Province, almost 15% of households directly depend on wood as a source of cooking fuel and 49% does not have access to public lighting. Over 60% have no formal solid waste collection service and 57% does not have formal toilet facilities (in almost all the country waste water and solid waste typically are dumped to rivers and streams without an efficient treatment) (Oficina Nacional de Estadísticas, 2012). As majority of agriculture and livestock activities in San Cristóbal take place in the poorest areas, the predicted trend in climate change in the Province is therefore likely to have severe impacts on the livelihoods of communities, which will be exacerbated by the poverty.

- Climate Change Impacts and Drivers

Much of the poverty in the San Cristóbal Province is risk and vulnerability induced. This exposure to risks and vulnerabilities is determined by a number of factors, ranging from natural, social, and human made causes⁵. These include –*inter alia*- the following:

Climate induced risks and vulnerabilities: about 72% of the rural population of the San Cristóbal Province depends on unimodal rain fed agriculture for their food, income and livelihoods. Therefore, events as droughts and floods have multiple effects on the coping habits of the people. With climate change, it is expected that the frequency, incidence and intensity of both droughts and floods will increase and hence erode the viability of coping strategies overtime. This could cause people to abandon the activity.

Limited opportunities for off farm/ non-farm activities: The Province is highly dependent on food crop farming, livestock and some forestry, with very little opportunity for non-farm activities (except for the limited urban based jobs, thus provoking large scale migration to Santo Domingo). The share of household income derived from non-farm activities remains significantly mid-to-low, compared with the rest of the country and other areas with industrial development (as *San Isidro, Santiago, La Romana, San Pedro, or Herrera*) or mining activities. For four to five months in the year, the majority of the agricultural population in San Cristóbal has no alternative or complementary means of securing their livelihoods, as infrastructure to support off-season agricultural activities are underdeveloped or non-existent.

Although small farmers usually engage in domestic or micro-agro processing initiatives such as coffee, onion, corn, coffee, and coconut, the markets for these products are underdeveloped, due to the production limited by the lack of technology and ineffective commercial practices. Therefore, these small-scale activities will provide a boost to business growth and development. In the case of bigger plantations (as sugarcane and orange), these typically are intensive on a yearly basis, but each off-season means no income for farmers. The livestock sector that holds a promise for providing alternative sources of income is also largely underdeveloped due to limited investments in the sector. Consequently, the opportunities for supplementing food safety and decent income from the rain-fed subsistent farming activities during the long dry season are limited.

Weakening Traditional Safety Nets: Mutual support initiatives, community savings, and remittances from friends and family members living outside the country (mainly USA and Europe) once served as an important source of supplementary food, income, and livelihood support to the families in San Cristóbal (as the rest of the country). However, due to social and economic pressures, this traditional safety net mechanism has been weakened, thereby increasing exposure of the poor, especially women, children and the aged to greater and increasingly more protracted poverty induced vulnerabilities.

⁵ These causes does not include the lack of mainstreaming of poverty and environment linkages and climate change into planning tools for territorial and land use development planning. This stills means a significant challenge for the Dominican Republic, as is noted in the last country profile of the UNDP-UNEP Poverty-Environment Initiative.

Incidentally, the risk exposure of these subcategories of the population to poverty induced vulnerability is greater because they face considerable cultural and institutional obstacles in gaining access to productive resources such as land, credit, and other support services for their farm and off-farm income generation ventures. This Programme will build on ongoing income generating activities in the Province as food processing, honey, fishing, handcraft, etc. Efforts to retrain community members in other marketable skills will also assist communities to reduce their reliance on rain-fed agriculture and conventional livestock, reducing their vulnerability to climatic shocks.

- *Adaptation Challenges and Potential Solutions*

Climate change presents societies with a variety of new challenges, especially in the poorest areas, as changes in mean temperature affect food productivity and water availability, triggering other burden of malnutrition, diarrheal illnesses and other water and airborne infections (Huq, 2014). Dominican Republic's water resources and water supply systems are vulnerable to current climatic patterns, its variability and expected droughts and flooding. Similarly, the production 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 affecting water resources and supply.

Both vulnerability and adaptive capacity are uneven, and in many cases, it is the most vulnerable individuals and communities who are least able to adapt. This further shapes the scale and types of adaptation actions required in response to the nature and context of the climatic vulnerability. The primary problem to be addressed by the proposed Programme, and that requires adaptation, is climate change-induced decreases in the availability and increasing unpredictability of water resources, and associated negative impacts of this on the livelihoods of rural communities in San Cristóbal Province.

Under such circumstances, preferred solutions for adaptation should address climate impacts on water availability and well as measures that reduce the vulnerability of sectors (e.g. agriculture, livestock, forestry, etc.) supporting community livelihoods in poorest areas. Although the consequences of climate change effects on water have been well established (República Dominicana, 2012), an understanding on how to cope with the potential impacts at regional, national and local levels is still not properly managed by developing countries due to limited investigation to generate knowledge required for adaptation and resilience of natural or human systems to actual or expected climatic threats (Berigüete, 2015). There is need for in-depth knowledge in addressing the underlying causes of vulnerability of water resources in order to tailor adaptation measures and adequate interventions. Adapting water management systems to ensure regular supply and distribution under climate change so as to reduce the vulnerability of local communities and their livelihoods activities remain a significant challenge in all the Dominican Republic. Natural disasters, as floods, droughts, wildfires and water related diseases have occurred in several areas of San Cristóbal in the past two decades and now becoming more frequent and intense, have led to seasonal stress to poorest persons.

The adaptation actions proposed by this Programme will target the principal causes of vulnerability identified in the Province and include the following key elements

- a) Water resource management planning taking into account the impacts of climate change;

Although the Government of the Dominican Republic has invested in major catchment development programmes, the basin wide management plan for the *Yaque del Norte*, for example, fails to take into consideration climate change impacts and the vulnerability of the sectors and communities that depend on the river as their primary source of water. Furthermore, there are currently only overarching management plans for the three biggest basins, but these are without plans for the small basins and tributaries directly used by local communities, and -by the way- a generalized lack of systems for early warning and quick response, as evidenced the recent floods in November 2016⁶. Due to the lack of resources and capacities for both the main basin and the sub-basins, climate change has not been mainstreamed into the current water resource management planning.

The importance of this Programme's interventions, therefore, is to ensure that water as a natural resource, can sustainably provide the range of goods and services required for social, economic and environmental adaptation. Therefore, some of the proposed measures targeting the underlying sources of vulnerability for communities (and creating links with key policy institutions) affecting their capacities for climate change adaptation are provided under the main sources of vulnerability identified above.

The enhancement of current water management plans for catchments (where available) with plans and for small subcatchments is considered, as well as mainstreaming climate change into current and future water management plans of both the main catchment and subcatchments. Although these are considered as important measures for mid and long-term adaptation, the Programme resources will be used to develop community level water management plans, which take into consideration future climate change and linked to the higher level management plans at the catchment and sub-catchment levels (a *bottom-up* approach).

In order to increase the resilience of communities against the adverse impacts of climate change and variability through water sources management, concerted efforts will be made with the central Government and Municipalities in scaling up an integrated water resource management to include climate change adaptation issues. This is considered as a *good practice* and an effective way to maximize water quality and quantity to meet water needs for consumptive use and aquatic ecosystems by integrating water and land-use decision-making by national agencies. In this case, the

⁶ On November 2016, four weeks of prolonged rains, floods and landslides affected the northern of the Dominican Republic causing over 20 deaths, displacing more than 20,000 people, isolating 130 communities and causing several damages on houses, hospitals, roads and communications systems. Floods damaged of agriculture and infrastructure is around US\$5.0 billion. The disaster has forced the Government to decree a state of emergency to channel resources to affected areas, practically the country's entire northern, northwest and northeast regions.

AF resources will support government institutions to implement long-term water resource planning and management, which is an effective means of increasing resilience to climate change impacts. In this context, the Programme could create a significant impact at national level, with the possibility to be further emulated by other provinces and/or countries.

Mainstreaming adaptation into the integrated water resources management will help local communities who are usually the most vulnerable in society, to respond timely to climate change disasters. More practically, the Programme will draw on diverse options for adaptation of water management strategies, such as:

1. Conserve water supplies more efficiently;
2. Adopt innovative means of harnessing water, especially supplies for irrigation and livestock watering;
3. Increase water storage and improve availability and quality;
4. Explore the role of groundwater; and
5. Improve water basin management, and restore ecosystems through catchments protection and buffer zones.

This strategy is based on the four principles formulated by the International Conference on Water and the Environment (Dublin, 1992) that includes: *i)* Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment; *ii)* Water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels; *iii)* Women play a key part in the provision, management and safeguarding of water; and *iv)* Water has an economic value in all its competing uses and should be recognized as an economic good.

- b) Grassroots participation in water management planning and community capacity for the implementation of water resource management activities to reduce vulnerability to climate change impacts on community livelihoods.

There are a limited numbers of communities that benefit from reliable community water supplies in San Cristóbal. As occurs in other areas of the county, historically there is a limited human capacity development related with high levels of poverty and very limited financial resources for investment in agricultural management techniques and water capture and storage infrastructure. There is also a weak knowledge base and capacity for effective water capture, management and conservation in addressing climate-induced shortages in water supply. Management planning and implementation is required to expand the number of beneficiaries and to enhance climate resilient management of water resources in communities in the San Cristóbal Province.

To establish community supply and management plans drawing from diverse sources of water supply in addressing shortages under climate change, it is crucial to achieve this in a large number of communities. Importantly, this will require financial support for the operationalization of community plans, such as an improvement of infrastructure for water harvesting, storage and distribution. Mainstreaming adaptation into water management planning of communities will help the most vulnerable to respond timely to climate disasters and improve the resilience of water supply sources as is noted above.

Following the predominance of smallholders' community activities, proper coordination systems will be put in place for water management planning to improve on their cost effectiveness and to reduce transaction costs. Consequently, this will improve on the competitiveness of agricultural products in the market following post-harvest and other climate-risk sharing measures and the ability to manage water resources. Importantly, emphasis will be placed on developing and building the capacity of existing community level institutions where possible, taking advantage of existing institutional arrangements (i.e., Irrigation User Committees).

- c) Diversification of livelihoods of local communities as safety nets to climate change impacts.

There is over-reliance on rain-fed water supply for agriculture and livestock that makes communities vulnerable to climate change, with limited capacity to capture, manage and conserve water. Because of erratic rainfall patterns, there is limited ability to increase productivity and improve capacity for livelihood diversification. As well, agricultural practices can be adapted to take advantage of any improved supplies to water that are possible, but also to be more resilient to low water conditions, moving away from a reliance on rainwater. Significant financial resources and capacity enhancement are necessary to provide the knowledge and alternative means of livelihood activities and the ability for agricultural intensification. Regarding this matter, strategies to be considered include:

1. Diversification of Livelihoods. Improving rainwater harvesting, water storage and conservation techniques by the local communities is crucial since such measures have the potential to create chances for livelihoods diversification in addressing climate risks in a zone that is currently heavily dependent on rain-fed agriculture⁷. These adaptation solutions will have a particular focus on supporting livelihoods options for women, who are very often most vulnerable to the climate change.
2. Improving water supply systems to enhance agricultural process. Encouraging small-scale irrigation schemes and instituting water-harvesting measures will provide adaptation solutions for improving agricultural productivity and improving community livelihoods. This is particularly important to achieve sustainability.

⁷ The diversification of livelihood options into sectors that are not dependent on rainfall will be supported. This could include options such as fisheries, food processing, small ruminants, tree seedling nurseries, handcraft, etc.

3. Improving agricultural techniques. Encouraging the use and -where appropriate- development of agricultural techniques and approaches more favourable than those used currently in future water availability scenarios. This includes the use of seed varieties that enable adaptation to a changing climate and rapidly maturing varieties that secure production during a decreasing growing season.

- d) Institutional and community capacity enhancement to deal with climate risks.

The current knowledge base on the impacts of climate change on the water resources at community level is weak to support institutional processes and development, from a regional to local institutional level. Improving the knowledge base in institutions to support *on-the-ground* measures in terms of water resource management and livelihoods diversification is an important solution targeted in the Programme. Building the capacity of local communities and local and national institutions in addressing climate change will also provide sustainability and required ownership of the Programme.

Development and dissemination of knowledge products on alternative livelihoods options and community level water management, as well as strengthening institutional capacity via *learning-by-doing* are crucial measures for adaptation that will be further carried out.

- e) Promoting land tenure systems favouring contiguous crop fields for supply of services

To improve productivity of crop fields and efficiency in the use of inputs / outputs and other services, land use planning and tenure systems that provide for time contiguous crop fields for local communities will be advocated. There are some institutional regulations for the clearing of trees in riparian zones, but enforcement remains a challenge. Through dissemination of good practices, pilot interventions, and the incorporation of decisions-makers to dialogue with communities, the Programme can to support the key institutions to enforce such regulations (i.e., providing livelihoods incentives to communities to reforest/afforest, or piloting some payment for environmental services). Community sensitization in the course of carrying out the activities will reinforce the value of ecosystem services for enhancing livelihoods and for disaster risk reduction. In addition, in the course of carrying out soil suitability analysis for the various project interventions, the Programme will contribute information regarding soil suitability within the target communities. This information will help farmers and authorities to plan land use better and will be an instrumental tool to prevent indiscriminate land destruction.

- f) Adapting Agricultural Practices

Agricultural practices will be adapted to take advantage of any improved supplies to water that are possible, but also to be more resilient to low water conditions, moving away from a reliance on rainwater. For example, lessons can be sought from other

areas (likely, drier ones), and successful initiatives where the water availability results in a better agriculture (as bigger yields, more resilient crops, and less water-demanding).

- Identified Barriers to Potential Solutions

The persistence of risks and the exacerbation of vulnerability in San Cristóbal Province (as many other places of the Dominican Republic) also derive from an intricate network of causal factors that have their roots, in many cases, in both historical and contemporary failures of development policies. Central to these are some major barriers that limit the realization of the preferred solutions for adaptation. Addressing these barriers will constitute the overarching change instigated by the Programme in order to reduce vulnerability of the local communities in the targeted area. Some of the barriers to the expected outcomes in providing preferred solutions for adaptation are the following:

a. Improved planning and management of water resources taking into account climate change impacts on surface and groundwater sources.

Limited institutional capacity in integrating climate change in water resources planning and management in the San Cristóbal Province. Attention on climate change in the Dominican Republic has gained momentum both at the highest political level and across sectors. At the policy level, climate change adaptation is referred into the Constitution of the Dominican Republic (Dominican Republic, 2010) and main national development policies, in particular, the National Development Strategy, coordinated by the Ministry of Economy, Planning and Development (MEPYD). The Ministry of Environment and Natural Resources and the National Council for Climate Change and CDM (CNCCMDL) are the leading institutions for climate change and UNFCCC activities in the country and are in charge -jointly MEPYD- of the National Policy on Climate Change (PNCC). Other institutions as The Ministry of Higher Education, Science and Technology (MESCYT) is financing some research regarding climate change carried by local universities. Other Ministries have developed their own sectorial policies on climate change and resilience.

At the implementation level, the Ministry of Environment is the main entity for governmental coordination of activities on climate change adaptation (as CNCCMDL does in mitigation), the UNFCCC and some other environmental conventions ratified by the Dominican Republic. Within the Ministry, a “Department on Climate Change” has been established. The capacity of these and other institutions to mainstream climate change resilience into their activities is being addressed by international agencies programmes (as GIZ, JICA, USAID, AECID, World Bank and UNDP). However, detailed technical capacity to respond to specific climate-induced problems, particularly the development and implementation of solutions *on-the-ground*, such as those relating to water resources, food safety and resilient livelihoods, remains low. For example, there is a lack of climate change projections and impact analysis for the *Yaque del Norte*, *Yaque del Sur*, *Yuna* and *Artibonito* rivers basins, which are crucial in managing climate change impacts on the water catchment and the vulnerability of the sectors and communities that depend on it for their water supply (almost all the country’s population).

Through dialogue and cooperation with key government institutions, the AF resources can catalyse other funds and/or to create synergies with other ongoing programmes in the country to contribute towards raising institutional capacity to increase community resilience in the San Cristóbal Province to climate change induced problems relating to water resources and livelihoods. It is expected that the Programme will achieve this through the key institutions (i.e., government agencies and local governments) with the full involvement and ownership by the local communities, in the adaptation activities, as well as generating knowledge products and dissemination mechanisms to assist in future understanding of problems and implementation of solutions.

Limited capacity to manage trans-border sources of risks and vulnerabilities. Much of San Cristóbal Province also shares common borders with neighbouring provinces (i.e., *Peravia, San José de Ocoa, Monseñor Nouel, Monte Plata* and *Santo Domingo*), meaning that there are potential off-site vulnerabilities resulting from the transboundary users of the water resources. There are documented cases of flooding triggered by weak coordination in the management of the basin across limits and/or institutions. Following the transboundary nature of the water basins in the Province, this might pose a barrier to implementation of some adaptation measures, as the activities of up-river provinces including those intended to increase their own resilience to climate change impacts. (For example, in recent floods of November, the opening of the Taveras Dam in *Santiago* has resulted in flood problems in *Santiago Rodríguez*, and *Monstecristi*, which are downstream of the dam). These issues can, at least in part, be overcome by this Programme using the currently established regional institutional platform of the *Commonwealth of Municipalities Madre de las Aguas* between *Jarabacoa, Constanza, Jánico, San José del as Matas y Monción*, as well the INDRHI (National Institute for Water Resources), EGEHID (hydroelectric generation public company), NAMET (National Office of Meteorology) COE (Emergency Operations Centre) and the Ministry of Agriculture monitoring changes in the rivers basins, by providing them with critical data and knowledge materials for the management of shared water bodies.

The proposed Programme will help key institutions in improving institutional capacity and coordination abilities in order to manage trans-border risks better. Enhancing the capacity of local communities in floodwater harvesting and storage will provide opportunities for livelihoods diversification during periods of water shortages such market gardening, local brick construction, etc.

b. Climate resilient management of water resources by communities in San Cristóbal.

Poor rural communities and local organizations currently lack incentives and preparedness to manage and provide better oversight to the management of natural resources, especially water resources. Risks and vulnerability in the Province are often exacerbated by increased human induced disasters under poor management of resources, which sometimes degenerate into conflicts. Indeed, in San Cristóbal has been home to most recurrent cases of conflicts by the land property in the Dominican Republic (being two examples the lands of former *Rio Haina* and *Catarey* sugarmills).

Historical consultations, undertaken in support of the development of this proposal, have revealed that water resources are also sources of conflicts between communities and farmers, especially for the dilemma agriculture-livestock-human consumption water.

Food and income vulnerabilities in San Cristóbal are accentuated by the limited investment in the development of agricultural infrastructure in the Province. Incidentally, the limited investment in the construction of small dams, retention ponds and the judicious management of watersheds is not only negatively impacting on the ability of many areas to produce food for home consumption and the market, it also creates the situation where the poor management of water resources have contributed to increased risks and vulnerabilities due to weather-induced disasters. For example, the high rates of surface water run-off during the short rainy season not only washes off the top of the already fragile and exhausted soils; the flash floods associated with the sudden and heavy downpours constantly destroy life and property of communities caught in their pathways. This affects the short and long term livelihood security of communities lying within the drainage paths of major rivers such as *Nizao*, *Haina* and *Nigua* rivers.

c. Enhanced diversification of livelihoods of communities in San Cristóbal.

There is a generalized lack of knowledge regarding alternative livelihoods as safety nets for communities, as well as a deep-seated cultural situation in which communities remain rooted in rain-fed agriculture as a means of existence, and do not look for opportunities for economic advancement. There is a national recognition that agriculture is a vehicle for growth and poverty reduction in the Dominican Republic⁸. However, the dwindling agricultural production and productivity for food and cash crop in the target area is due to the over dependence on rain-fed agricultural, coupled with dwindling soil fertility and outmoded agricultural practices (slash and burn techniques, shifting cultivation, etc.). These local factors have been exacerbated by ineffective agricultural policies and inadequate investments in infrastructure support systems for the agricultural sector such as irrigation and agricultural market systems to promote efficiency and diversification in production. Other places much drier than San Cristóbal are known to produce more home-grown cereals and vegetables, largely due to their investment in the development of basic infrastructure for in and off season farming. As well, this has been made possible by the development and/or adaptation of low cost appropriate technologies to enhance agricultural production. Countries like Israel and Taiwan shows that simpler and cheaper technologies for harvesting and use of rain water catchment systems could yield immense benefits in agricultural productivity and poverty reduction.

The higher population density in San Cristóbal, approximately 460 persons per square kilometre, does not limit continuous land expansion practices (mainly towards forest zones and protected areas) as opposed to intensification practices to improve crop yield under climate change. There are, however, opportunities to overcome this barrier.

⁸ Inauguration of President Danilo Medina speech on August 16, 2012. This statement started an ongoing program of “surprise visits” where communities and producers are motivated to formalize themselves in order to receive soft loans from the government to finance economical activities. Such activities have mobilized DOP 33.8 bn in 5 years.

Agricultural growth through intensification is possible because of the current gap between potential yields and achieved yields that provide the opportunity to increase yield on the same piece of land. Secondly, the agro-ecology, in general, supports a wide range of arable crops. Using the Programme resources in improving year-round water availability, the communities and producers will create emerging income generating opportunities in market gardening and livelihoods diversification (i.e., fishing, construction etc.) that would shift communities away from purely climate dependent sectors.

d. Improved knowledge and institutional capacity for coordination, management of water resources and diversification of livelihoods of communities in San Cristóbal.

The most important asset for the development of any province is its human resources. Unfortunately, the quality and potential of this human resource base has remained largely underdeveloped and untapped due to the limited investment in the provision of access to good quality education and other capacity development programmes at all levels. Eighty-five years after its creation, the San Cristóbal Province still lags behind many other provinces in terms of educational development, even though the people embraced education as the ladder for social mobility out of poverty, despite the late start and the current limitations of the Dominican educational sector. The proposed Programme will help to address this barrier through a range of capacity development and knowledge generation activities by communities and national institutions in the region, with an emphasis on using concrete demonstration actions that enable a *learning-by-doing* process. This is crucial for sustainability of the implemented actions.

Above discussed barriers are under the expected outcomes in considered solutions:

Table 3: Barriers to Achieving Preferred Solutions

Considered Solutions	Identified barriers
Improved planning and management of water resources taking into account climate change impacts on surface and groundwater sources	Limited institutional and community capacity in integrating climate change in water resources planning and management. Limited capacity to manage trans-border (with other provinces) sources of risks and vulnerabilities.
Smart-climate resilient management of water resources by communities of San Cristóbal	Lack of incentives and preparedness to manage and oversight the management of natural resources. Income vulnerability accentuated by the limited investment into develop community infrastructure.
Enhanced diversification of livelihoods of communities through better water services	Lack of knowledge regarding on alternative livelihoods as safety nets for communities. Deep-seated cultural beliefs in which communities remain rooted in rain-fed agriculture as a means of existence.
Institutional and community capacity enhancement to deal with climate risks.	The quality and potential of human resource still is largely underdeveloped and untapped due to limited investment in the provision of access to good quality education and other capacity development programmes at all levels.

Based on McSweeney et al., 2015; Christensen et al., 2007

- Other Adaptation Challenges

San Cristóbal has a high degree of vulnerability, due the significant amount of human activities within protected areas (272.62 km², 22% of the province area). In most cases, human activities are incompatible with the protection measures established by the laws (i.e., extraction of materials from rivers, subsistence agriculture in wooded areas, etc.).

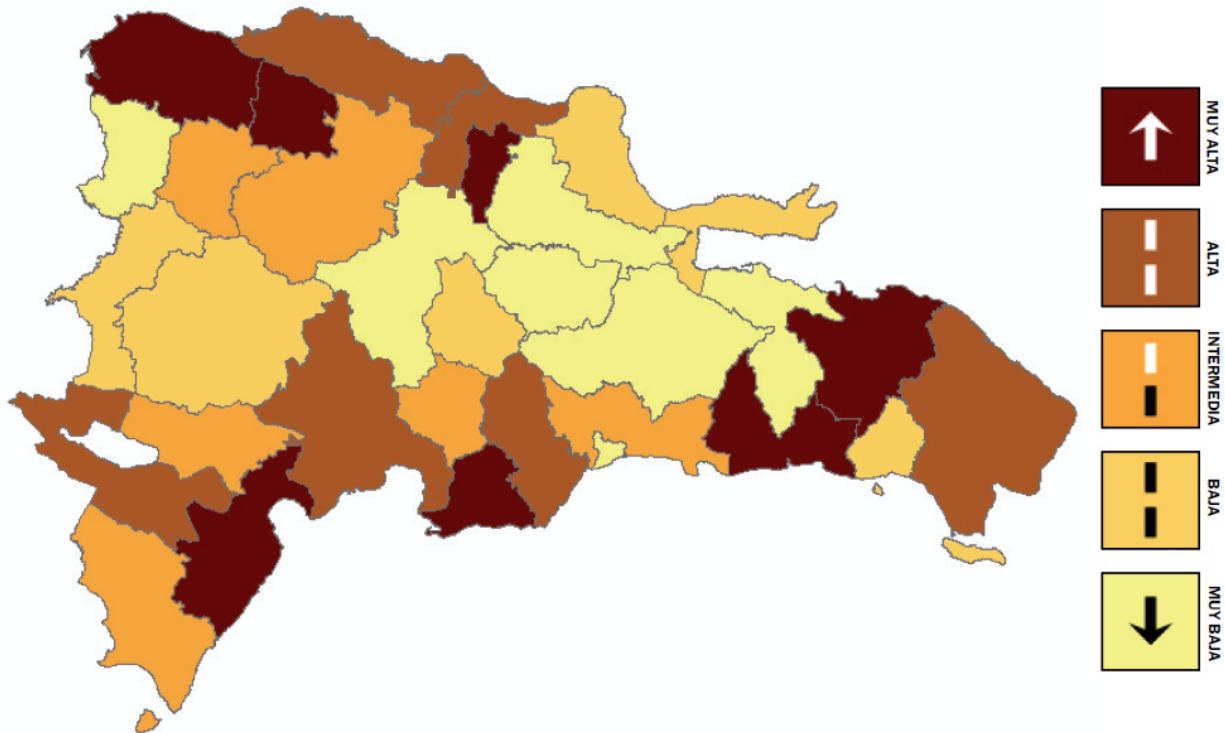


Fig. 9b: Vulnerability of Protected Areas by Province

Source: (Izzo et al., 2012)

According with the lasted pollution index (Blacksmith Institute, 2015), San Cristóbal is one of most polluted places in the world, due the enormous industrial and chemical activity existing in *Bajos de Haina* (referred typically as “Dominican Chernobyl”). Other climate-related impacts have been identified as biodiversity losses and sea level rise.

Problems to be addressed

The Programme seeks to address the negative impacts that the forecasted variations in temperature and precipitation will have on San Cristóbal in terms of water management, due to the greater number of warmer days, longer dry periods and increase in drought events, greater intensity of rains in a shorter time period. These climate threats will increase the vulnerability of the rural population, especially for the small producer and poor households. This is exacerbated by the following underlying drivers of vulnerability: strong dependence on rain-fed agriculture; higher soil degradation due to prolonged use; insufficient soil and water conservation practices; high poverty levels; deforestation and degradation of areas; and lack of adequate water supply and sanitation services.

The proposed Programme will address specific climate threats over hydric resources and management in targeted areas. These threats include variations in temperature and rainfall patterns, increasing extreme weather events (as storms), increasing severity of droughts, and the lack of resources and capacities to manage their water resources and public health. This will have other positive impacts on most vulnerable populations of San Cristóbal Province, as agriculture, livestock, health care and livelihoods, namely small producers and vulnerable communities, who are the Programme's target population.

Table 4: Programme Targeted Areas

Community	Population	Poverty	Vulnerability
San Cristóbal (main city)	216,875	31.4%	Medium
Hato Damas (DM)	15,894	55.8%	Very High
Sabana Grande de Palenque	15,466	25.3%	Very High
Bajos de Haina	83,582	31.5%	Very High
El Carril (DM)	40,611	20.1%	High
Cambita Garabitos	20,655	55.4%	Very High
Cambita el Pueblecito (DM)	10,402	51.9%	Very High
Villa Altagracia	53,576	46.6%	High
San José del Pueto (DM)	14,493	38.4%	Very High
Medina (DM)	7,066	58.9%	Very High
La Cuchilla (DM)	9,177	53.4%	Very High
Yaguata	42,325	38.5%	Medium
San Gregorio de Nigua	30,268	4.1%	Medium
Los Cacaos	9,540	78.4%	Very High
TOTAL	569,930		

Based on Oficina Nacional de Estadísticas, 2014; Izzo et al., 2012.

Building on consultations with civil society and government institutions, the Programme will target all San Cristóbal municipalities (based on a preliminary assessment). At specific community level, interventions will be based on its vulnerability, population, poverty, social cohesion and overall program efficiency, avoiding duplication of efforts.

Project / Programme Objectives:

Water is highly relevant to the thematic priorities and crosscutting issues of Dominican Republic's development agenda and rural livelihoods activities. Integrated management of water resources that takes into consideration climate change, especially in river catchment, subcatchments and other sources of water supply for rural communities, is therefore a pre-requisite for any water-related intervention in addressing climate change impacts and vulnerability of communities. Therefore, cross-sectoral and inter-community coordination is highly essential in addressing climate impacts on multiple sectors and regions of Dominican society and to improve the efficiency and effectiveness of water capture and distribution and reduce losses and wastefulness of water.

The Programme is designed to support the implementation of the national priorities for climate change adaptation outlined in the National Adaptation Programme of Action

(PANA-RD) as well as those highlighted in the Draft of Third National Communication. Out of the ten priorities listed in the PANA-RD, the Programme, with support of the Adaptation Fund, will directly work to priorities (a) and (c), and contribute to priority (g):

- Priority (a): water resources.
- Priority (c): agriculture and food safety.
- Priority (g): settlement and infrastructure.

Furthermore, the Programme is also meant to address climate change adaptation in most vulnerable areas of the San Cristobal Province, especially building on findings and recommendations included in Critical Points of the Vulnerability to Climate Change and the Variability in the Dominican Republic related to water resources management, food safety and resilient livelihoods. The Programme will also seek to support the implementation of the National Policy on Climate Change (PNCC), which provides strategic direction and coordinates issues of climate change in the Dominican Republic. To address the climate change adaptation issues in the country, natural resource management, agriculture and food security, and disaster preparedness and response have been identified as part of the broad thematic areas of the PNCC.

List the main objectives of the Programme.

The main objective of the Programme is to enhance the resilience and adaptive capacity of rural livelihoods to climate impacts and risks on water resources in the San Cristóbal Province. This objective will be achieved through key results centered on the improvement of water access and also increase institutional and community capacity and coordination for integrated water management to support other uses of water resources especially for the diversification of livelihoods by rural communities. On the ground, the Programme will implement measures recommended in the *Critical Points of the Vulnerability to Climate Change and the Variability in the Dominican Republic* and the *National Action Plan for Climate Change Adaptation*, aligned with main country's policies, as *National Development Strategy*. The Programme total beneficiary targeted population is approximately 500,000 people. The Programme short name (tagged as) "*ClimaComunidad*" (a simplified Spanish word to Climate and Community).

This Programme aims to increase resilience to climate change through both immediate and long-term adaptation measures by way off rural development activities, projects and actions. Such outputs are organized according the Programme three components:

- (1) Community level implementation of water resource management activities;
- (2) Rural development trough diversification of livelihoods; and
- (3) Capacity building and capacity development to manage climate-related risks.

The proposed Programme will follow existing interventions at municipal, province, regional or national level (if any), looking to scaling-up successful initiatives and to create more capacity building synergies at all levels of governance (using bottom-up approach). This will avoid further interventions gaps and/or overlaps (looking or top-down approaches).

The Programme will address key vulnerabilities of identified areas regarding agriculture and water resources management (Berigüete, 2015), and thus contribute to immediate and long-term development and resilience needs of communities, households and vulnerable farmers/producers, with a particular focus on extremely vulnerable groups: women, elderly, children and young. The Programme is aligned with recommendations of UNFCCC Nairobi Work Programme (UNFCCC, 2010) and most comprehensive available scientific evidence on climate change impacts, vulnerability and adaptation in agriculture, water resources and food security (Niang et al., 2014; Porter et al., 2014).

Programme Components and Financing:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.

For the case of a programme, individual components are likely to refer to specific subsets of stakeholders, regions and/or sectors that can be addressed through a set of well defined interventions / projects.

Programme Components	Expected Concrete Outputs	Expected Outcomes	Amount (US\$ MM)
1. Community level implementation of climate resilient water resource management activities	1.1 Community water supply and management plans developed for 8 municipalities to incorporate climate change-related risks.	Implemented climate resilient management of water resources by 30 small communities of San Cristóbal	0.050
	1.2 Water supply increased for multiple uses and users in 30 communities during period of shortages under climate impacts (as droughts, heat stress, etc.).		3.900
	1.3 Small scale irrigation systems installed in 30 communities and water users associations to manage irrigation systems established and/or strengthened to improve efficiency and effectiveness of water usage under conditions of climate induced water pressures.		1.500
	1.4 Measures for water conservation under climate impacts (as catchment/river bank, re-afforestation schemes) implemented for 400 hectares.		0.650
TOTAL COMP. 1			6.100

2. Diversification of livelihoods of rural communities under climate change	2.1 Improve infrastructure (e.g. canals, pipes, etc.) for water distribution for adaptation and use in agricultural systems installed in 8 municipalities.	Enhanced diversification of livelihoods under climate change by 30 communities of San Cristóbal	0.600
	2.2 Dry-season gardening activities, agricultural processing schemes (as honey, orchids or handcraft) by women, improved for climate change adaptation in 20 communities.		0.700
	2.3 Tree nurseries and wood lots for climate risks management (i.e., for rehabilitating floodplains, hillsides, watersheds etc.) are established and managed by 20 communities.		0.400
	2.4 Demonstrative fish farms are established and supported in 20 communities.		0.400
TOTAL COMP. 2			2.100
3. Capacity building and capacity development in key institutions and communities to manage long-term climate change-related risks	3.1 A set of manual and other materials on best practices for water management and resilient livelihood are developed, including a fully operational website.	Increased technical capacity of communities and institutions to assess impacts, vulnerability and adaptation needs according their respective competences.	0.044
	3.2 A Provincial Climate Change Adaptation Monitoring Committee established in San Cristóbal.		0.032
	3.3 Learning platforms and systems for integrating climate change-related risks into community management of water resources and livelihoods activities institutionalized in 8 municipalities.		0.102
TOTAL COMP. 3			0.178
4. Programme Execution cost			0.796
5. Total Programme Cost			9.174
6. Programme Cycle Management Fee charged by the Implementing Entity			0.780
Amount of Financing Requested			9.954

Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme

Milestones	Expected Dates
Start of Project/Programme Implementation	June 2017
Mid-term Review (if planned)	June 2019
Programme Closing	June 2021
Terminal Evaluation	September 2021

PART II: PROGRAMME JUSTIFICATION

- A. Describe the Programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a Programme, show how the combination of individual projects will contribute to the overall increase in resilience.

The components of the Programme have been designed to provide an integrated solution to managing expected climate change risks and uncertainties in the selected municipalities and communities within the San Cristóbal Province. The components itself constitute a series of interlinked projects. Considered linkages between the components constitute the creation and / or strengthening of community planning and management of water resources, followed by enhancing community level organization and capacity in carrying out water resource management activities in addressing climate impacts. In this process, some activities will be carried (and some synergies already foreseen can be reached) to strength the relevant key institutional capacity (at the individual, organization, process, cooperation and learning levels) regarding water resources management and climate change. It can contribute, later, to extend the Programme results and impacts to other provinces in the Country.

Furthermore, the benefits of managing water resources in the Province -but with a community based focus-, provides emerging opportunities for diversification of rural livelihoods for increased resilience to climate impacts. Finally, the information and knowledge generated during Programme implementation will be used to improve local organizations, community and institutional capacity, sharing lessons with other communities and better coordination between water users (at both household and producers) and institutions. All activities for the realization of this component will commence with the selection of communities, during an inception phase. The specific target areas will be identified as a result of local consultations⁹. Participants of the community consultation process will be able to propose their own criteria to select target communities for Programme interventions and potential candidates for local committees.

The following criteria has been established in order to maximize Programme impacts:

- (1) Poverty: communities with 50% or more of the households considered poor (based on household income and other measures of deprivation) will be given priority;
- (2) Population: communities with a population of at least 500 people will be priority;
- (3) Commitment: communities will be prioritized by their commitment to co-finance some of the activities (i.e., counter-part labor, creating SMEs, etc.);

⁹ The inception phase and correspondent local consultations will be carried out shortly after to receive the resources requested in the Project Formulating Grant submitted with this Request for Programme Funding from the AF.

- (4) Reasonability: the availability of natural capital (i.e., land for woodlots, groundwater potential for boreholes, etc.) to implement the activities described in the full proposal;
- (5) Inclusiveness: This will be determined by the presence of women's groups and/or women leaders in the community, and young leaders, as well.
- (6) Consistency: proposed interventions and community tradition shall be compatible. This will be determined by screening each intervention on a case-by-case basis.

Additional criteria may be added during the inception workshop to fully capture other issues that may increase the vulnerability of different groups in the community such as producers, gender, youths, farmers, etc. The inception workshop will bring together all key stakeholders, including organizations that particularly represent associations of producers, communities and neighbourhoods (if any), local NGOs and other vulnerable groups, and will jointly identify and target those communities most vulnerable to climate change impacts, especially those that previous support has never been provided.

Communities, agricultural producers, NGOs as well representatives of different municipalities will be of particular focus. Using the above mentioned selection criteria, each workshop participant will be required to prepare a short-list of potential communities to be targeted in the Programme. This will be complemented drawing on the expertise of development practitioners working across the Province (mainly government officers, academics, guild members and other local experts in water supply and sanitation) in matching the views expressed by the participants' assessments. A summary of the ranking of the prioritized communities will be prepared during the workshop. Each of the communities on the prioritized short-list will then be visited for further on-the-ground assessments before finalizing the 30 (minimum) communities that will pilot the Programme. This multiple consultative approach, undertaken with communities with a particular emphasis placed on obtaining the views of beneficiaries and identifying pilot communities for Programme implementation, provides a better-cost effectiveness of AF funds and its impacts.

An alternative would have involved taking a more prescriptive approach to the implementation of water management measures, which is not driven by community level management planning and place of execution. Such an approach is of high risk of implementing measures that are not appropriate for particular local context and miss out in targeting some vulnerable groups. Similarly using a "*one-size fits all*" approach could have been proposed. Such an approach would have a high risk of inappropriate solutions and also offers a piecemeal solution with the likelihood of redundancy following the end of the Programme. Finally, another alternative approach would have been targeting solutions at the household level. This would not result in wide benefits and offers less value for money than a community level response, so is discarded.

Component 1: Community level implementation of climate resilient water resource management activities.

Through capitalizing available information related to water management planning under Component 1, the Programme will focus on improving community level involvement in the planning and implementation of climate resilient water resource management activities (Ministerio de Medio Ambiente y Recursos Naturales, 2008). Current participation of communities, and in particular women, in planning and decision-making processes is highly limited resulting in lack of transparency, inequity in access and distribution of water resources. Options to integrating water resources management in communities will be identified and tested and assessed for implementation. This will require monitoring and reviewing these options in their effectiveness. A strong emphasis will be placed on interventions that will ensure:

- Integrating water resources management and development with environmental management at the community level, in order to ensure the sustainability of water resources in quality and quantity, as well as resilience;
- Strengthening and ensuring sustainability of ongoing community management, operating and maintenance of facilities, in order to safeguard investment already made;
- Strengthening community-based organizations to assume a central role in supporting community management of water and sanitation facilities, and in maintaining the integrity of aquatic systems.

Outcome1: Implemented climate resilient management of water resources by 30 small communities of San Cristóbal.

Specifics expected outputs from Component 1 are:

1.1 Community water supply and management plans developed for municipalities to incorporate climate change-related risks;

In recognition of water as a finite and vulnerable resource given its multiple uses, developing a community water management plan is crucial. Under this output, therefore, the Programme will work with at least 30 communities from across the target Province to develop community level water management plans. The establishment of a plan for water supply and management is expected to empower local communities in providing an enabling environment for the diversification of their livelihoods and embarking in self-actions in reducing vulnerability to climate change. These community level plans will be integrated with those basin and sub-basin plans developed and/or strengthened by the Programme under cooperation, collaboration or synergies with government institutions.

This component start with a review of existing community structures/ institutions that are capable to develop and implement water supply management plans will be conducted

for each community to ensure that the optimal institutional arrangement is adopted. For example, in communities where INAPA is supporting the Irrigation User Committees such entities are already in place, and these are likely to provide an effective institutional mechanism for community water management planning. In other communities, well-established local water and sanitation organizations could play this role. Importantly, a target will be set for a 50% or more representation by women on committees that lead the planning process and a participatory methodology will be used for the plan making process that targets high levels of engagement amongst particularly vulnerable groups.

Options for integrating water resource management in communities will be identified and tested and assessed for implementation. This will require monitoring and reviewing these options in their effectiveness. A strong emphasis will be placed on interventions that will ensure integrating water resources management and development with environmental management at the community level in order to ensure the sustainability of water resources in quantity and quality, as well as resilience under climate change. The process of developing the plan and forging institutional arrangements will build upon, and learn from previous initiatives on water management planning that has been undertaken in some communities of the Dominican Republic, as part of civil society-led and/or international cooperation funded initiatives, such as those implemented by the European Union (SABAMAR for sanitations in slums) and Catholic Relief Services (Agua+). For example, a key success of these projects has been regular meetings of those community institutions that have led a better to water management planning and implementation. After this success, when key government institutions hold sharing and learning events, they typically invite to representatives from beneficiaries communities.

The Programme will subsequently support the implementation of the community water management plans by the provision of infrastructure and other physical interventions, together with training and technical support (these interventions are detailed under Outputs 1.3, 1.4 and 3.3 below). Communities will be visited on a regular basis by staff from agencies such as the Ministry of Environment and Natural Resources, INAPA, INDRHI, IDDI, as well as technical experts recruited under the Programme. These visits will assist with ongoing monitoring of management plan implementation and continue to provide fresh impetus and motivation to the water management efforts of communities.

The community management plans will address long-term sustainability of the measures implemented under the plan, and in particular the establishment of a mechanism to ensure the long-term maintenance of infrastructure. The exact nature of such mechanisms will be determined by communities, on a community-by-community basis, but in all cases, communities will be required to establish maintenance funds, either through making a charge for use of water resources, or through use part of the funds generated by livelihoods diversification activities supported under Component 2. This approach has been tried and proven to work in other regions of Dominican Republic¹⁰.

¹⁰ Two interesting cases of study related to this approach are: 1) IDDI to support neighborhood foundations into providing waste collection and sanitation services in slums of Santo Domingo; and 2) the ProNatura initiative of

1.2 Water supply increased for multiple uses and users in communities during period of shortages under climate impacts (as droughts, heat stress etc.);

Under climate change impacts, ensuring that there is adequate water supply year-round for multiple uses and users is crucial but constitutes a challenge. To achieve this, the Programme will perform activities that mobilize community involvement, planning, and implementation of practices that restore and preserve the natural character and functioning of the water system (as waterholes, retention ponds, reservoirs, dams, tanks, rain harvesting, irrigation systems, etc.). The stipulated standards of water quality and regulations will be important to ensure that human activities do not adversely impact on the long-term availability of water. There will also be construction and rehabilitation of water collection facilities (tanks, boreholes, etc.). Other technologies and traditional systems for rainwater harvesting (i.e., wells) will be identified and their use enhanced in the local communities. Practices that reduce siltation in the watershed (such as grass and tree planting, etc.) will be promoted. These interventions shall be identified by communities and other stakeholders as those which are most effective, will provide water throughout the year including at times of drought and, are also those which will directly contribute towards the livelihoods diversification activities supported under Component 2. Following table summarizes the characteristics of envisioned facilities.

Table 4a: Programme Targeted Areas

Facility	Description
Retention Ponds and Dams	Retention Ponds capture and store rainwater, and Dams capture and store flood waters, are typically utilized to maintaining water supply, particularly providing supply which satisfies multiple uses, such as for dry seasoning gardening (see Component 2) and a water supply for livestock. Dams also provide an effective floodwater management function, assisting with reducing risks associated with uncontrolled floodwaters. Combined with boreholes, ponds/dams are able to address the majority of water supply needs by communities. There are a large number of both retention ponds and dams across the Dominican Republic, which has considerably reduced in effectiveness due to siltation and structural disrepair. The Programme will therefore support implementation of community water management plans via a programme of both new retention ponds and dams, and rehabilitation of existing ponds and dams (where be feasible and viable). The number of beneficiaries for each pond/dam will vary according to its size and demand.
Boreholes	The Programme will implement an extensive programme of borehole provision, with an allowance made for two hand-pumped boreholes to be provided in support of each of the community water management plans, with each borehole having capacity to provide water for approximately 200 people. Boreholes provide an excellent source of water, which can be managed carefully to ensure quality. While hand-pumped boreholes require labour to draw water, and also draw less water than mechanized boreholes, this option is considered to be more robust and require less long-term maintenance. Boreholes can reach deeper aquifers than wells and as such are more flexible in where they can be located successfully, particular because literature suggest that in the San Cristobal area, aquifers have been located between 14.2 and 29.7 m with an average of

collective savings in *Loma La Humiadora*, where common resources are utilized to protect natural water sources. In both cases, the earnings are re-invested in community needs and to finance other activities, ensuring the long-term sustainability of such programmes and giving to people the opportunity of to invest in their self-development.

	22 m. Programmes of borehole provision have previously been implemented in the Dominican Republic by organizations such as World Vision, INAPA, and INDRHI; and exists a detailed expertise of such facilities and relevant knowledge such as in drilling techniques to suit different geological conditions, which will be used by the Programme.
Rainwater Harvesting Facilities	Rainwater harvesting from the roofs of community buildings provide water for human consumption without large labour costs, at important locations such as schools and rural clinics. Systems incorporating water capture from roofs and pipe connections to storage tanks will be used by the Programme, with an allowance made for the installation of 1 harvesting system in support of each community water management plan.

Based on *Rural Water Supply Design Manual*. World Bank, 2012; and *Design of Small Water Storage and Erosion Control Dams*. USAID, 1975.

1.3 Small scale irrigation systems installed and operating in communities and water users associations to manage irrigation systems established and/or strengthened to improve efficiency and effectiveness of water usage under conditions of climate induced water pressures (30 systems to reduce the water deficit to 20%); and

The Programme will undertake activities for the installation of small-scale irrigation systems in at least 30 communities to improve the productivity of agriculture and remove the reliance on rain as the only means of irrigating crops, thereby extending growing seasons and the range of crops that can be grown. This will lead to other emerging opportunities for the diversification of livelihoods under Component 2. This output will first of all require an activity that fully identifies the suitability of various small-scale irrigation techniques for the region. That will be conducted by reviewing all the small-scale irrigation techniques already being used and known to work well in the country, such as seasonal shallow-well systems, permanent shallow-well systems, shallow-tube well systems and communal borehole systems. Seasonal shallow-well irrigation systems in particular are dominant in the southwest region but under the programme, it is necessary to thoroughly examine the various options based on climate change, poverty reduction, and gender considerations. Literature about both engineering and utilization of catchments suggests that there are trade-offs associated with each particular irrigation technique (i.e., a system that could provide the highest level of income to users is not necessarily the one that also allows for greater women participation). The communities will be informed of the trade-offs required and will be empowered to make the decisions by themselves under Output 1.1.

The strategy for post-project repair and maintenance will be a crucial activity spelled out in the community water management plans (under Output 1.1) drawing upon lessons of existing and INAPA driven successful practices in other regions of the Dominican Republic. This will involve training of the community in how to carry out the repairs and maintenance. The Programme will encourage the formation of water users associations in target communities where they do not exist as yet with the mandate of carrying out user fee collection and making management decisions. It will be set up such that the fees collected are used for activities such as canal repairs and maintenance. If communities decide to adopt this approach, the Programme will work with them strengthening the community committees to assure that they function as expected

through leadership, organizational development trainings, and learning visits to communities with well-functioning user associations.

- 1.4 Measures for water conservation under climate impacts (as catchment/river bank, re-afforestation schemes) implemented in communities utilizing coffee (10), fruits trees (10), wood trees (10) and others.

Deforestation in catchments and along riverbanks has led to reduced capacity of the land in many areas to retain flood waters within bank, retention of water and also to increased soil erosion. Under Output 3.3 the Programme will implement activities of re-afforestation, targeting particularly those communities that border watercourses, with a target of re-afforestation in support of community water management plans (Output 1.1). Each re-afforestation scheme will target approximately five hectares of land, and will plant cash-crop trees where possible. There are a number of related projects currently being implemented in the Dominican Republic, such as a river bank tree planting projects in places like *Valle Nuevo* and *Sierra de Bahoruco*, and many other being implemented by private sector (as Manuel Arsenio Ureña, CONCADOM and Banco Popular) and civil society organizations (as Fundación Tropigas, Plan Sierra, Sur Futuro, etc.). All those projects has shown the importance of obtaining a local supply of seedlings, an issue which will be addressed by the Programme, by linking this output with Output 2.3, which will develop community wood lots and tree nurseries.

Achieving sustainable management of water resources for reliability in supply requires measures for water capture, conservation and quality control. This is crucial to ensure equitable sustainable exploitation and utilization in a way that maintains biodiversity and the quality of the environment for future generations. The activities for the realization of this output will include the establishment of appropriate baselines to determine the effectiveness of current water conservation measures in the Province. Similarly, quality control measures will be assessed. Training of communities in water conservation and quality control measures will be carried out. There will be an activity directly supporting the communities to put in place water conservation and quality control measures. Support will be provided for the implementation of conservation tillage techniques in selected communities. The installation of communal freshwater harvesting facilities from rain or groundwater sources will be implemented. The designing and constructing of contour bunds in reducing runoff will also be carried out as measures of conservation.

Summary of the Component 1:

To improve water infrastructure does includes a preliminary assessment of key local entities and/or community-based organizations empowered in their water management structures (small farmers, local producers, vulnerable groups, etc.) and to produce with them downscaled data regarding climate vulnerability and main risks in targeted areas. In such areas, measures to utilize new water sources and/or to care and upgrade existing sources will be implemented both at household and community-based level.

At household level, potential interventions include *-inter alia-* systems for water supply, storage, treatment, distribution and disposal. Such systems will include waterholes, pumping, tanks, chlorination, and cesspool and filter pits, and training to monitoring the drinking water quality. At the community-scale, this component includes rainwater collection and storage facilities to build irrigation infrastructure, tanks, micro dams, and reservoirs.

As the Programme will invest in communities to build and to operate facilities for improved usage of water resources, the strategy for post-project repair and maintenance will be a crucial activity spelled out in the community water management plans drawing upon lessons of existing practices. This will involve training of the communities in how to carry out repairs and maintenance. However, achieving sustainable management of water resources for reliability in supply requires measures for water capture, conservation and quality control. This is crucial to ensure equitable sustainable exploitation and utilization in a way that maintains biodiversity and the quality of the environment for future generations. The activities for the realization of this output will include the establishment of appropriate baselines to determine the effectiveness of current water conservation measures in the region.

Expected outcome of Component 1 is related to develop and implement climate resilient management of water resources by at least 30 small communities of San Cristóbal. Such communities will be included in all levels of the Programme governance in order to create other benefits and to identify potential synergies (livelihoods, food security, etc.).

An overall budget of US\$ 6,100,000 is estimated for Component 1.

Component 2: Diversification of livelihoods of rural communities under climate change.

Component 2 is building on the opportunities emerging from community management of their water resources of Component 1 in diversifying their livelihoods away from climate-sensitive practices such as rain-fed agricultural production, into other activities that improve their resilience to climate risks.

Assisting with the diversification of the livelihoods into sectors that are not dependent completely on rain-fed agricultural systems will be crucial for the resilience of rural livelihoods in targeted communities. As highlighted previously, many communities are dependent on rain-fed agriculture, which is extremely vulnerable to the impacts of climate change. This component therefore seeks to expand climate change adaptation for those people that are most vulnerable by diversifying their livelihoods and increasing their income. The improvement of accessibility to water has the potential of enhancing the resilience of livelihoods of communities by providing opportunities for diversification.

This will be achieved through activities such as the establishment of tree seedling nurseries, fisheries, tourism, construction, river transportation, etc. which could be used by local communities as sources of household incomes. Communities, with a focus on

the participation of women, will be supported by the Programme in the engagement in market activities such as market gardening, flowers, and handicrafts. The Programme will build on existing programmes supporting women's groups through training activities to gain marketable skills (such as food processing) to improve their livelihoods. With *off-farm* income generating activities to complement their incomes, their resilience is increased.

Very importantly, this outcome will place a high emphasis on activities that improve the capacity of communities across the value chain. (i.e., activities for the identification of actions that enhance market demand of a commodity, marketing of products and financial management and adding value to products will be promoted). This is crucial to ensure the long-term sustainability and success of livelihoods interventions and also ensures far better value for money than simply livelihoods support activities that provide initial infrastructure/capital but which do not link communities to a market.

The four outputs of this component are all related to water management and therefore to Component 1. As Components 1 and 2 will be likely implemented in the same areas, this will help enable a seamless approach and commonality in implementation, and hence value for economic resources. During the proposal development a number of different livelihood options will be considered, such as raising small ruminants, crafts and poultry raising. However, any livelihood options are related to Component 1, due to (theoretically) this to offer less opportunities for synergies and cost sharing and to represent less value for money in terms of overall impacts of the Programme.

For each of the outputs listed below under Component 2, the measures to be implemented in particular communities, including their detailed design, will be determined by the requirements of the particular communities, local environmental and biophysical conditions, a consideration of local environmental impacts, cost effectiveness/economic viability and land ownership constraints. Lessons learned from other previous/ongoing projects will be integral in this detailed design phase, to ensure cost effectiveness and appropriateness of particular solutions in particular communities.

Outcome 2: Enhanced diversification of livelihoods under climate change in 30 communities of San Cristóbal.

Specifics expected outputs from Component 2 are:

2.1 Improve infrastructure (i.e., canals, pipes etc.) for water distribution for adaptation and use in agricultural systems installed in municipalities;

Access to water is a key constraint to agricultural production in poorest zones and this constraint will become more acute with climate change impacts. Therefore, the Programme will implement activities that improve water distribution and promote efficiency and productivity in agriculture in getting more value from every drop of water used. The activities that will be conducted will include the training of local communities in small-scale water saving techniques, such as pitcher irrigation, sub-surface pipe

irrigation and low-drip head irrigation. There will be community based training for the selection of most appropriate crop, water, and nutrient management techniques that are viable under different climate conditions. There will also be activities for the training of extension services to enable them to provide ongoing support to the local communities through training, regular visits, demonstration farms, and other approaches as applicable.

Findings from earlier research initiatives that looked at practices that enhance rainwater and nutrient use efficiency to improve crop productivity in the Dominican Republic will be reviewed and considered for implementation. In this matter the Programme will bring support from recognized universities and technical institutes (as INTEC and Loyola).

2.2 Dry-season gardening activities, agricultural processing schemes (as honey, orchids or handcraft) by women, improved for climate change adaptation in communities;

Market development activities for non-state cash crops, is already well established with demand for locally sourced vegetables and fruits. However, the issue is rather one of supply and productivity with water availability under climate change as the main limiting factor. Undertaking agricultural activities that maximize economic benefits from increased capacity to drawdown water and increased capacity to use it productively, as market gardening, is crucial for diversification of livelihoods of rural communities.

Dry season gardening schemes: The Programme will provide small-scale infrastructure support, such covers, pumps and pipes, to facilitate dry seasoning gardening by women in selected communities. Dry-season gardening, led by women, is strongly supported in consulted documental references but it must be validated by communities during consultation. This activity will be linked to increased water supply and storage, particularly retention ponds and small-scale dams (Output 1.2). Dry-season gardening will provide women with access to income sources during the dry-season but also importantly access to more and better diverse sources of food. Each gardening scheme will be targeted to directly benefit at least 25 women from communities.

Agricultural product processing schemes: the Programme will establish and support schemes for processing of agricultural products (as butter, honey etc.) with schemes led by women. Twenty (20) community schemes are targeted, with the number of direct beneficiaries from each scheme likely to be in the order of 25 women. Domestic butter processing is an industry with a largely untapped potential in Dominican Republic and is an industry, which requires a source of water, thereby benefitting from increased availability of water achieved by the Programme in beneficiary communities under Component 1 of this Programme. Honey processing will also be developed in a number of communities in which beekeeping is promoted, as part of the establishment of wood lots (Output 2.3). The first foreseen market of these products are large hotels and resorts.

The activities that will be implemented to achieve this will also include training of women in how to increase their yields, to successfully market their products and also on business management. There will be activities to train extension services to enable them to provide ongoing support to women with their market gardening activities. With the Programme resources, it is considered vital to demonstrate the efficacy of community-scale water adaptation approaches that enhance the profitability of market gardening commonly practiced by women and elderly who often lack access to major resources, technologies, assistance and land for other cash crop production.

Financials mechanisms schemes: borrowing from the experience of implementing the UNDP's Small Grants Programme (GEF) in the Dominican Republic and by some guidance from representatives of local NGOs, at least 3 options of funding modality to community beneficiaries should be considered under the following considerations: accountability, effectiveness, sustainability, and suitability to local context and existing capacities, stakeholder preference and swiftness of the delivery of interventions. The element of swiftness is particularly important because the adaptation needs finally identified in the full proposal must be considered as urgent and immediate and should not be impeded by lengthy start-ups. The best funding option would be providing grants to communities using NGO support as per the Small Grant model. The resources would be administered by local NGO partners that have a long-standing presence in the target areas.

Under the Programme the implementing partners could undertake a competitive tender process of selecting NGOs that have capacity to manage funds in target communities that would be appropriate to the needs and capacities of the target community. NGOs participating in this will be assessed according to the following criteria:

- Presence in the community where it proposed to manage the funds and relevant experience;
- Financial capacity: financial management and reporting, accounting system, operational procedures, financial reporting and other internal control framework
- Technical capacity: ability to implement and monitor a project with efficiency;
- Managerial and administrative capacity: ability to plan, coordinate, monitor and control activities and performance.
- Proposed approach to managing the fund and working with communities and district assemblies.

This set of criteria is only indicative at this stage and more criteria may be added in consultation with target communities. UN agencies, including the UNDP, have a set of tested tools and methodologies to carry out the micro-assessment of NGOs. The Programme can use these tools and methodologies with appropriate modifications. By virtue of its programmatic and budget oversight role (under an eventual implementation arrangement), IDDI and key government institutions will vet the whole selection process to ensure competitiveness and transparency in the whole process.

The NGO grantees act as the custodian of the funds and administer grants directly to the beneficiaries according to a number of installments that will be defined during the project inception phase. There is robust capacity to implement this modality as local NGOs (and local affiliates of international NGOs) are already using this modality to implement livelihood projects in the southwest regions of Dominican Republic. NGOs are responsible for disbursement and financial reporting. Oversight over NGO activities will be done by the IDDI. Again, by virtue of its programmatic and technical oversight role and consistent with its fiduciary responsibility to the donor, IDDI will ensure proper financial reporting and overall accountability in the whole process.

The process of channeling funds from grantees NGOs to communities will be done as following:

- 1) Community-based organization or individuals will develop and tailor proposals for alternative income generating activities such as dry-season gardening, agricultural products processing schemes (as butter, honey, etc.). These proposals will be assessed and selected based on a set of criteria that will be developed by the Programme and approved by the Programme Steering Committee. Indeed, the Programme will create a Steering Committee comprised by IDDI, Ministry of Environment and Natural Resources, INAPA, and other key institutions such as the INDRHI, MEPyD, Local Governments, Universities and NGOs.
- 2) The selection criteria will include the climate change vulnerability of the proponent and other socio economic indicators such as the level of poverty and the high risk to food security. The Steering Committee will be responsible for the review, selection and approval of proposals and for ensuring their technical and substantive quality, their resilience to climate change.
- 3) Programme grants will be channeled from Grantee NGOs to community-based organizations, and individuals, and the maximum grant amount per project will be US\$50,000. The Programme, along with the Steering Committee, will lead this process and will provide financial oversight on Grantees NGOs allocation of the grants to the communities.
- 4) In addition, the Programme, with the guidance of the Steering Committee, will ensure that each community is assisted by qualified technical personnel from government extension agencies, NGOs and/or community based extension agent to ensure that all environmental, social and technical issues that may arise are squarely addressed. This will be important to guarantee that Programme activities are in full compliance with Adaptation Fund requirements, do not lead to maladaptation or other undesirable consequences (i.e., that activities aggravate inequality, cause negative environmental impacts or create dependency on technical solutions requiring resources and capacities beyond the reach of community participants).

- 5) In its review of community proposals, the Steering Committee will determine the necessity of further design or development of specific risk mitigation measures to avoid maladaptive outcomes. On the Steering Committee, IDDI will ensure that Due Diligence is observed.
- 6) The Programme Coordinator will work closely with the communities to identify viable projects for funding, provide assistance in project design, monitor implementation, lead participatory evaluation of the projects and help synthesize lessons learned and other knowledge for policy inputs.
- 7) The Steering Committee will oversee the development of the portfolio of community based projects, ensuring its alignment with Programme requirements and that lessons learned are discussed and evaluated. To increase transparency, information collected from M&E will be centralized in a database and shared with communities, organizations and government institutions for policy and program discussions.
- 8) The selection process will give priority to women individuals or women based organizations. As well, the Programme will promote the participation of young people.

2.3 Tree nurseries and wood lots for climate risks management (i.e., for rehabilitating floodplains, watersheds etc.) are established and managed by communities;

The Programme will undertake activities for the establishment of community nurseries and woodlots to provide opportunities for income generation and diversification of rural livelihoods. Not only can nurseries serve as stocks for rehabilitation and regeneration purposes, they can also constitute direct employment opportunities especially for youths in filling up nursery bags, topsoil collection and composting. It should also be recognized that nurseries provide the opportunity for activities that targets the selection of crop types or varieties on the basis of their drought tolerance for improving agricultural productivity or increasing soil fertility as the cases with agroforestry tree species. This is a cost effective and relatively simple approach in addressing water shortage with tolerant crop types/varieties as commonly used further into other areas, rather than channeling or harvesting groundwater. It is possible that these activities may indicate that economic resources can more effectively be directed towards changing agricultural practices than substantial investment in water supply infrastructure.

The activities to realize this output will also include the training of communities in establishing and managing tree nurseries and wood lots. Other training will target how to successfully market the wood products. There will be activities supporting community identification of sites for nurseries and wood lots. Activities for the collection/purchasing of planting seeds of native tree species more adapted to the local conditions will be implemented. Similarly, training activities for extension services to enable them to provide on-going support to the activities carried out by communities for climate risks management using ecosystem-based approaches will be undertaken. Where appropriate, bee-keeping activities will be developed within the nurseries and wood lots,

thereby providing additional income and also a strong disincentive for burning of the trees, as is often the case with unplanned agricultural activities or illegal coal production. Opportunities will also be sought to include *medicinal plants* within the nurseries. Women will be involved in all aspects of the training and it will be a requirement that all wood lots that are established must involve women in the groups that plan and manage the lots. All these actions will increase the livelihoods resilience.

Retention ponds and woodlots may be established by either a community organization or an individual depending on the scale or objective of the problem that they seek to address. Under the Programme, investments will be directed towards community-managed ponds/woodlots to ensure equity and to benefit as many people as possible. But experience from forestry projects (in *Jarabacoa*, *Restauración* and *Sabaneta*) suggests that while traditionally community-managed interventions are fundamentally built on existing practices and customs; they may not necessarily support efforts in reducing deforestation, addressing other drivers of climate change and enhancing land use planning. The Programme will therefore promote the development and adoption of community bylaws and customary rights in collaboration with the communities involved to govern the Programme interventions, including ponds and woodlots. These bylaws should exclude unsustainable practices and include climate change mitigation and adaptation measures as well as climate-smart agriculture mechanisms.

It is expected that Component 1 produce enough information and sounding to contribute the reframing of water legislation to include climate change considerations, and help introduce regulations that support communal management of water delivery services.

2.4 Demonstrative fish farms (20) are established and supported in communities.

Improving the availability of water in catchment and river systems allows for the establishment of fishery resources. The Programme will establish and support 20 community fish farms. Informal consultation suggest that some communities believe this to be an interesting source of alternative livelihood and, based on its response during consultation, it considered that an allowance for 20 fish farms will respond both to demand and the availability of suitable sites within the communities supported. Fish farms of the scale to be supported under this output could benefit up to 500 people.

These are emerging opportunities which could be harnessed by the communities in improving household dietary intake and protein supplement, as well as serve for income generation activities. In promotion of community-based fish farming, training activities and field demonstration will be provided to communities in how to establish and manage small scale community fish farms and how to successfully market the products. As part of the ownership process, communities will be trained to identify the sites for fish farming. The Programme will support the communities by providing the fingerlings as initial stocking of the fish farms. There will also be training of extension service agents to enable them to provide ongoing support to the activities. Women groups will be involved in all aspects of the training and it will be a requirement that all fish farms that are established must involve women in the planning and management of these farms.

Summary of the Component 2

With this component, the Programme will reduce pressure on forest and agricultural resources, as well as avoid deforestation and soil erosion through promotion of agro-ecological practices and vigilance of community committees. Forestry activities will be focused on middle and upper area of the micro-watersheds in order to protect existing water resources and to create new income sources for involved people. Enormous synergies can be achieved with local NGOs already developing agri-business in these areas.

Participation of women and other vulnerable community members (especially identified young leaders) will be particularly promoted. Early identified local young leaders and empowered women will be granted with combined work and studies scholarships in themes as agribusiness, small enterprises, cultural business, etc. This component has a strong potential to spread a sustainable and resilient development for communities.

Expected outcomes of Component 2 are related to enhanced diversification of livelihoods under climate change of 30 communities of San Cristóbal, which can to increase their income through handy-innovative practices. Such practices will be enabled as soon as the communities are empowered of the climate-resilient water resources management.

An overall budget of US\$ 2,100,000 is considered for Component 2.

Component 3: Capacity building and capacity development in key institutions and communities to manage long-term climate change-related risks

The Dominican Republic still faces significant challenges in terms of the amount and quality of data, information and technical capacity to implement climate change adaptation at community level. Despite recent progress made, and increasing number of scientific, technical and economic studies elaborated so far, important gaps remain with regards to climate impacts, socio-climatic vulnerability, and effectiveness of climate adaptation actions and planning (at national, provincial, municipal, and community level). In this context, the proposed Programme proposes a component for building technical and institutional capacity for climate change adaptation planning for vulnerable communities; both long-term perspectives on adaptive capacity building/policy development and near-term climatic risk management. Particularly this will include participative development of on-site water-management adaptation actions and the development of contingency plans, early warning systems, and climate-risk management. A further focus will lie on the strengthening of interactions between relevant actors for climate change adaptation: government, meteorological services, agriculture sector, research institutions, regional and national government, media, and local and poorest communities.

Outputs of this component include a strategy to systematize the effective communication of Programme outputs and outcomes, to include more support from key institutions at field level, and to disseminate good practices and lessons learned from components 1 and 2. Additionally, a Provincial Climate Change Adaptation Monitoring Committee (PCCAMC) has been included. This Committee will be a collaborative management structure to secure the Programme's long-term sustainability and replicability, to address any unforeseen interventions, other future community-based projects and to enforce the policies.

Outcome 3: Increased technical capacity of communities and institutions to assess impacts, vulnerability and adaptation needs according their respective competences.

Specifics expected outputs from Component 3 are:

3.1 A set of manual and other materials on best practices for water management and resilient livelihoods are developed, including a fully operational website;

The Programme will dedicate resources on activities to document and share knowledge and experiences in terms of utilizing information and data from the Programme to inform decision-making and replication across the Country. To facilitate this, a communication strategy will be developed. Different ways of dissemination of information such as social media, infographics, papers and dissertations will be employed. Previous projects have proven that bringing together community participants on a regular basis is an effective mechanism for knowledge sharing, so this model will be adopted. Approaches will be identified and used to target different sections of society, including a consideration of communication methods that targets young people, old people, children and women, including those who cannot read nor write. Some materials will be in English as well.

Community-based extension agents (in agriculture, livestock, risk, etc.) will be engaged on an ongoing basis to deliver technical assistance to communities in relation to livelihood diversification activities through proven approaches, such as community training, regular visits, and field demonstration. Investing in the training of extension workers, as well as giving them the opportunity to acquire *hands-on* experience, will help build a pool of a new cadre of extension workers who are capable of appreciating and operationalizing livelihood adaptation to climate change. This new breed of extension workers will then be in a position to extend similar support to other communities that are not directly targeted under the Programme. The modality of engaging agricultural extension service to deliver/support activities under this Programme is outlined in more detail under the Implementation Arrangement section¹¹.

3.2 A Provincial Climate Change Adaptation Monitoring Committee (PCCAMC) fully established in San Cristóbal; and

¹¹ Across the Dominican Republic there is a significant experience regarding this approach. For example, in cases as agricultural assistance programs, public health operatives, and disaster risks management, technicians work with communities and typically training multipliers, so the experience can be easily reproduced within the community.

As the Programme proposes to coordinate with, and contribute to, other national and regional efforts towards climate change adaptation, disaster risk management and to increase the resilience, there is an envisaged need to monitor the policy compliance and coordinate the actions at sub-national level. In order to maximize the overall impact, the Programme stipulates the establishment of a Provincial Climate Change Adaptation Monitoring Committee (PCCAMC). The Programme will support the establishment of this committee initially to serve the Programme objectives but with a wider view of supporting the identification of other climate change adaptation needs and the implementation of solutions in benefit of most vulnerable people and the sustainable development of the San Cristóbal Province.

Because the composition and mandate of the Committee will have implications beyond the project, one of the Programme's first activities will be to initiate a multi-stakeholder consultation process that would develop and agree on the terms of reference of the Committee considering existing coordination bodies at municipal and community level. The PCCAMC will be used to further integrate the Programme activities and outputs into regional/ national planning processes, as well as providing long-term support to the activities of local communities by developing the platforms for future up-scaling of the activities within Components 1 and 2. The PCCAMC will meet at least 3 times per year.

The Programme will advocate that the PCCAMC will be mandated to:

- Serve as a platform for multi-sectoral management and coordination of climate change and related programmes, activities and projects in the Province;
- Monitor the progress of and link the Programme with other adaptation initiatives within the Province to ensure that the Programme contributes to the overall development objectives of the Province;
- Provide a platform for a long-term and sustained process of understanding adaptation, synergies, gaps, and the required adjustments in existing interventions to ensure that they are all integrated and contribute to broader climate change and development planning and delivery at the provincial and regional level; and
- Provide feedback and inputs to national and provincial policies, especially those related with neighboring provinces, climate finance and land-use planning.

The final PCCAMC design, attributions and members will be defined after a stakeholder consultation process. However, it is highly anticipated that it will include existing entities as the Governance, local governments, MEPYD, COE, Ministry of Public Health, Ministry of Environment and Natural Resources, INDRHI and INAPA. Private sector representatives from industrial, services, banking, and agriculture, and civil society organizations, as universities, NGOs, women, youths and communities will be included. The Programme will have a seat in the PCCAMC in order to provide it technical support.

The PCCAMC is necessary for the sustainability of the Programme. The Programme will implement activities to assess and strengthen the capacity of PCCAMC and other key institutions, such as INAPA, Ministry of Environment and Natural Resources, INDRHI, Ministry of Agriculture and MEPyD in order to provide adequate support. There will also be an activity to design and implement capacity building training programmes across the Province targeting local governments and local institutions. The Programme will provide substantial materials and opportunities for capacity development.

3.3 Learning platforms and systems for integrating climate change-related risks into community management of water resources and diversified livelihoods activities institutionalized.

It is vital that the lessons learned from implementing Component 1 are recorded and disseminated widely, in particular how community level planning and implementation links to higher level planning and livelihood diversification (Component 2). The Programme will use communications experts to produce lessons learned documentation, and this will be disseminated to key stakeholders, particularly to other neighbouring provinces and other areas in Dominican Republic and Haiti. Current capacities of communities to analyse and interpret climate data and utilize this in development and decision-making are lacking. The Programme will therefore carry-out activities to build up institutional capacities and individual skills within the local communities. There will be activities aimed at developing the capacity of communities and municipalities for integrating climate change into their development planning and budgetary processes. As a key agent of mass communication and awareness raising, the capacity of the local media will also be developed. It should be recognised that a large number of different institutions, at different spatial scales, are responsible for managing resources and development in the Dominican Republic, which can be synergic with the Programme.

There will be training of selected communities in constructing and/or refurbishing of drainage canals/ditches. There will be a training activity for channelling water (i.e., using road designs) with culverts for storage in reservoirs. Finally, training for the rehabilitation of water catchments using afforestation techniques in selected areas will be carried out.

Summary of the Component 3

In order to guarantee sustainability and the visibility of the Programme and its long-term results, under this component a collaborative knowledge management strategy will be put in place. The core dissemination products from the Programme will be a manual of practical and concrete best practices in sustainable water management, water and sanitation and community-based climate change adaptation. Key stakeholders, staff, communities and beneficiaries will further interact with national media outlets (newspaper, internet, radio, etc.) to make the public aware of climate risks and adaptation needs addressed by the Programme. Other publications with regards to impact assessment of other components are planned. The Programme outputs will also be shared through international fora on climate change, including UNFCCC.

An innovative aspect of this component is the establishment of a Provincial Climate Change Adaptation Monitoring Committee (PCCAMC) for San Cristóbal Province. This Committee will be responsible for the Programme's long-term sustainability, and to identify synergies with other ongoing and/or foreseen climate change related initiatives in the Province (as early warning system, disaster risk management, development aid, climate finance), and to channelling more public/private funding to adaptation and down-scaled data -produced by the Programme and other initiatives- into public policies.

Expected outcome of Component 3 is an increased technical capacity of communities and institutions to assess impacts, vulnerability and adaptation needs according their respective competences to secure the Programme's long-term sustainability. Additionally, lessons learned on climate-resilient water management practices and diversified livelihoods in targeted communities and regions, which will be implemented within the Programme, are disseminated contributing to resilience and development needs in other places; and recognizing and integration of new knowledge further generated.

An overall budget of US\$ 178,000 is estimated for Component 3.

- A. Describe how the programme 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 programme will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy of the Adaptation Fund.

The proposed Programme will provide safe and reliable freshwater supply to a vast majority of the vulnerable population particularly in rural areas in San Cristóbal Province. Climate change is expected to have an impact on agricultural production by increasing pressure on water resources. Projection scenarios indicate that in addition to a certain reduction in annual flows of rivers, a substantial increase in the water requirement per hectare under irrigation will also occur in step with an increase in temperature due to warming.

The National Development Strategy recognizes access to water and sanitation, increase in agricultural productivity, pollution control, development of water infrastructure and integrated transboundary river basin management as key factors in the sustainable development of the Dominican Republic. The share of agriculture to GDP has declined from 12% between 1990 -1995 to about 7% between 2010-2015 (Banco Central, 2016). But despite this decrease, agriculture remains critical from the point of view of poverty reduction and job creation. Most of the agriculture practiced is on a subsistence basis with yields per hectare lower than Latin-American countries average and is mostly non-irrigated. The potential irrigable land is estimated at about 277,700 hectares, of which only 127,750 hectares (46%) are under irrigation at present (FAO, 2016). However, the transfer process and the performance of water user associations are still far from ideal. While such groups show a significant increase in

cost recovery, especially when compared to low values in areas under state management, a high subsidy from the government still contributes to cover operation and maintenance costs in their systems.

The Programme will promote three types of adaptation intervention: 1) livelihoods enhancement and livelihoods diversification; 2) ecosystem protection and enhancement; and 3) community-level water infrastructure planning and actuation. These approaches will build up the financial, natural, physical and social capital of communities. A conservative estimate gives a total of 45,000 people as direct beneficiaries of the projects. The indirect beneficiaries are the entire population in the San Cristóbal Province which is estimated to be close to 570,000 as of 2010. The main indicator of vulnerability reduction will be changes in access to water and diversification of livelihoods activities and income generation will increase by 30% in at least 30% of households in selected communities.

Household level livelihoods resilience to climate shocks including diversification: There is clearly the need for a transition to alternative less-climate sensitive and higher income-generating activities as the necessary condition for a successful adaptation to climate change impact on livelihoods in the targeted areas. Priorities include the diversification of crops, the introduction of drought and temperature-resilient crop options, more water efficient crops, and strengthening other capacities (such as fisheries).

Community-level adaptation measures and ecosystem protection and enhancement: Establish sizable plant nurseries in each of the sites. The Programme will invest mainly in native plant species in the rehabilitation of degraded land (if it is plausible and viable).

Table 5 below summarizes the anticipated economic, social and environmental benefits of the proposed Programme, both for communities and the county more widely.

Table 5: Programme Economic, Social and Environmental Benefits

Benefits	Programme Scenario	Baseline Scenario
Social Benefits		
a) Households/ Farmers	<ul style="list-style-type: none"> ○ Improved water supply for about 60,000 people (close to 12,000 households) in selected areas. ○ Improvement of public health for avoiding water related diseases in approximately 15,000 households, benefiting most child and elderly. 	If integrated water adaptation actions are not implemented, the population of the Programme area will continue to suffering increasing vulnerability and growing insecurity due to decreased availability of drinking water.
b) Communities	<ul style="list-style-type: none"> ○ Greater and better mutual trust among people and communities under climate change conditions. ○ Reduced potential social conflict among stakeholders sharing the common resources (as water and 	Conflicts between human, forest, crop, energy and livestock uses. This will damage the social fabric in rural areas and exacerbate existing migration to urban areas, resulting in

<p>c) Local governments/ Central Government</p>	<p>forests.) especially the semi-mobile pastoralists and sedentary farmers because of increased availability of water and other livestock fodder.</p> <ul style="list-style-type: none"> ○ Better community and producers' cohesion through planning and working together. ○ Increase solidarity through the creation / enhancement of women and young focused activities. ○ Reduction of risks of conflicts among communities within and/ or without of the same basin. ○ Enhancement of social cohesion and autonomy for management committees for water supply and climate change adaptation. ○ More community empowerment achieved with the participatory approach in general, through enhanced knowledge and ability to act on climate change, and through usage of the community-based early warning system. ○ Reduction in migration of young in search of new prospects and means of subsistence. ○ Greater mutual trust among the communities and municipalities in the climate change framework. ○ A knowledge base is set up to enable best practices to be identified and replicated. ○ Specified community cooperation committee supported and tested. ○ Key government institutions are strategically involved; their role is identified and reinforced. 	<p>increased urban joblessness and poverty. Women and young will be particularly hard hit.</p> <p>Vulnerable rural communities and their associated livelihoods would diminish over time, with loss of productivity and increased migration to urban areas, resulting of increasing pressure on already constrained urban economies.</p>
Economic Benefits		
<p>a) Households/ Farmers</p>	<ul style="list-style-type: none"> ○ Job opportunities created through Programme activities. 	<p>High dependence jobs treated due to climate change and current impacts.</p>
<p>b) Communities</p>	<ul style="list-style-type: none"> ○ Increase in income through an increased agriculture productivity and commercialization of existing 	<p>Largely reliant on unimodal rain-fed agriculture as a source of livelihoods, which is already vulnerable to drought</p>

	<p>and new “resilience” products.</p> <ul style="list-style-type: none"> ○ Stabilization of food supply through increased and regular flow of water for food production. ○ Diversification of livelihoods actions (fishing, forestry, livestock, etc.) improving safety nets for most vulnerable households. ○ Increase in productivity (yields) of production systems following improvement in the effectiveness and efficiency of resource-usage. ○ Increase in market access. ○ Increased water storage capacity of the channels and waterways, and the associated irrigation and introduction of climate resilient production practices will support farmers to expand current zones of land used from subsistence rain-fed to irrigated production. ○ Households and farmers using the water supply will increase their production by several folds. ○ Selected areas where soil water conservation on farmlands and flood diversion for supplementary irrigation is introduced; the risk of crop failure is reduced. Crop yields are expected to increase and availability of animal feed is increased (by crop residue and pasture land carrying capacity). ○ Climate-resilient livelihoods can to include the development and utilization of both drought-resistant and/or early-maturing seeds that can reduce the risks of crop failure. ○ The dissemination of drought-resistant and crop management techniques will enhance the economic benefits of the off-farm water user groups, and, together with the improved extension services, will result in improved rangeland management in the Programme targeted areas, with 	<p>and flood events, as well both of which are predicted to become even more prevalent with climate change.</p> <p>Crop damage linked to storm events, excessive soil moisture and flooding.</p>
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<p>c) Local governments/ Central Government</p>	<p>other associated economic and environmental benefits.</p> <ul style="list-style-type: none"> ○ Increase revenue through local taxes following the improvement of income generating activities. ○ Reduction in food imports and greater food security. ○ Improvement in the GDP following increased productivity of the rural economy. ○ Improvement decentralization and distribution of the economic wealth of the nation. 	<p>More subsidies and other government direct interventions to rescue farmers if their activities do not perform as is expected due to climate change. Less food security and more food imports.</p> <p>More expenses for the government and local families to attend diseases related with water and sanitation.</p>
<p>Environmental Benefits</p>		
<p>a) Households/ Farmers</p>	<ul style="list-style-type: none"> ○ More and better conservation of natural resources (water, land and forests) that deliver ecosystem services (i.e., water purification, less degraded lands etc.). ○ Improvement in the availability of water. ○ Reversing degradation of natural resources such as forests, waters, lands and biodiversity will improve the livelihoods of most vulnerable people. Introducing of multipurpose trees including forage and fruit trees within basins and woodlots will reinforce coping mechanisms of communities during droughts. ○ Increased regularity of water availability by securing waterways and channels from erosion and siltation. ○ Increased protection against land degradation and desertification. ○ Increase in forest cover and stabilization of areas with planting, thereby decreasing the rate of desertification. ○ A better conservation of natural resources resulting in higher resilience to climate change. ○ A better understanding of the 	<p>Increased climatic variability, reduced rainfall and increased incidence and severity of drought will exacerbate existing issues on ecosystems already stressed through land degradation, soil erosion and reduced soil moisture. This will reduce the availability of ecosystem services and further hamper precarious livelihoods.</p> <p>There will be ongoing and increased out-migration in search of animal feed and water and the associated spread of bush fires, which will have negative impacts on natural resources and on ecosystem functioning.</p> <p>Erosion and siltation of the water ways and channels</p> <p>Potential conflicts between different resources users such as between pastoralists and sedentary farmers.</p>

	<p>interaction between climate, environment and human factors which impact the sustainable use of natural resources.</p> <ul style="list-style-type: none"> ○ The Programme will result in increased carbon sequestration through integrating tree planting within the soil water conservation works outside of farmlands and by expanding temporary and permanent enclosures, which will enhance vegetation regeneration. Increase in crop plant coverage and density will also contribute on carbon sequestration from agricultural activities. ○ Environmental degradation will be reduced by reducing vulnerable communities' high dependency on natural resources for fuel wood, construction and other purposes, through tree planting and woodlots. ○ Improvement of habitats with the rehabilitation of the riparian zones. ○ Establishment of fish stock and fisheries with the improvement of water flow into riverine systems, and breeding areas in the riparian zones. ○ Establishment and rehabilitation of nursery sites and tree planting, and expanding multipurpose trees and community enclosure areas, will enhance ecosystem services. 	
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As is noted previously, the Programme will provide economic, environmental and social benefits to targeted communities, particularly to households and farmers most at risk, which will receive more and better water supply. Economically the interventions aim to improve and stabilize income from agricultural activities through diversification of income streams to farmers, with secondary economic benefits in the near- to mid-term through the strengthening the Province's economy. Socially, the main benefits will be to stop the displacement of people, both by reducing susceptibility to extreme events, as well as through avoiding water shortages, reducing diseases and improving their lives.

Additionally, the Programme will help to targeted areas to decrease the vulnerability of their livestock due to any low feed availability (caused by climatic events); reduced loss of livelihoods security caused by extreme events or overall annual climatic variability

would be an additional social benefit of the Programme. With respect to environmental matters, the Programme will reduce pressure on forest resources, deforestation and soil erosion through promotion of agro-ecological practices and vigilance of community committees.

All activities under Component 1 and Component 2 will be developed jointly with the communities and their representatives in order to create a shared understanding on climate adaptation and sustainable water management, including the assessment of concerns and needs of most vulnerable communities. The Programme will initiate activities using diagnostic and rural planning techniques common into develop community-based interventions. Besides, several official agencies are targeted as institutional executing entities; local NGOs / community based groups are going to be selected as partners for local execution, due their solid experience in these techniques and/or local communities where they operate.

Principles to be considered in all local interventions are, among others, the following:

1. Encouragement of participants to take responsibility;
2. Respecting the diversity of the local population;
3. Promote full involvement participation;
4. Reconciling different interests, if any; and
5. Involving multidisciplinary approaches and teams (on the Programme's staff).

Children, women and elderly are frequently amongst the more vulnerable of the poor. As women plays a key role in the family health, education and income, the Programme is heavily interested in incorporating women in most activities and community management structures. However, despite their important role in agriculture, household, and for food security, the participation of women in economic activities still may be limited/suppressed due to conflictions with traditional or religious beliefs. The Programme is aware of these aspects, and will openly encourage women empowerment at all stages; including:

6. Discussing the need to integrate women into projects with community leaders;
7. Opening subproject grants and specific work packages for women's associations;
8. Strengthening their role in community relevant organizations on climate change; and
9. Establishing a recognition and/or certified to outstanding women.

At the national level, the Programme will also pursue the inclusion of qualified women technical personnel into staff / personnel. As such, the Programme makes an important

contribution to women empowerment in Dominican Republic, and not limited to the target region. Identified young leaders can be involved similarly and with scholarships grants.

In order to mitigate and/or avoid negative impacts, specific indicators on key economic, social and environmental variables will be integrated in the results-framework, therefore assuring compliance with the Adaptation Fund's Environmental and Social Policy (ESP). These indicators will be monitored and evaluated regularly throughout the Programme, and will be reported in order to prevent violation. Field teams will regularly interact with relevant persons and organizations of targeted areas to resolve any possible conflicts.

A. Describe or provide an analysis of the cost-effectiveness of the proposed programme.

As vulnerability to climate change is multi-faceted, any additionality to a socioeconomic baseline scenario is hard to prove. Furthermore, there are limited options for key institutions and communities of Dominican Republic, in terms of alternative actions to build climate resilience in the water resources management. The Programme thus proposes a combination of promoting more and better water supply and strengthening rural livelihoods with integrated climate risk management that take into account local development needs of the targeted communities. However, based on consultations with government authorities, National Communications, and academic literature, an agro-ecosystem based approach that utilizes smart-agriculture practices and efficient water management is thought to be a cost-effective way to reduce the vulnerability (in comparison with heavy physical infrastructures) in the Programme's targeted areas.

The *2nd National Communication*, and *Study on Investment and Financial Flows* have stated that on the basis of research and consultation with key stakeholders, cost-effective adaptation to climate change of the food security sector should include the promotion of activities as forest's restoration and conservation, land zoning and proper use of land, increased use of climate-resilient crops with focus on traditional varieties, sustainable livestock actions with focus on ecosystem friendly approaches, sustainable soil management and efficient use of water (Ministerio de Medio Ambiente y Recursos Naturales, 2009; United Nations Development Programme, 2011). The Programme has been conceived based on such elements, which reflect national priorities and strategies.

Strengthening the resilience of local communities to climate change impacts in the San Cristobal Province has been identified as an urgent and immediate adaptation priority, with the highest immediate benefit in achieving SDG1 on achieve food security and improved nutrition and promote sustainable agriculture, SDG6 on ensure availability and sustainable management of water and sanitation, and SDG15 on sustainably manage forests, combat desertification, and halt and reverse land degradation. In absence of the Programme, the San Cristobal Province can achieve some degree of adaptation, but not as is proposed in the Post-2015 agenda. The proposed interventions financed by the Programme focuses on developing adaptive capacity and strengthening livelihood resilience through practical and locally appropriate "soft" adaptation measures as more

cost-effective than “hard” engineering measures assuming that soft measures can adequately withstand the impacts of future climate change even under worst scenarios.

The main principle of the Programme (condition *that must to be changed* through its implementation) is to develop practical climate change adaptation experiences and capacities to ensure that the water resources in the San Cristobal Province and its dependent economic activities can be made resilient to the increase of the frequency and intensity of the droughts and other climate risks over the next 25-50 years.

The proposed Programme is considered as a catalytic initiative to set the course of climate finance in a right direction. There is high agreement by all national and sub-national analyses of vulnerability by various sources including officially commissioned reports and independent research that vulnerability especially to drought effects has geographical patterns and socioeconomic associations, with the San Cristóbal Province being one the most vulnerable. Decreasing annual rainfall and increasingly erratic rainfall patterns, due to climate change, are adversely affecting rural livelihoods across the country especially agricultural and pastoral practices. Neglecting water resources and dependent livelihoods vulnerability and bringing *ad hoc* responses to *site-specific problems* will have dramatic impacts on the livelihoods of the San Cristobal Province. Therefore, incidents of droughts, floods and forest fires have devastating effects on the coping strategies of the people. With climate change, it is expected that the frequency of the incidence of both droughts and floods will increase and hence erode the viability of coping strategies overtime. This scenario must be changed with the Programme efforts.

The proposed Programme budget will support:

- a) the acquisition of the best technical expertise available to help to implement, with the full involvement of water resources management and agricultural stakeholders, adaptation measures and supporting capacity development that will guide all future water resources management and agriculture adaptation in the Dominican Republic, with Government staff involvement in the Programme being a “*in-kind*” contribution.
- b) the design and construction of infrastructure (boreholes, mini dams, ponds, rainwater harvesting facilities, etc.) to improve the water supply and access in the context of climate changes for 30 communities (meaning more than 25,000 people), and the adequate transference of skills and knowledge to their respective beneficiaries.
- c) the design and construction of small-scale irrigation infrastructures in 30 communities to improve the productivity of agriculture and minimize the reliance on rain as the only means of irrigating crops, thereby extending growing seasons, the range of crops that can be grown and the chances to diversification of livelihoods.
- d) the enhancement of the diversification of livelihoods away from climate-sensitive practices such as rain-fed agricultural production, into other activities that improve their resilience to climate risks for 30 communities in the Province.

- e) the development of the enabling environment for addressing the climate risks for water resources and the depending economic activities through: *i*) integration of climate changes in the existing water course management plans and development of new climate resilient water courses management plans; *ii*) a Provincial Climate Change Adaptation Monitoring Committee established; *iii*) community level water supply and management plans developed to include climate change-related risks.
- f) the dissemination and management of lessons learned from the Programme, so that all Dominicans acquire a better understanding of climate change issues and guidance on what practical solutions will suit for specific areas.

The Programme three-pillar approach (implementation of water supply improvement measures, development of the enabling environment and diversification of livelihoods) is essential to the full replication of the adaptation measures at any other vulnerable site in the Dominican Republic in the future. Not addressing any one of the pillars would reduce the effectiveness of the whole Programme. With approximately 98% on technical solutions and 2% on enabling environment is believed to be the most effective and balanced way of realigning and initiating the climate change adaptation process in any province of the Dominican Republic, with a priority given to actual interventions that reduce communities and economic activities vulnerability in this part of the country.

For climate resilient water resource management: with an investment of \$3,900,000, the Programme will benefitting at least 60,000 people (50% of whom should be women) and rainwater harvesting systems in place, providing water supply to 30 community facilities (as identifying, building, updating or upgrading waterholes, storage tanks, pipelines, pumps, etc.); and the implementation of measures for water conservation under climate impacts (i.e., catchment/river bank, re-afforestation schemes, etc.) in 30 communities.

Considering that such investment will help to satisfy the water needs for the agricultural exploitation of over 6,000 farms, 20 tree nurseries/ wood lots, 20 gardening farms with each an average farm of 2.5 ha, this will lead to a cost per ha of \$258. Considered alternatives will lead to the following costs: external catchments with ridging (228 to 291 \$/ha); permeable rock dams (287 to 347 \$/ha); rock and roof catchment systems (91 \$/m³)¹². As these investments will also allow the 60,000 beneficiaries to satisfy their domestic water needs (estimated by the WHO as 50 to 100 litter/day/person), we can see that these investments are more cost effective than the alternatives. Similar, with a cost of 100 \$/ha, the Programme will contribute to improving the food production for over 6,000 farmers, the increase of health care/prevention for about 12,000 households, increase in productivity (yields/ha) of production systems following improvement in the effectiveness and efficiency of resource utilization and the stabilization of food supply through increased and regular flow of water for food production and other services.

¹² Considered alternatives are the included in the last version of Sourcebook of Alternative Technologies for Freshwater Augmentation in Latin America and the Caribbean. A compilation of experiences and good practices in the utilization of several technologies for water supply, harvest, quality, treatment and conservation (UNPEP, 2016).

The cost-effectiveness analysis of these options will be improved as more data become available during the Programme's implementation before the building any of these technologies¹³. Water augmentation options are meant to function for 20 to 50 years or more. Thus, the lowest cost of m³ of water is not always the most cost effective, particularly if the quality of construction is compromised to save money. Cheap drilling or poor construction quality can lead to premature failure of the well or contamination of the water supply. Water augmentation infrastructures that are subsequently abandoned by the users after a few years of operation are clearly not cost-effective. Cost-effectiveness takes into account the distance between the home and the source, the protection of the source from pollutions and contamination and the cost of the maintenance of the infrastructures. All these costs are difficult to apprehend without an evaluation of all the option and the environment in which they will be build and operate. Thus, the costs effectiveness of the options will be guaranteed during the Programme implementation by ensuring that the building of the freshwater augmentation infrastructures take in account expectations and principles of cost-effectiveness to allow an economical and sustainable access to safe water¹⁴.

Concerning the small-scale irrigation systems: alternatives that have been considered are the medium and large-scale irrigation systems. The cost-effectiveness of the large and medium scale irrigation systems is limited by: (a) the small size of farms in the targeted areas that constrains their development or undermines their viability (linked to population growth and family break-ups) compared to the limited pace of irrigation land development; (b) the limited availability of water to fulfil the requirements of large development Programme that could ensure their economic profitability; and (c) the need of an organization with the required institutional and managerial capacity.

The proposed Programme will invest \$1,500,000 with the objective of satisfying the irrigation needs for the exploitation of at least 6,000 farms, 20 tree nurseries and wood lots, 20 dry season gardening farms. Assuming all each have an average land of 2.5 ha, this will represent a total of 15,100 ha for an investment of 99 \$/ha. The alternatives of the irrigations technologies considered are large and medium scale run-off-river diversion and gravity-fed systems, river pumping-based and gravity-fed systems, and river pumping-based sprinkler irrigation systems, that are widely used in all the Dominican Republic. According with several reports, the cost of medium-scale irrigation systems in the Dominican Republic has been evaluated between 9,200 and 17,620 \$/ha (FAO, 2016). Even if these figures include the costs of the infrastructures to divert and pump water from rivers and other facilities, it appears clearly that the option selected by the Programme are more cost-effective. Furthermore, the costs of the operation of small-scale irrigation systems are cheaper than large or medium-scale schemes.

¹³ Cost-effective technologies for improving water access and management, in the context of climate change, means optimum value for money invested over the long term. So this aspect shall be monitored during all interventions.

¹⁴ For example, Presidential Decree 42-05 does include some guidelines and codes of practice, which provide a basis for the realization of economical and sustainable access to fresh waters integrating all these criteria spelled out above. As well, the Programme implementation will furthermore make profit of any study and/or assessment available related with technologies and techniques that improve the water sources and further utilization.

According to the Ministry of Agriculture (Ministerio de Agricultura, 2015), in 2014 farmers for the large scale scheme have irrigation expenses of 22 to 64 to \$/ha into their production costs. Besides their fee for irrigation services is low (5 to 12 \$/ha for non-rice farmers), and these water levies are used for the maintenance of canals and organizational activities, maintenance and operation requirements of irrigation systems results highly subsidized and compromised every year (the revenues from water fees is less of 15%). Another factor in favour of the cost effectiveness of the small-scale irrigation systems is the fact that it is managed and controlled by farmers who are the end users. There is general consensus that the success of small-scale systems is also due to the fact that they are self-managed and dedicated to the felt needs of local communities.

Considering small reservoirs, permanent shallow wells, large reservoir irrigation, riverine water, temporal shallow wells and riverine alluvial dugouts can to deliver water services at the same cost of water fee (5 to 12 \$/ha); for a total of 6,000 farms (13,200 ha), and under the hypothesis of right use of appropriate inputs, the Programme investment of \$1,500,000 would generate a profit of \$12,856,800 -based on a lowest profit of \$974 /ha for farmers with permanent irrigation. Thus, unless the productivity of the large irrigation scheme is improved, end users will continue using more expensive technologies.

Furthermore, the cost effectiveness of small-scale irrigation systems will be improved during the project implementation. The Programme will review the small-scale irrigation techniques already being used and known to work well in the Dominican Republic based on climate change, poverty reduction, and gender considerations. A short-time assessment within the targeted areas will be carried to secure the trade-offs associated to each particular irrigation technique (i.e., the system that could provide the highest level of income is not necessarily the one that allows greater women participation).

For diversification of livelihoods of communities: Concerning the livelihoods alternatives interventions, an investment of \$2,150,000 will allow to establish 20 community fish farms, 20 community tree nurseries and wood lots, and 20 dry season gardening schemes, benefitting at least 5,000 women and their families. If this investment is compared to the 12,000 direct beneficiaries, it will lead to an investment cost of 180 \$/per direct beneficiary. With such actions, this Programme will incorporate 12,000 households through increased agricultural productivity (vegetable growing), and commercialization of woody and non woody products (honey, plant) and fish and other freshwater foods. The alternative to the proposed approach is to do nothing, in which case the 12,000 direct beneficiaries and their families will see their livelihoods deteriorated becoming even more vulnerable, or being subsidised by government programmes of social assistance.

A conservative estimate gives a total of 60,000 people as direct beneficiaries of the project. The indirect number of beneficiaries is the entire population of San Cristóbal Province, which is estimated to be 569,930 in 2010. The main indicator of vulnerability reduction will be changes in access to water and diversification of livelihoods activities

and income generation will increase by 50% in at least 30% of households in the communities. Additionally, the Programme will have direct environmental benefits (better conservation of natural resources and environmental services) as is described in the section related to the project benefits). This will contribute to strengthen the cost-effectiveness of the project interventions and to demonstrate the adaptation's feasibility.

For the development of the enabling environment (set-up the Provincial Climate Change Adaptation Committee and information dissemination and management), there are no reasonable alternatives to the approaches suggested by the Programme, as it is designed to address all existing government instruments that will contribute to address the full range of stakeholders involved in water resources and agriculture management in the San Cristobal Province. Such measures will reduce physical exposure of the water basins to climate risks, and help avoid the additional costs resulting from mal-adaptive land use and development planning and practices such as destruction vegetation of the water catchment, unsustainable water use by farming and grazing that currently characterize the water catchments. This is critical in safeguarding sustainability of community livelihoods and economic development activities of the Province in the face of climate change. Investing 2% of the Programme resources (i.e., USD 44,000+32,000+102,000) constitutes a cost-effective investment considering the economic role of this region. Indeed, San Cristobal is among most productive provinces of the country (industrial activity in *Haina* contributed 32% of GDP in 2014).

Thus, the Programme is aiming to safeguard this potential in the context of climate change, and its cost-effectiveness is strengthened by the enormous economic potential of the Province. Total agricultural land is 61,500 hectares of which, just 25,000 are used for intensive crops and the rest is utilized for subsistence. San Cristóbal has a wealth of under-utilized resources to support an intensified agriculture modernization programme. These include a network of river micro-basins with highly fertile zones, and over 15,000 hectares considered as forest where there is slash and burn agriculture. These areas can become major agricultural production zones for different crops¹⁵. With adequate water management, horticultural commodities, including tomato, chili, mango, avocado, water melon, sweet melon, ginger, coffee, cacao, yucca and banana can also be produced, boosted and marketed competitively and over a longer season than is currently the case. Additionally, it is possible to plant oilseeds, which can be developed into a major oils and fats industry with benefits to rural women and current local farmers. The Programme can build on existing programmes supporting women's groups with training in marketable skills, such as food processing and conservation. Seedling cultivation for re-forestation efforts presents another potential area for livelihood diversification.

Furthermore, on-the-ground cost-effectiveness of the Programme will be reflected at the operational level through the following approaches:

¹⁵ Data provided by the last study on land-use and cover from the Ministry of Environment and Natural Resources (2012), and statistic from the Ministry of Agriculture (2015). This data does not establish the difference among the proportion of protected areas and other forests invaded by unplanned agricultural activities and coal production.

- Throughout the Programme, resources will be aligned with the financing and delivery of programme outputs that have competitive procurement components to ensure best value for money. In this regard, the Programme will apply best practices identified by other, ongoing climate change adaptation projects in the Country and the region.
- This Programme will utilize existing government structures and processes for implementation. By building on existing government and institutional structures, the Programme will also harness in-kind support and contributions from offices at the national, provincial, and local levels (office space, staff time, communications, etc.).
- Through the existing network of stakeholders, the results framework of the Programme, will be able to utilize existing baseline surveys of line agencies and harness existing delivery mechanisms such as the UNDP Small Grants Programme, if applicable. This will further expand the reach and replicability of outputs.
- The bulk of the Programme funds will be directed to community-level activities and hence brings opportunities for local procurement of goods and services with it.

Table 5a: Cost-effectiveness of Proposed Measures

Objective	Budget (USD MM)	Beneficiaries	Cost/ Benefits	Alternative
Water supply	3.90	60,000 people (50% of whom should be women)	Assuming this will satisfy the irrigation needs for at least 6,000 farms, 20 tree nurseries/ wood lots, 20 gardening, and assuming all each have an average land of 2.5 ha, this will represent a total of 15,100 ha for an cost of 258 \$/ha. Such investment will also allow the 60,000 persons to satisfy their domestic water needs (50-10 l/day/person).	Options to improve water access in the context of climate change are the external catchments with ridging (228 to 291 \$/ha), permeable rock dams, (288 to 347 \$/ha), and rock and roof catchment systems (91 \$/m3). These investments are less cost effective than the proposed by the Programme.
Irrigation systems	1.50	6,000 farms means 30,000 people; of whom at least 12,000 should be women. Each community scheme incorporates 50 women. This totals 1,000.	Assuming this will satisfy the irrigation needs for at least 6,000 farms, 20 tree nurseries/ wood lots, 20 gardening, and assuming all each have an average land of 2.5 ha, this will represent a total of 15,100 ha for an cost of 99 \$/ha.	Mid-scale irrigation systems range 9,200 to 17,620 \$/ha. Even if costs of facilities, pump and other are later included, it's clear that proposed options results to be more cost-effective.
Livelihoods interventions	2.15	12000 people (50% of whom	\$2,150.000 for the benefit of 12,000 people means	The alternative to the proposed approach is

		should be women)	\$180 per direct beneficiary. Identified benefits are: 20 community fish farms established; 20 community tree wood lots/ nurseries; and 20 gardening schemes established, and 20 product processing schemes established and operating.	to do nothing. In tis case the 12,000 direct beneficiaries and their families will see their life quality deteriorated, being more vulnerable, or being subsidized.
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The proposed interventions are cost effective in that large infrastructural investments are not considered: selected adaptive measures contained in the Programme consist mainly of a series of targeted activities designed to restore natural capital and achieve resiliency in water systems as a means to reduce the vulnerability of rural communities and small cities. Restoring the natural capital of any ecosystem has multiple benefits for rural communities, and it is anticipated that the benefits will greatly exceed the costs.

It should be noted that this Programme follows the country’s NAPA’s priority list, which already considers cost-effectiveness as a key concern for measures prioritization. The measures are furthermore linked to UNFCCC and World Bank concepts such as *no-regrets and low-regrets strategies for adaptation*. The specific project interventions will follow a ranking of costs and benefits, including inputs needed (i.e., labour, materials, finances, time) and positive outcomes (as increased income, house savings, increased livelihoods security, better climate protection). Underlying needs or demand for the activity, level of familiarity with, and acceptability of activities (including attention to differing responses by gender) and environmental benefits will also be considered. However, at early stages of the proposed design, alternatives to the Programme were discussed with government authorities: (1) to establish a small grants facility for specific small adaptation measures; and (2) a support project based on ecosystems services which includes -among others- seeds are more resistant to climate variability and climate change and water conservation in micro watersheds. While relevant in terms of their activities, discussions led to the finding that such activities could be better developed in separate accompanying projects for which funding will be sought later.

- A. Describe how the programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

The Law 5852 (passed in 1962 and modified by Laws 281, 238, and 431) establishes the main aspects of the legal framework for water resources management, including: (a) water as a public domain (meaning that ownership of water either resides with land owners or is public); (b) water use concessions system; (c) prioritization of municipal use; (d) pollution of water ban; and (e) participation of users in water resources management. The Water Law ties water rights to land ownership or public service providers and establish a limited private property right of water, only for water

originating in owner's land such as springs and rain water¹⁶. In addition, Law 6-65 created the National Institute for Water Resources (INDRHI) assigning it functions at three levels: (1) policy development and planning at the normative level; (2) water rights administration, regulation enforcement and hydrological services at the organizational level; and (3) water use for the irrigation system at the operational level. As INDRHI is a dependence of Ministry of Environment and Natural Resources, Programme related activities agree with the current policy.

The proposed Programme is aligned with the National Development Strategy, which states "Sustainable environmental management and adequate adaptation to climate change" as one of four pillars. Among 29 actions mentioned under this strategic area, the fresh water receives particular attention (Dominican Republic, 2012). As well, this Programme is consistent with the National Environmental Policy and National Policy on Climate Change. All these policies aim to the implementation of several strategies as restoration of protective ecosystems and safekeeping and management of water resources and to promote innovative livelihoods (Dominican Republic, 2010).

In addition, following policies are considered in the Programme design:

- Law 64-00 - General law on environment and natural resources;
- Law 202-04 - Sectorial Law in Protected Areas (as important criteria to select areas);
- Strategic plan for agricultural sector 2010-2020.

The Strategic plan for agricultural sector includes four main pillars: (1) Institutionalization and consolidation of the process of reform and modernization of sector; (2) Productivity and competitiveness of the sector and promotion of exports; (3) Strengthening the production of items of domestic consumption and domestic marketing mechanisms; and (4) Development of rural infrastructure and services, catalysts of poverty reduction, with a territorial approach. Besides this plan include also two important cross-cutting issues (agro-ecological sustainability and social equity), in the process of drafting this proposal, no evidence of the use and/or benefits achieved by implementing this plan was found.

Regarding the climate policy, the Programme responds specifically to several of priority sectors, namely food sovereignty and security, water resources (Dominican Republic, 2015) and includes National Adaptation Programme of Action's main recommendations:

- Vulnerability of poor communities and vulnerable groups shall be a country priority, due to climate change threats on human settlements and livelihoods;

¹⁶ Since 2000, the congress is discussing a new law that regulates the use of water resources. Such bill is not foreseen to be approved in short/mid-term. However, Programme shall monitor it and its impacts if implemented. A positive coordination and communication with the Ministry of Environment and Natural Resources -which coordinates environmental policy and among different levels of government- can to facilitate the inclusion of potential Programme results and outcomes in the law when it is finally approved. This approach could be equally useful for law's implementing regulation.

- Expected increases in temperature and reduction of rainy seasons are impacting water for agriculture, crops yields are reducing and soils are being degraded;
- Institutional and community capacities shall be to strengthened to provide adequate responses to climate change issues and to increase resilience;
- It is fundamental to foster partnerships that include the private sector and civil society to address climate change in areas with limited or low income; and
- Address climate change and its impacts needs to mobilize additional financial resources and capital to manage risk and to promote technologies and innovation.

The Third National Communication (which is being drafted presently) defines as a priority adaptation measures and policies which support vulnerable communities and prioritizes water resources and agriculture-resilient. As the Programme includes activities in all these sectors, it is contributing with Country's food security. With a focus on addressing threats to food production and water access, the Programme will contribute to putting the Dominican Republic on a firmer path towards food security with better utilization of water and improved public health in vulnerable communities making it more resilient.

- A. Describe how the programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

The Programme appraisal considers quality programming standards based on current applicable norms and standards for different sectors. The necessary safeguards will be followed and incorporated into the projects' design. In addition, proposed interventions will adhere to all national technical standards that are in force, particularly those relating to agriculture, water resources, sanitation services, infrastructure, civil and mechanical, construction and operation, environment and social standards, public health, safety and security. The Programme will identify gaps/overlaps in appropriate sector technologies aligned with adaptation needs (or synergies if any) and identify possible solutions (or opportunities if any) including sources of technical assistance and transfer modalities.

Table 6: National Standards Applicable the Programme

Standard	Applicability	Comment
Law 64-00: General Law on environment and natural resources	<ul style="list-style-type: none"> o Environment and social standards o Issues environment licenses o Planning and surveillance of water resources, forest and biodiversity. 	Main policy on sustainability, environment protection and social participation.
Law 176-97 about municipalities and the	<ul style="list-style-type: none"> o Issues environment authorizations. 	Main policy enforcement for local governments as first

National District	<ul style="list-style-type: none"> ○ Manage the participative budget. 	level of land use planning.
Environment norms and complementary regulation	<ul style="list-style-type: none"> ○ Environmental norms on water quality and discharges into water. ○ Environmental norm on environment management of non-hazardous waste ○ Environmental norm on quality of subterranean waters and discharges to the subsoil ○ Environmental norm for forestry industry that process woods ○ Regulation of forestry resources ○ Environmental norm on air quality and emissions control 	
Other guidelines	<ul style="list-style-type: none"> ○ Guidelines for Social impact assessment ○ Guidelines for Environment impact studies 	
Presidential Decree 42-05	<ul style="list-style-type: none"> ○ Include some guidelines and codes of practice, which provide a basis for the realization of economical and sustainable access to fresh waters. ○ 	Include technical standards to design, operate and build infrastructure for fresh water and sanitation.
Law 150-97	<ul style="list-style-type: none"> ○ Promote the investments in agriculture. 	It does create tax exception incentives for raw materials, equipment and machinery.

As project will be coordinated with key institutions (as Ministry of Environment and Natural Resources, INDRHI, INAPA, JAD and local NGOs) it will be easy to monitor the Programme alignment with technical standards in water management, waters supply and sanitation services, community-based associativity and people labour rights. Entry in force of unforeseen standards shall be part of Programme quality management.

Other agreements could be signed by the Programme with relevant institutional partners in the areas of water resources management, small infrastructure, environmental and livestock and agriculture will support this process. Such partnerships could to include protocols that create synergies with Programme activities as:

1. The National Institute for Drinking Water and Sewerage (INAPA), that can to provide training in water infrastructure operation and handling, and technical advice.
2. Ministry of Agriculture, particularly for training activities and dissemination of improved agricultural techniques, and studies of irrigation schemes shallows;

3. The National Directorate of Livestock, especially for training on hygiene, health and animal feed, livestock vaccination campaigns, and technical advising to farmers;
4. National Institute for Water Resources (INDHRI), including water resources management activities and supervision of boreholes and wells in communities;
5. The National Office of Meteorology (ONAMET) that could train local people on climate conformation and the enabling and equipment of meteorological stations;
6. Special Fund for Agriculture Development (FEDA) that can to provide additional resources and capacitation for farmers based on their organization and involvement;
7. The Dominican Institute of Agricultural and Forestry Research (IDIAF), for improved seed development activities and the provision of improved seeds; and

For planning, design and construction in the water, agriculture and livestock, existing benchmarks will be utilized for dimensioning infrastructure works (i.e., wells, small-scale dams, etc.). Concerning water management existing standards on construction of new water points will be followed (as is provided by INAPA). This includes the necessity of hydrological and feasibility studies (social, economic, demand, safety, quality, capacity, etc.), administrative authorization processes, the constitution of the water management committees, information to the public, health education and periodic monitoring, with inclusion of stakeholders. Specifically, water points will need to be constructed close to the communities but not in, in order to avoid pollution risks. Furthermore, it will be ruled that the community retains ownership of the land around the water point and that any activities or constructions within a specific radius around the waterhole that can threaten water quality (latrines, water troughs, laundry, mechanic, etc.) will be prohibited.

On December 2016, INAPA issued an endorsement letter towards the Programme, stating that, as the national water and sewerage authority of the Dominican Republic, INAPA confirms that the proposed Programme is in accordance with local regulation for water supply and sanitation services and applicable standards (a copy is attached).

As part of the Full Proposal an Environmental and Social Impact Assessment will be carried out to assess the project's legal and regulatory compliance in detail, as well as to identify possible management options in case of conflicts. Therefore, the project will comply with the national environment and social regulations and with the Environmental and Social Safeguards of recognized entities as FAO, World Bank, GEF or AF itself.

A. Describe if there is duplication of the programme with other funding sources, if any.

The proposed Programme is the first integrated approach to scale-up sustainable water management and resilient-livelihoods across communities of San Cristóbal Province while contributing to its institutional and community capacity. The Programme components are based on the products of “*The USAID/TNC Environmental Protection Program* (No. 517-A-00-09-00106-00)”, which produced the study *Critical Points of the*

Vulnerability to Climate Change and the Variability in the Dominican Republic, but will go beyond in terms of interventions, integration of new climate change adaptation approach for water management and water supply and sanitation services, and the scope of monitoring & evaluation (M&E) and knowledge dissemination as is proposed by Berigüete, 2015 and Berigüete, 2016.

USAID/TNC project 517-A-00-09-00106-00 ended on April 2014 so duplication of funding sources / interventions can be excluded. Other existing water and agriculture initiatives by government and NGOs in Dominican Republic which integrate climate adaptation and resilience into their overall framework does not cover the selected province. Among these interventions, most recent climate change adaptation projects are:

- *“CCRD’s Climate Resilient Infrastructure Services (CRIS) Project”*. A multi-country USAID project focused on to increase resiliency of National District’s infrastructure services (e.g. transportation, water, sanitation and waste management, energy, communications, and housing) to climate change. This project ended in 2014.
- CCCCC/EU *“Vulnerability and capacity assessment (VCA) in climate change in agriculture in the province of San Juan and Subzone Hondo Valle, Elias Piña, Dominican Republic”*. This project ended in 2015.
- Ongoing USAID/DR projects *“CLIMA Plan-Planning for Climate Change Adaptation Program”*; *“Climate Change Implementation and Adaptation Measures (CLIMA-Adapt)”*; and *“CLIMA Info-Improved Climate Information Program”* are focused in Provinces of Santiago, Samaná, San Pedro, and National District.

However, the Programme incorporate some lessons learned from mentioned projects.

Table 7: Learned Lessons from other Adaptation Projects

Project	Applicability
Critical Points of the Vulnerability to Climate Change and the Variability in the Dominican Republic	a) Understanding of vulnerability, sensitivity and exposure to climate change towards water, agriculture and other sectors can to help to design better climate adaptation projects and activities. It does include discussing the causes of vulnerability.
CCRD’s Climate Resilient Infrastructure Services (CRIS) Project	a) Anticipate institutional challenges to sustain cities’ internal capacity for climate resilience and take advantage of opportunities to introduce climate considerations into the decision-making planning process. This is translated to a community context. Engage and retain the right municipal staff and leverage the value of working groups. Engage the private sector with a distinct strategy, even consider to prepare short-term and long-term options in an adaptation portfolio.
Vulnerability and capacity assessment (VCA) in climate change	a) Gain credibility: use the best available, highest quality data, information, and recognized methods and analysis

in agriculture in the province of San Juan and Subzone Hondo Valle, Elias Piña, Dominican Republic	<p>procedures; Clearly communicate data gaps, limitations of the methods, and uncertainties in results; Discuss non-climate related confounding factors.</p> <p>b) Gain legitimacy: Involve key stakeholders in the design of the project; Ensure that stakeholders represent the full range of appropriate technical sectors and levels of society; Maintain dialogue and open involvement, providing voice to many actors throughout the process.</p>
CLIMA Plan-Planning for Climate Change Adaptation Program”; “Climate Change Implementation and Adaptation Measures (CLIMA Adapt)”; and “CLIMA Info-Improved Climate Information Program	<p>Public documents of those projects are utilized just for reference. However, the projects design suggests the involvement of direct beneficiaries/ affected as a reasonable approach to address the climate change vulnerability and to reach other co-benefits (as political involvement, institutional capacity and more information).</p> <p>No lessons learned from such projects are publicly available.</p>

Other reviewed interventions are focused in human settlements, watersheds, and tourism. No other interventions were found in the Programme’s targeted province.

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

The project has been conceived as a demonstration mechanism to enhance capacities to implement measures directed to strengthen climate change adaptation at the community level. In this regard, identification of lessons learned will be a key activity of the project. The Monitoring and Evaluation Plan will pay special attention to capturing lessons learned to up-scale project results to other areas and vulnerable communities of the country. Component 3 (“*Capacity building and capacity development in key institutions and communities to manage long-term climate change-related risks*”) included in the Programme, focuses particularly on outreach and information exchange. As detailed in this concept note, different knowledge materials (manual, website, calendars, presentations, etc.) will be produced for specific target groups (policymakers, field workers, communities, scientific community, and partner’s communication channels, etc.), integrating practical lessons on “how to reach more resilient livelihoods and a more sustainable water management” in targeted communities. Further outreach will also occur at higher national/international level, ministerial dialogues and UNFCCC COPs.

The Programme will develop a series of tools and instruments that will be applied in the selected pilot sites and will serve as the basis for assisting in dealing with climate change in the targeted communities through diversifying livelihoods. Component 1 and Component 2 will create technical instruments to support a wide range of concrete adaptation activities for sustainable water management and resilient livelihoods that will be founded upon the identification of best practices, appropriate technologies and lessons learned that will be mainstreamed into best practice manuals and guidelines. Participatory development of these tools and instruments, as well as in development of

pilot activities will ensure the endorsement by stakeholders, therefore contributing to successful future replication efforts, especially in other areas with communities similar to targeted areas.

At the field level, the Programme will benefit from experiences and knowledge of producers, municipalities, government agencies, farmers, local leaders, NGOs, universities, consultants and other institutions. The Programme will facilitate the development of community adaptation activities through participatory workshops at the local level to ensure a high level of community involvement, fostering empowerment and ownership of the Programme, and thereby strengthening its long-term sustainability. Participatory workshops will serve to identify local conditions (strengths-weaknesses-opportunities-threats), understanding the community needs, especially in regards to vulnerability and adaptation, and identifying and prioritizing concrete adaptation activities on-the-ground.

Several programmes and projects have been identified so far, which can mainstream the experiences and lessons learned into their work activities. Up-scaling will be facilitated by Component 2 and Component 3 through training, awareness-raising and on-the-ground activities. As Component 3 include: the establishment and maintenance of a website; a newsletter; training and outreach programmes aimed at relevant stakeholders (empowered women and young leaders) that may include field exchange visits, information materials, training workshops and events; as well, dissemination of the Programme results and lessons learned and to promote exchange of experiences. International agencies can share the lessons learned through global/ regional initiatives.

All knowledge products of the Programme will be socialized with relevant audiences. To secure that it will work beyond the life of the project, all these products will be transferred to key institutions (not only as training or capacitation but also introducing the climate change adaptation into the decision making process) in order to become Programme main outcomes as regular process for institutions and communities. For example: in the preparation of every written guide there will be included two consultations steps, the first to capture the existing knowledge of interest to be disseminated (particularly in the reported more experienced persons of the community), and the second one to verify the adequacy of the guide design, by using a preliminary version to be tested with community members. The final version of the teaching materials shall be also transferred to the local authorities during the follow-up and replication agreements.

The Programme assessment and monitoring activities will incorporate criteria and indicators for assessing knowledge management activities and will include items for the identification, description and reporting of lessons learned. At Programme conclusion, a final report on lessons learned will be made in digital format and will be presented to the authorities and institutions related to the project. This report will have printed report for dissemination to participating communities and other identified communities that may be interested in the experience and that share conditions of vulnerability prior the projects.

- A. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy of the Adaptation Fund.

The proposed Programme reflects the main pillars and crosscutting approaches of the *National Development Strategy*, the *National Policy on Climate Change* and other relevant instruments. IDDI executives, officers from Ministry of Environment and Natural Resources, and consultants were involved at preliminary consultative process. As results of several meetings, it was established the Programme's potential intervention areas and the multi-interdisciplinary approach towards the consultative process to ensure that the Programme's targets encompasses key sectors, stakeholders and beneficiaries.

The Ministry of Environment and Natural Resources (the key governmental counterpart of the process), through its Climate Change Unit, suggested key government institutions related with the overall Programme objectives and activities and instructed IDDI to look for their support, and to coordinate further consultation with all major stakeholders during the Programme conceptualization and design phase. This process lead to a series of meeting with government officers to secure their institution's involvement.

The main issues discussed during such these meetings (May to December 2016) dealt with the future climate scenarios drafted by the 3rd National Communication and Critical Points, areas of the country to be most severely affected by climate change, as well as the criteria to select the areas of intervention. The five criteria taken into account were:

- Climate vulnerability (exposure and sensitivity to climate change);
- Social vulnerability of family producers and poverty (low adaptation capacity);
- Availability of relevant information (production systems, agricultural practices);
- Existence of ongoing programmes and projects (to avoid duplicity/ overlaps); and
- Diversity of production systems and target groups (farmers, women, etc.).

San Cristóbal Province has multiple areas that comply with above mentioned criteria. Within these areas, communities are identified for potential Programme's intervention. The specific pilot sites for implementation of project activities will be selected through further consultations during preparation of the full-fledged proposal.

Other relevant institutions consulted about the Programme potential outcomes and relevant stakeholders are: The Ministry of Agriculture, the Dominican Agrarian Institute (IAD), Dominican Institute for Water Resources (INDRHI), the Dominican Agribusiness Board (JAD), Fondo Pro-Naturaleza (PRONATURA), Santo Domingo Institute of Technology (INTEC), Centre for Sustainable Agriculture with Appropriate Technologies

(CASTA), Foundation for the Development and Welfare of Women and Children of San Cristobal (FUNDEBMUNI) and Foundation for Water and Sanitation of Haina. In these officials' opinion, it is necessary to hold a consultation workshop to aim the stakeholder's engagement at full proposal stage and define specific programme's pilot sites. Consequently, a first stakeholder's map was drafted, and it will be the base for consultations designs¹⁷.

In terms of community involvement, each community is different from the other. While some consulted local representatives commented they need specific and previous approval from their constituents to meet/agree with any project on behalf of such communities, all of them are in agreement to hold public consultations when the Programme proposal is more advanced and financial resources are obtained (meaning that such resources be made available by Adaptation Fund). This approach assures that if communities participate in the Programme from the very beginning it would represent a commitment by them and part of their current development plans/strategies. It shall be pointed out that these consulted representatives are present in each of the target areas and can secure communities to participate cooperatively and collaboratively as partners with the Programme, which it means that they understand the need for real alternatives to their water, sanitation and livelihood problems.

As the detailed process of stakeholders consultation and engagement process will be developed at full propose level, the proposed Programme envisages a strategy to get more involvement and commitments from the communities and their organizations. Such strategy does include, so far, the following:

- Workshops with key stakeholders (individual and/or organizations) will be carried out to introduce the project, conduct assessments, and identify activities and establish goals and commitments. When needed, workshops can to include some sessions in Creole (for Haitian people who may not be fluent in Spanish).
- The whole process will include preliminary visits to communities to provide them with sufficient information on the Programme and to allow the community leaders and its members to discuss the Programme among themselves first prior to the workshops, thus respecting their own processes and timing regarding internal consultation and decision making.
- After the communities have discussed the expectations and potential benefits of the Programme, the workshops will be conducted in order to identify and prioritize project activities taking into account their resources and capacities. This process has been proven to facilitate the successful participation of stakeholders, and hence in achieving a proper needs assessment and the establishment of proper goals.

¹⁷ To ensure representatives especially organizations represent their entities views rather than their personal ones, it was asked to all of them to communicate freely their involvement so far in the Programme design and to look for their respective leaders due approval in order to continue collaborating with the proposal development.

- Communication will be in Spanish and Creole (if necessary) with an adequate and respectful cultural approach to ensure proper understanding and contribution. In all cases, participation of women and young's leaders will be fostered to ensure an equitable participation and a more comprehensive vision at the community level.
- Beyond consultative face-to-face meetings and interactive events, the Programme will also prepare knowledge management materials on climate change resilient water management and livelihood diversification activities. Existing IDDI and PRONATURA awareness materials could be adopted. Key findings will be prepared in a format for dissemination to key stakeholder audiences.

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

Under a baseline scenario targeted areas reported poverty conditions, socioeconomic and climatic vulnerability (lack of adequate water supply and sanitation) will continue. As Dominican Republic is highly vulnerable to climate impacts, under increasing temperatures it is highly likely that availability (production) and access (prices, income) to food would be further affected. Changes in total precipitation, higher drought or storms frequency would act in a similar direction. Regarding such matters, Programme interventions look for synergies with food security, increase income, and risk management. While there is high uncertainty regarding the precise regional or local consequences of global warming, inaction would surely be detrimental for the Country, both in terms of incurred losses due to current climatic variability and future changes.

Regarding the proposed Programme interventions, in general there are limited options available in terms of alternative actions to build climate resilience in the agriculture and water resources sectors. Additionality to a socioeconomic baseline scenario is hard to prove because of vulnerability's multi-faceted character (environmental, social, economic, territorial, etc.).

Following analysis shows several justifications regarding funding request by component.

Component 1: Community Level Implementation of climate resilient water resource management activities.

Baseline Scenario (with no Adaptation Funds resources and support)

Currently, community involvement in the planning management activities, particularly by women, is very limited which exacerbates their vulnerability to climate change impacts. There are also no linkages between river basin management plans and community needs limiting the water cross-services with social and economic potentials highlighted in the National Development Strategy. As a result, the drive and purpose required for integrated, climate-resilient water resources management is lost and unsupported by local communities, or harnessed by civil societies and government programmes to in addressing transformational changes (as SDO, for example). There is a lack of information for communities on how to manage their water resources for diversification

of their livelihoods activities in response to climate change impacts on their water resources thereby limiting their abilities to respond and adapt to climate change.

As occurs in many communities of the Dominican Republic, vulnerable communities of San Cristóbal Province currently face significant constraints in implementing water management measures that build resilience to climate change impacts. There is insufficient capacity within communities themselves and within the government to support communities, to identify appropriate measures and implement and maintain these. Even where infrastructure is in place, such as pumps, lack of resources and effective community organizations results in insufficient maintenance.

Programme Scenario (with Adaptation Funds resources and support)

Using AF resources, the Programme will implement extensive training of key institutions and communities, enabling long-term support to be provided to communities in the planning and implementation of climate resilient water management measures. This will be an essential element, both in implementing the proposed AF programme, but also wider support to selected communities. Thirty (30) communities, across 8 municipalities, will initially be supported in the development of community level water management plans. Essential to this process will be the establishment of appropriate community level institutions, with a target of at least 50% representation by women in these organizations.

A key aspect of this component will be convening regular meetings of representatives from these 30 communities, enabling sharing of experiences and assisting in maintaining momentum in implementation of the community level plans, which will promote long-term adaptive management of water resources within these communities. Crucially, resources from the AF are necessary to implement an extensive programme of water management infrastructure in the 30 selected communities. This will primarily comprise boreholes, ponds/dams, rainwater harvesting, small-scale irrigation and catchment re-forestation. These measures will provide communities with the capacity to manage their water resources at a community level, greatly assisting in their ability to adapt to climate change impacts, including increasing prevalence of droughts and flooding. INAPA will be a key player due its higher authority on the water supply and sanitation.

Mechanisms will be developed via community level institutions to ensure continued maintenance and management of these measures beyond the lifetime of the proposed Programme. Lessons learned from the development and operationalisation of community level water management plans will be documented and disseminated to key stakeholders across the entire Province and other regions. This will establish a situation whereby the key institutions will have the necessary capacity to support community led climate resilient water management activities across all the entire country.

Component 2: Diversification of livelihoods of rural communities under climate change

Baseline Scenario (with no Adaptation Funds resources and support)

Currently, rural targeted communities in the San Cristóbal Province are largely reliant on unimodal rain-fed agriculture as a source of livelihoods. These are already vulnerable to drought and flood events, both of which are predicted to become more prevalent with climate change. Communities do not have the capacity to diversify their livelihoods base, due to limited institutional capacity to support networks, limited capacity within communities themselves and limited resources available to implement diversification activities. As the ratio of precipitation to evaporative demand is expected to decrease in the country, rain-fed agricultural production is vulnerable to climate change. Even where erratic increases in precipitation could contribute to increase yields, this often results in crop damage linked to heavy storm events, excessive soil moisture and flooding.

Similarly, livestock production practices are restricted under traditional practices under reduced grounds and the drying up of important water bodies. Unfortunately, coupling climate change with ongoing agricultural land expansion only leads to an increased vulnerability to climatic shocks¹⁸. All these have placed different community groups in direct competition with each other over land and water, leading to local-level tension and conflicts. Given that the vast agricultural land in the San Cristobal Province is rain-fed, changes in water quantity and quality due to climate change are expected to have significant positive impacts on the sector in terms of productivity, hence affecting food security.

Programme Scenario (with Adaptation Funds resources and support)

The Programme will hold extensive training of key institutions, particularly extension officers, enabling long-term support to be provided to communities in the planning and implementation of climate resilient livelihoods diversification. As with training under Component 1 relating to water resource management, this will be an essential element, both in implementing the proposed Programme, but also in providing wider support to communities across the Dominican Republic. Thirty (30) communities, across 8 municipalities of San Cristóbal, will benefit from training in issues such as business skills and marketing. These skills are essential and will result in communities to be better able to maximize opportunities that all livelihoods activities present, increasing their resilience to climate change impacts on the traditional livelihoods activity of rain fed agriculture.

Using resources from AF the key institutions will implement an extensive programme of livelihoods diversification activities in 20 communities. This will primarily comprise dry season gardening for women, community-based fish farms, community-based woodlots/tree nurseries and agricultural product processing facilities. The measures will considerably diversify livelihoods, moving communities away from a reliance on one prime source of climate vulnerable livelihoods. Importantly, the livelihoods activities supported by the Programme will build on the water management support provided under Component 1, thereby offering an integrated programme of response.

¹⁸ This dilemma is widely discussed since the publication of the technical paper: *Water and climate change impacts and adaptation strategies*, by UNFCCC on 2011. Available at: <http://unfccc.int/resource/docs/2011/tp/05.pdf>

Component 3: Capacity building and capacity development in key institutions and communities to manage long-term climate change-related risks

Baseline Scenario (with no Adaptation Funds resources and support)

Under a baseline scenario targeted areas reported poverty conditions, socioeconomic and climatic vulnerability (rain-fed agriculture, extensive livestock, and lack of adequate water supply and sanitation) will continue. As Dominican Republic is highly vulnerable to climate impacts, under increasing temperatures it is highly likely that availability (production) and access (prices, income) to food would be further negatively affected. Changes in total precipitation, higher drought or storms frequency would act in a similar direction. While there is a high uncertainty regarding the precise regional or local consequences of global warming, inaction would surely be detrimental for the targeted communities, both in terms of incurred losses due to current climatic variability and future climate change. In this context, socioeconomic scenarios point at increasing risks of poverty-related problems such as water shortages, food insecurity, health or social welfare. Climate variability and change thus put heavy burdens on family farmers and their communities that will very likely exceed their capacities.

Programme Scenario (with Adaptation Funds resources and support)

The approach of this component does include both concrete strengthening capacities across scales in adaptation planning and climate risk management. While this represents only a first step in scaling-up successful actions and learning, the outcomes of the Programme for the selected areas and Country foresee a significantly positive alternative scenario compared to the baseline. Lessons learned from the development and operationalisation of community level water management plans will be documented and disseminated to key stakeholders all across the Dominican Republic using a wide range of alternatives. This will establish a situation whereby the Programme has produced the necessary capacities to support community led climate resilient water management activities and livelihood diversification activities across all the Country.

Regarding the proposed Programme interventions, there are limited options available in terms of alternative actions to build climate resilience in water resources management and usage. Additionally, to a socioeconomic baseline scenario is hard to prove because of vulnerability's multi-faceted character (environmental, social, economic, territorial, etc.) and the lack of strong public policies to manage climate risks in poor communities.

- A. Describe how the sustainability of the Programme outcomes has been taken into account when designing the Programme.

The sustainability of the Programme outcomes relates to "*practice-focused*" Component 1 and Component 2 (sustainable water management and improved resilient livelihoods) and "*capacity-focused*" Component 3 (institutions capacity building/ development and outreach). At community level, capacity building will provide permanent benefits after the Programme ends: trained local personnel will have positions strengthened, and may participate in future adaptation and/or development projects, or continue improving its

efforts related to climate adaptation. Due to the Programme's novel but realistic design, its results will likely influence practice and policy beyond project implementation time.

The long-term sustainability of the Programme is based on several prongs. On the one hand local, community based ownership is critical and steps have been taken into account to assure this such as incorporation of all potential partners and populations during the formulation stage of the proposed Programme (as discussed previously). The deliverance of the proposed outcomes with enough quality and transparency to constitute -by itself- the best practices for community-based adaptation (and prove it within the Component 1 and Component 2 implementation on-the-ground) will dramatically promote this. The Programme will also take into account needs of the local organizations, as they identify them, respecting their cultural and legal frameworks, avoid conflicts and be useful enough to creating an end-user ownership. This is also relevant to local NGOs.

The Programme will also build upon existing best practices and local knowledge, and will make use of instruments that it will develop, to identify cost-effective technologies and practices and design a set of concrete climate change adaptation activities that will be tested in pilot sites. Lessons learned will provide solutions for sustainable climate-smart agricultural production that can be consolidated and replicated beyond the life span of the Programme, thereby incorporating adaptive technologies into the current spectrum of conservation and development instruments in use. In terms of water supply and sanitation services, a similar approach can be utilized in order to achieve savings.

Households, small farmers, and representatives from targeted communities are to take ownership of small scale infrastructures, and young men and female will be trained by the Programme to undertake smaller maintenances, thus also contributing to local capacity building and empowerment. This commitment shall be accorded during the full proposal consultation phase, and will be a *must* for any subproject implementation.

At another level, sustainability is a factor of government involvement, both at the municipal level as well as the national level. Through the Ministry of Environment and Natural Resources, as the Programme seeks commitment from water authority (INDRHI, INAPA) and other authorities to support the communities to maintain the water and sanitation infrastructures built by the Programme after its completion. Similar, the Ministry of Agriculture, which can contribute significantly supporting communities to scaling-up the good practices after programme ends.

At a third level, the Programme will demonstrate how investments in climate-resilient livelihoods can be profitable, thereby promoting the extension of similar activities beyond the targeted sites. With increased awareness of the market opportunities related to adaptation to climate change, the Programme would be promoting further investments in adaptation. Sharing methodologies, results and lessons learned will be compiled and disseminated to other third parties through the Programme and through a range of communication media. A public awareness campaign and field demonstrations will be organised.

The Programme will also monitor and evaluate (M&E) the implementation continuously; therefore, reducing the risk that households and/or communities may be unsatisfied with the interventions. Preliminary lessons from other projects seem to indicate that the risk of subprojects terminating after project teams have left is low and manageable.

In summary, the following aspects of the Programme sustainability have been identified:

Table 8: Programme Strategy for in Long-Term Sustainability

Criteria/ Explanation
<p>Capacity Development</p> <p>Capacity development of planners and at all levels of the government will provide a central focus for all activities. Climate related training will be developed with a focus on community based adaptation and water ecosystem restoration activities. These will be designed with a replicability in mind and remain after Programme completion as a continuing key resource for workers, authorities and other sectoral agencies. The Programme will develop evidence of adaptation cost per beneficiary unit (i.e., household, productive hectares of irrigated land, farmers' income, etc.).</p>
<p>Community-level infrastructure investments</p> <p>Intervention structures will undergo a financial feasibility assessment during the prioritization process to ensure sustainability and maximize the cost-benefits of particular interventions for particular communities.</p>
<p>Financial Sustainability</p> <p>This Programme will channel support to communities with a focus on assisting community economic groups of farmers/ producers (i.e., management committee for fish farms, management committee for woodlots) or water user groups become independent and self-sustaining. In the context of the Programme, this would mean that the groups would continue to operate beyond the period of grant.</p>
<p>Institutional Sustainability</p> <p>The proposed Programme will assist the Dominican Republic to improve and create management plans for provinces/ municipalities, and mainstream these into the activities of a number of relevant institutions. These plans will also inform local plans in the communities, building strong national and local management plans will be important to the sustainability of the activities implemented under Component 2 (as increased water supply, small scale irrigation schemes, soil and water conservation measures).</p>
<p>Social Sustainability</p> <p>The capacity building activities, networking and field-level presence will help achieve social sustainability of the Programme. The buildup of trust through dialogues and stakeholder consultations and stakeholder mobilization done through capacity building will help to achieve sustainability. A strong focus on building local knowledge, capacities and incentives – as well as strong Programme focus on ensuring gender equity in all operational matters are expected to lead to social sustainability.</p>
<p>Environmental Sustainability</p> <p>The Programme focus on climate change adaptation within existing protected areas in the San Cristóbal province are expected to lead to better environmental sustainability and enhanced natural resources management. Reforestation and all the variety of “soft” measures being adopted to protect water catchments will stabilize the physical environment. The Programme will promote integrated water</p>

management with full engagement of the community and community based organizations. As well the Programme can to support the use of renewable energy such as solar energy as opposed to fossil fuel, to operate mechanized boreholes (if are technical and economically plausible). As demonstrated by existing water facilities powered by solar energy, the solar panels will be also useful in providing security lights in the water facility. The sustainability of a solar-powered system is dependent on the existence of technical and financial capacity of the community to maintain the system. Hence, under this Programme, an appraisal will be carried out first to determine the readiness of the community to maintain such system.

A. Provide an overview of the environmental and social impacts and risks identified as being relevant to the Programme.

The table below constitutes of a preliminary assessment of environmental and social risks relevant to the Programme. All items marked as “*potential impacts and risks*” - “*further assessment and management required for compliance*” will be included in the Programme’s results-framework, and compliance with Adaptation Fund’s regulations (including the Environmental and Social Policy) will be monitored and evaluated (M&E) during Programme duration using specific, verifiable and time-bound indicators.

For the full proposal a comprehensive Environmental and Social Impact Assessment (ESIA) will be designed and carried out in order to identify potential impacts and risks to the relevant standards in key areas of to the proposed Programme, such as agriculture, water management, small infrastructure, and social and environmental and standards.

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
<i>Compliance with the Law</i>	No Programme component or activity contravenes any laws or regulations currently in force in Dominican Republic. The Programme complies with the country’s legal framework for water, agriculture, and environment protection. For the full proposal an Environmental and Social Impact Assessment (ESIA) will be carried out in order to identify any potential risks related to compliance with the law.	Very low: the ESIA will ascertain whether there are any conflicts with other sectoral laws or policies.
<i>Access and Equity</i>	The intervention logic of the Programme is to provide potential beneficiaries in target communities with fair and equitable access to Programme activities and equipment throughout both planning and implementation phases. All producer groups which request participation will have an equal opportunity to benefit from the adaptation activities proposed by the Programme. Eligibility criteria of the Programme will be clear and transparent, and defined together with all relevant stakeholders, including traditional authorities. For the Programme interventions it is planned to include: difficulty of access to water in the area; vulnerability in terms of biophysical and climate risks; social vulnerability as selection criteria. Through these criteria the Programme will assure the participation of less empowered groups, including women, minorities and	Very low: Pilot projects implementation will guarantee access and equity to sensitive groups (including children, gender, elderly).

	particularly vulnerable groups. The Programme's results framework will measure developments related to 'access and equity for vulnerable groups' throughout the Programme duration.	
<i>Marginalized and Vulnerable Groups</i>	The Programme focuses on marginalized and vulnerable groups (young, minorities, women, elder, etc.) and aims to assist them to improve their agricultural practices and living conditions. As such the Programme is not expected to have any negative impact on these groups.	Very low: The Full Programme Proposal will follow relevant social and environmental safeguards for full proposal stage. These include: screening of communities; (b) social assessment of needs and conflicts; (c) free, prior, and informed consultation with the affected groups, if any; (d) preparation of a Vulnerable Group Plan or Framework if required.
<i>Human Rights</i>	The Programme affirms the fundamental rights of people in the intervention areas, and thus does not affect their freedom. Furthermore, the Programme does not integrate any activities contrary to custom law or traditions. Participation in the Programme cycle will be participatory and voluntary.	Very low. In particular, the 4C and communities' heads will be consulted to avoid any negative impacts on human rights.
<i>Gender Equity and Women's Empowerment</i>	The logical framework of the Programme foresees direct participation for women and women's associations so they can benefit directly from the Programme. In particular, the Programme proposes to support women to develop sustainable income generating activities and improve thereby their living conditions, therefore also empowering them in the context of a largely traditional and male-dominated society. Participation of women and empowerment will also be a key focus of the Programme's M&E framework.	Very low. Progress with regards to women's participation and equity will be measured through the Programme's M&E framework, but compliance is not a problem.
<i>Core Labour Rights</i>	Core labour rights concern gender aspects, respect for workers; maximum work hours; child labour; etc. The Programme will ensure that national working standards are respected on production sites. The Programme will also ensure that appropriate wages will be paid per assigned task, and that no child labour will be employed. Social security standards (i.e., access to first aid) will also be respected and enforced.	Very low. Monitoring on core labour rights will be undertaken throughout the Programme.
<i>Indigenous Peoples</i>	N/A	N/A
<i>Involuntary Resettlement</i>	Involuntary resettlement due to Programme activities does not represent a problem. Water storage facilities and irrigation implementation do not require any resettlement. The ESIA will take care of these issues at full proposal stage.	Very low. The Programme will undertake, when the full Programme will be designed, surveys, studies and assessments for identifying the risks and impacts of each intervention and plan possible mitigation measures. These undertakings will be based on the social and environmental safeguards

		and regulations.
<i>Protection of Natural Habitats</i>	All Programme activities will be carried out on areas already under usage, and the Programme will teach practices to dispense traditional agriculture practices, therefore reducing pressures on ecosystems. Furthermore, the Programme will work with water-saving irrigation techniques to limit runoff and soil erosion in the selected areas. Nevertheless, the Programme may cause negative impacts on the biophysical environment, including natural habitats, if programme activities are not monitored consequently. For this reason, the ESIA (at full proposal stage) and M&E framework will focus on assessing potential risks and impacts on natural habitats.	Low. ESIA and M&E activities in order to identify potentially adverse risks and impacts on natural habitats.
<i>Conservation of Biological Diversity</i>	The Programme will adopt agricultural practices that increase biodiversity compared to the baseline scenario, including conservation agriculture. Furthermore, the Programme will not introduce any exotic or invasive species in the targeted areas. However, as noted before, water storage facilities and irrigation may impact biodiversity particularly when areas need to be cleared.	Low. ESIA and M&E activities in order to identify potentially adverse risks and impacts on biodiversity.
<i>Climate Change</i>	Focus of the Programme is climate change adaptation through sustainable water management, which from a climate perspective incorporates resilience (adaptation) and reduction or removal of greenhouse gases (GHG) (mitigation). All adaptation actions undertaken under the umbrella of this Programme will need to be assessed constantly in order to understand whether they contribute to building of resilience under increasingly variable climate. The final assessment of the Programme as well as the socio-climatic vulnerability assessment will support achieving this principle. Potential impacts on land use will also be registered, thus contributing to the assessment of GHG emissions reductions (mitigation).	Low. The Programme foresees assessments on adaptation and mitigation.
<i>Pollution Prevention and Resource Efficiency</i>	Water resources are currently exposed to various forms of pollution associated with the use of fertilizers and pesticides and manure. The Programme will work to prevent these types of pollution. There may be further pollution linked to the construction of water storage facilities, including deterioration in water quality downstream, or detrimental effects through limiting access to water by downstream users.	Low. ESIA will be undertaken to identify potentially adverse risks and impacts in this area.
<i>Public Health</i>	By supplying more and better water and sanitation services it is expected a positive impact in selected communities towards public health.	Low. Application of ESIA in order to discern health impacts in communities and disease occurrence.
<i>Physical and Cultural Heritage</i>	No adverse impacts on the physical and cultural heritage of the people in the intervention areas is foreseen. The chances of damage to physical assets are zero.	Very Low. Potential impacts will be assessed throughout pilot projects implementation where risks are highest.
<i>Lands and Soil Conservation</i>	The Programme will have positive impacts on the landscape of the intervention areas through the establishment of agro forestry systems and conservation agriculture. Soil conservation and restoring fertility is a key practice in smart-agriculture.	Very low. Monitoring activities foreseen to identify potentially negative effects.

Other actions contributing to reduce the risks are:

- Short-time community-based adaptation plans will detail specific goals, adaptation activities, implementation arrangements and commitments by the project, partner institutions and beneficiaries. This can increase Programme efficacy.
- Under Components 1 and 2, financial mechanisms will be identified and assessed for their cost-effectiveness. Based on the results, only financial mechanisms that are the most cost-effective and appropriate for the area will be piloted, and hence not all of the identified financial mechanisms will be piloted. Such cases could present an opportunity for proved schemes as microcredit, small grants, or sub-projects.
- A key component of the community adaptation will be the monitoring and evaluation plan in order to track the progress and results of the implemented activities. This plan will include a set of indicators to measure the outcomes of activities.
- Measures for water conservation under climate impacts (as catchment/river bank, re-forestation schemes) implemented for at least 400 hectares will help to secure project long-term sustainability, in terms of water preservation and protection.
- Dissemination of Programme results and outcomes will permit to replicate it in other places. As well, the availability of a learning platform can help to communities to be more accurate towards other adaptation initiatives.
- Activities as awareness raising, training and technical assistance for implementation of sub-projects will be carried out by relevant agencies, universities and NGOs. The Programme will identify those NGOs working directly in targeted communities.
- Multi-party agreements will be established to design, implementation and monitoring of sub-projects and specific activities. These agreements will include the process for ensuring that Programme funds are distributed specifically to the local communities.
- Stakeholder participation at all Programme levels will ensure adequate planning and implementation of activities in line with the Programme objectives and with the local development and stakeholder priorities, as well as complementarity with other ongoing and planned interventions.
- Consultative groups will be established in targeted areas to ensure engagement of beneficiaries, to help identify and prioritize activities and interventions as well as to overview the implementation and progress of the targeted activities at field level. These groups include representatives from each beneficiary groups, implementing partners, community organizations, cooperatives, churches, local clubs, and NGOs.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for programme implementation.

The Project will be implemented by IDDI with support from other public (Ministry of Environment and INAPA), private (Water Users Associations), civil society organizations (PRONATURA, INTEC, etc. and selected community groups. As the Dominican Republic has established a regulatory and institutional framework for climate change, based on (among other policy instruments) the National Development Strategy, Programme activities will be aligned with country's priorities and its national commitments under the UNFCCC.

Management Agreements

The management arrangement of this Programme will be designed at full proposal level to facilitate extensive linkages at all levels, from national-level policymakers to institutional-level operations down to communities and beneficiaries. In designing such implementation arrangement, following key considerations are taken into account:

- 1) consistency with governance structures and mandates of various agencies in order to foster mainstreaming and ownership;
- 2) accountability and transparency in fund flows to ensure cost-effectiveness;
- 3) disbursement of funds in a timely manner to ensure Programme delivery within the stipulated timeframe; and
- 4) mainstreaming and sustainability.

The deliveries of the Programme at the community level will follow the channels of the current governance structure in Dominican Republic. The Ministry of Environment and Natural Resources will serve as primary government institution to ease linkages among national and local levels. The Ministry is in a good position to do this because it has offices at the Provincial level. Implementation of community-level activities will be the responsibility of the Communities Committees through the appropriate decentralized agencies, primarily the INAPA, Department of Agriculture, Department of Forestry, Department of Livestock, INTEC, PRONATURA and CASTA depending on the nature of the activity. All activities which are envisioned by the Programme to be performed by the Community Committees will be strongly connected with Water User Associations and Irrigation Users Committees (for water resources management and irrigation systems, as the supervision of infrastructure projects, identifying of private contractors, etc.). Consistent with its Programme approach, the Communities Committees will be strengthened so they can work with various decentralized agencies in connection with the Programme.

The Dominican Institute of Integral Development (IDDI) will serve as the National Implementing Agency (NIE) for the Programme. Services that IDDI typically will provide in support of achieving the Programme outcomes are diverse (identification, sourcing and screening of ideas; feasibility assessment / due diligence; development & preparation; implementation; evaluation and reporting). Any implementation arrangement for the Programme will recognize clearly the separation between implementing and execution services. Regarding this matter, IDDI will comply with all Adaptation Fund guidelines.

Steering Committee

The Programme will create a Steering Committee comprised by IDDI, Ministry of Environment and Natural Resources, INAPA, and other key institutions such as the Governorate, INDRHI, MEPyD, Local Governments, Universities and NGOs. It will be chaired by the IDDI and the Ministry of Environment and Natural Resources will be the permanent secretary. In addition, the membership of the Steering Committee could to include parent ministries of the decentralized agencies that will be involved in delivering the project outputs at the community level, such as the Ministries of Agriculture, of Women, of Tourism, of Industries and Commerce, of Presidency and others.

Executive Board

Programme Executive Board, will be responsible of approving key management decisions of the Programme and will play a critical role in assuring the technical quality, financial transparency and overall development impact of the Programme and will be established as soon as the proposal is approved. The Board will consist of designated senior-level representatives of agencies with direct stakes in the implementation of the Programme (i.e., IDDI, INAPA, MEPyD, Governance of San Cristobal Ministry of Environment and Natural Resources, Local Governments, etc.). A complete list of Executive Board members, and their designated alternates will be provided in the inception report.

Management Unit

IDDI will establish a Management Unit, which will be responsible for implementation of project activities. This Unit will prepare annual work-plans, progress reports and will carry out the project M&E plan. Management Unit will be in charge of coordinating activities under each component with the different government agencies / local organizations that will collaborate and be involved in the project execution. This unit will also be responsible of ensuring adequate stakeholder participation and involvement.

Provincial Committee

A Provincial Climate Change Adaptation Monitoring Committee will be created and empowered to provide overall guidance and supervision in order to lead the Programme to its long-term sustainability. The Provincial Committee will act as “*representative*” of programme beneficiaries and community-based organizations towards key government institutions. Its main activities will be related with the inclusion of the Programme achievements and further steps within both central and local government investment plans. This does include, but not limited to, the National Budget and Public Spending

Law, Participative Budget (a well-known and well established existing mechanism that promote the civil society participation into local governments investments to secure its plurality, efficiency, sustainability and transparency), and furthers Multi-Year Public Sector Plan. As well PCCAMC can work with other national and / or international relevant institutions into develop further climate and development related projects in benefit of communities and organizations of the San Cristobal Province.

The final design of the Provincial Committee, attributions and members will be defined after a stakeholder consultation process. However, it's highly anticipated that it will include existing entities as the Governance, local governments, MEPyD, COE, Ministry of Public Health, Ministry of Environment and Natural Resources, INDRHI, INAPA, Ministry of Agriculture, and Ministry of Industry and Commerce. Private sector representatives from industrial, services, banking, and agriculture, and civil society organizations, as universities, NGOs, women, youths and communities will be Included. The Programme will support the establishment of this committee initially to serve the Programme objectives but with a wider view of supporting the identification of other climate change adaptation needs and the implementation of solutions in benefit of most vulnerable people and the sustainable development of the San Cristóbal Province.

Local Coordination/ Implementation

At the local level, Community Committees will be established in each pilot site to ensure adequate local level coordination and participation of key local stakeholders and representatives of the target groups. Further details of such community management and attributions will be provided in the full-fledged proposal. The institutional arrangement and processes for community-based organizations in Dominican Republic is relatively mature. However in some communities there already exist community based structures which can play -with appropriated dialogue- the role of Community Committee.

A Programme of this size will not be able to rely on the government system alone. Fortunately, local NGOs are fast acquiring capacities to run agricultural, forestry and environmental projects in collaboration with communities and international agencies, in the context of implementing livelihood programmes. The strategy of the Programme will be to supplement government and NGOs with new and/or existing capacities (in other sectors) to create a pool of community-based extension workers. This has been proven to work based on the experiences of local NGOs, Disaster Risk Management, and in Small Grants Programme in Dominican Republic. Regarding this aspect, it's anticipated that, according with their mission, experience and availability, INAPA, PRONATURA and INTEC could reach some leadership in water facilities (Component 1), resiliente livelihoods (Component 2) and capacity building (Component 3), respectively; while other entities (CASTA, INDRHI, FUNDEBMUNI, etc.) can deliver services and back-up.

The capacity of the Extension Agents in targeted communities will be established through assessment of their skills as well as an assessment of the capacities of target communities to assimilate technical support. The Programme will conduct an assessment of functional, technical and other critical needs in support of delivering

Components 1 and 2 of the Programme. It is expected that capacity needs will vary significantly across communities but the common skills that will be developed under this Programme would be agronomic practices that are appropriate under changing climate conditions, community mobilization, climate risk management in agriculture (i.e., water conservation techniques, etc.). The required resources for capacity building activities of extension agents will be finally budgeted at full proposal level, as well budget for local internal/ external consultants who will carry out the training will be provided.

Programme Assurance

IDDI will be the Implementing Entity for this Programme. A designated Programme Officer will be assigned to provide financial and technical oversight. As Implementing Entity, IDDI will ensure compliance with relevant decisions of the Adaptation Fund by respecting the separation of implementing and execution services. Any Programme audit will follow international finance regulations and rules and applicable audit policies.

The first sought architecture of the Programme could be as follows:

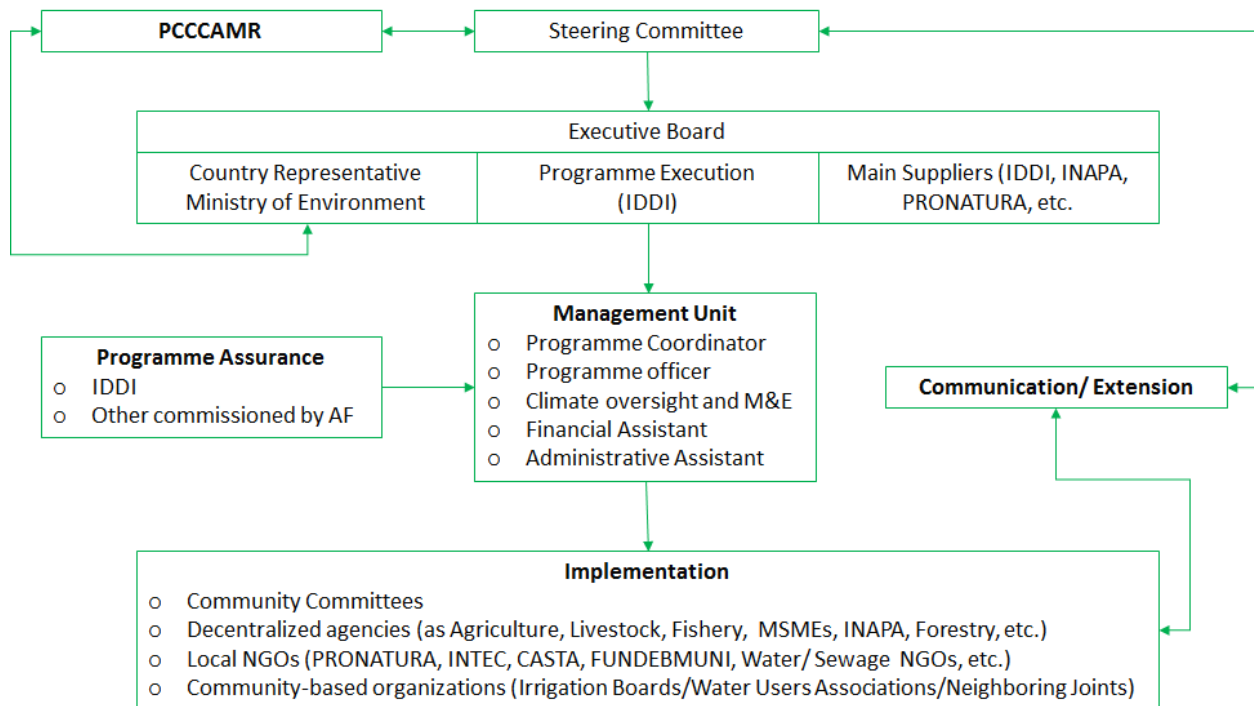


Fig. 10: Preliminary Architecture of the Programme

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

A detailed financial and risk management framework will be developed during the full proposal development phase. For financial risk management, the framework to put in place will be aligned with Adaptation Fund financial management requirements.

The following table summarizes the key project risks.

Table 9: Programme Risks and Risk Management

Identified Risks	Level	Mitigation Measures
Lack of adequate coordination, collaboration and cooperation among the executing agencies.	Medium	Operational agreements between implementing partners and agencies with adequate definition of roles and responsibilities. Dialogue and consensus building.
Changes and rotation of staff in local implementing agencies may affect the Programme activities.	Low	Training. Information and communication. Interinstitutional agreements that provide a framework for designation of qualified staff. Awareness raising among authorities. Strengthening of target groups for implementation of activities.
Lack of buy-in and participation of key stakeholders and target groups, or differences between groups or stakeholders may weaken and delay activities.	Medium	Capacity building, training and awareness raising. Participatory processes to promote engagement and inclusion of all interested parties. Representation of key groups and stakeholders in community committees and field activities. Mediation in case of conflicts.
Instruments to be developed by the Programme could take longer to provide tangible results than its lifetime.	Low	Prioritization of activities that can be effectively designed and implemented within project lifetime. Inclusion of long-term research in institutional work plans. Awareness raising and lobbying among authorities for approval of incentives / licenses (if any) within a period that will ensure sufficient timing for field piloting.
Policymakers or politicians prioritize economic benefits over social and environmental.	Low	Project activities explicitly integrate social, economic and environmental development needs in an integrative framework of climate-resilient agriculture and water management. The project will prioritize low-regrets strategies for resiliency that prove impact on income.
Congress is discussing a new law that regulates the use of hydro resources.	Medium	This risk is minimized with more coordination and communication with the Ministry of Environment which coordinates environmental policy and among different levels of government.
Lack of local level and down-scaled information on many aspects of climate change.	Medium	To minimize this risk, it is necessary to prepare specific studies on targeted areas and/or at community level regarding the threats of climate change. The project foresees the need to start with short-time assessment to priority activities and interventions.

A. Describe the measures for environmental and social risk management, in line with the Environmental and Social Policy of the Adaptation Fund.

Monitoring and Evaluation (M&E) of all the Programme's activities, including environmental and social consequences, are part of the IDDI's management responsibilities. This includes tracking the implementation progress, learning (in terms of environmental and social concerns), feedback, and knowledge sharing on results and lessons among the primary stakeholders. The Project Management Unit (PMU) and involved Ministries/ technical agencies have built proven capacities in conducting inclusive and consultative processes, which will be essential to mitigate any possible social or environmental risks. Participating households, small farmers and their institutions (producers/ women's associations, NGOs, etc.) will be key stakeholders in these processes.

To screen and assess social and environmental risks, as well as to mitigate potentially adverse impacts, a specific, measurable and time-bound set of indicators reflecting these risks will be integrated in the results framework of the project (to be included in the full proposal). In general, failure complying with Adaptation Fund's Environmental and Social Policy is believed to be a low risk given the Programme focuses strongly on increasing resilience of social and environmental systems in targeted areas.

A. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

All Programme's M&E will be undertaken in accordance with the procedures and rules of the Adaptation Fund, with respect to planning, reporting, monitoring and evaluation procedures for procurement. IDDI will be responsible for coordination of M&E. A detailed schedule of project reviews will be developed by the Project Management Unit, in consultation with project implementation partners during the early stages of project launch. Such a schedule will include methodologies and tentative time frames.

Monitoring and evaluation (M&E) will be separated into technical M&E (adaptation actions and capacity building) and a financial and project management M&E. For the technical M&E the Project Management Unit (PMU) will develop criteria for participatory monitoring of the project activities. For financial and project management M&E an appropriate mechanism and methodology will be established at the very outset of the project. M&E activities will be based on the logical results framework (to be developed). The overall M&E format for the project will follow the instructions and guidelines of the Adaptation Fund, including compliance with the Adaptation Fund's Environmental and Social Policy (ESP).

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

Table 10: Programme Results Framework

Indicator(s)	Baseline	Target	Source of Data
Outcome 1: Implemented climate resilient management of water resources by small communities of San Cristóbal			
Number of communities in which management plans have been developed and are implemented.	Management plans are not in place. Lack of coherent and planned water management activities in communities.	Community water management plans implemented by 8 small municipalities.	Programme progress/ reports
Number of operative infrastructure for water supply and storage implemented by communities.	Communities have limited infrastructure in place for supply and storage of water.	30 communities, benefitting at least 60,000 people (approx. 50% of whom are women).	Programme progress/ reports
Number of operational community scale irrigation systems installed.	Very few communities have effective irrigation systems or depend of rain-fed systems.	30 operational irrigation systems, benefitting at least 6,000 farmers and their families	Programme progress/ reports
Number of measures for water conservation implemented.	A few individual and not inclusive measurement systems for water conservation are in place.	Rainwater harvesting systems in place, providing water supplies to 400 hectares.	Programme progress/ reports
Outcome 2: Enhanced diversification of livelihoods under climate change by 30 communities of San Cristóbal			
Number of improved infrastructure operative for agriculture.	Few communities benefit from improvement in agriculture.	Agriculture resilient and handle in by 8 small municipalities.	Programme progress/ reports
Number of dry season gardening schemes for women established.	Few communities benefit from effective dry season gardening.	20 dry season gardening schemes established.	Programme progress/ reports
Number of tree nurseries/wood lots operatively established and managed by the community.	Few communities benefit from community managed tree nurseries and wood lots, nor from bee keeping activities.	20 community tree nurseries and wood lots established.	Programme progress/ reports
Number of operational community	Few communities benefit from	20 community fish farms	Programme progress/ reports

fish farms established (or another diversified resilient livelihoods).	community fish farms (if any).	established, benefitting at least 6,000 producers and their families	
Outcome 3: Increased technical capacity of communities and institutions to assess impacts, vulnerability and adaptation needs according to their respective competences.			
Number of training materials produced utilized in training.	Farmers and households remains vulnerable to climate change.	Availability of materials on best practices for water management and resilient livelihoods	Programme progress/ reports
Number of provincial committees for climate change adaptation.	Reduced linkage among key institutions and communities regarding climate change.	A Provincial Climate Change Adaptation Monitoring Committee fully established in San Cristóbal	Programme progress/ reports
Learning platform created under the Programme operative.	Communities and institutions does no work collaboratively towards the adaptation to climate change.	A collaborative platform increases the community involvement into climate changer adaptation.	Programme progress/ reports

B. Demonstrate how the programme aligns with the Results Framework of the Adaptation Fund

To be prepared for Stage Two of the application process.

C. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

A detailed budget, together with breakdown into cost categories, explanations, etc., will be developed in the full proposal stage of the Programme application process.

D. Include a disbursement schedule with time-bound milestones.


To be developed at full proposal stage of the Programme application process.

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

A. Record of endorsement on behalf of the government¹⁹ *Provide the name and position of the government official and indicate date of endorsement. If this is a regional programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the programme proposal. Please attach the endorsement letter(s) with this template:*

<p>Ing. Pedro García Brito, M.Sc Director of Climate Change and CDM Ministry of Environment and Natural Resources, Dominican Republic +1 809-567-4300 / +1 809-807-1116 pedro.garcia@ambiente.gob.do</p>	<p>Date: (July, 25, 2016) See annex I (LoE)</p>
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B. Implementing Entity certification *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the programme contact person’s name, telephone number and email address*

<p>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 (<i>National Development Strategy, National Communications to UNFCCC, National Policy on Climate Change, and Dominican Republic’s National Action Plan for Climate Change Adaptation</i>) and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this programme.</p>	
<p>David Luther, Executive Director, Dominican Institute of Integral Development Implementing Entity Coordinator</p> 	
<p>Date: December, 20, 2016</p>	<p>Tel. and email: +1 809 534-1077 dluther@iddi.org</p>
<p>Project Contact Person: David Luther (Executive Director)</p>	
<p>Tel. And Email: +1 809 534-1077 dluther@iddi.org</p>	

⁶. Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

ANEXES

Annex 1 – Letters of Endorsement



ADAPTATION FUND



MINISTERIO
DE MEDIO AMBIENTE
Y RECURSOS NATURALES

Dominican Republic

August 1st, 2016

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

Subject: Endorsement for Enhancing climate resilience in San Cristóbal Province, Dominican Republic - Integrated Water Resources Management and Rural Development Programme

In my capacity as designated authority for the Adaptation Fund in Dominican Republic, I confirm that the above national programme 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 programme proposal with support from the Adaptation Fund. If approved, the programme will be implemented by Dominican Institute of Integral Development and executed by the Ministry of Environment and Natural Resources; the National Institute for Water Supply and Sewerage; and community-based NGOs.

Sincerely,

A handwritten signature in black ink, appearing to read 'PGB', written over the official stamp.

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





INSTITUTO NACIONAL DE AGUAS POTABLES Y ALCANTARILLADOS (INAPA)

001890

“Año del Fomento de la Vivienda”

08 DIC 2016

- AI:** The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Correo: Secretariat@Adaptation-Fund.org
Tel.: (202) 458-7347
- CC:** Instituto Dominicano de Desarrollo Integral, Inc. (IDDI)
Calle H #17, Zona Industrial de Herrera, SDO
Correo: info@iddi.org
Tel.: (809) 534-1077
- Tema:** Programa de Fortalecimiento de la Capacidad de Resiliencia en la
Provincia de San Cristóbal, República Dominicana – Manejo Integral de
Recursos Hídricos y Desarrollo Rural

El Instituto Nacional de Agua Potable y Alcantarillados (INAPA) es la autoridad nacional para el agua y el saneamiento en la República Dominicana, y como tal, confirmamos que la propuesta de referencia está alineada con las normas nacionales para suministro de agua y servicios sanitarios. En relación a esto, confirmamos nuestro apoyo a las intervenciones que se proponen en el marco del Programa, así como nuestra disponibilidad e interés de participar en el desarrollo e implementación de cada una de dichas intervenciones.

Al efecto, con gusto endosamos el Programa propuesto al Fondo de Adaptación, esperando que sea valorado positivamente. Si el mismo es aprobado, nosotros vamos a trabajar con el Instituto Dominicano de Desarrollo Integral, Inc. (IDDI) para emitir los permisos y autorizaciones necesarias para ejecutar las intervenciones, en la medida que estas cumplan los requerimientos de ley.

Atentamente,


Ing. Horacio Mazara,
Director Ejecutivo