REQUEST FOR PROJECT/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:

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN N7-700
Washington, D.C., 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: afbsec@adaptation-fund.o

Fundación para la Conservación de los Recursos Naturales

January 5th, 2017
FN-DE-001-17

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

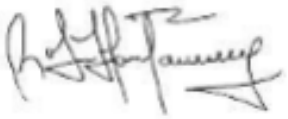
Subject: Submission letter Project "ADAPTING TO CLIMATE CHANGE THROUGH INTEGRATED WATER MANAGEMENT IN PANAMA"

Dear Adaptation Fund Secretariat,

On behalf of Fundacion Natura, Panama National Implementation Agency, please find enclosed the fully developed project entitled **"Adapting to climate change through integrated water management in Panama"**, which commits Panama's national priorities based on climate change adaptation and water management as key driven pillar at local and national scale.

Attached your will also find the endorsement letter from the Ministry of Environment, as National Focal Point to the Adaptation Fund.

Sincerely,



Rosa Montañez
Executive Director

C.c. Dr. Emilio Sempris, Ministry of Environment, Panama

EXECUTIVE SUMMARY

"ADAPTING TO CLIMATE CHANGE THROUGH INTEGRATED WATER MANAGEMENT IN PANAMA"

Located in the Central American isthmus, Panama is considered a highly vulnerable country to climate change impacts. Panama experiences a series of extreme weather events including intense and protracted rainfalls, windstorms, floods, droughts, wildfires, earthquakes, landslides, tropical cyclones, tsunamis and ENSO/El Niño-La Niña events. In parallel, Panama is considered one of the countries with the largest water resources, approximately 35,000 m^3 of renewable freshwater resources per capita. This abundance scenario is relative, since it hides a series of regional and seasonal limitations, specifically those limitations associated to the area known as the "Arco Seco", the most arid region of the country. The relative water abundance scenario (current and future) has not escaped the existence of serious conflicts due to competition for water use that tend to worsen, in quantity and intensity. The Chiriquí Viejo river watershed currently represents one of the areas with higher conflict level among the different groups of water users for hydropower generation and agricultural livestock production.

This relative water abundance scenario and increasing conflicts it's aggravated by climate variability and extreme weather events, mainly droughts and floods, where users and authorities have a lack of means and information to face them timely and effectively. According to statistical and meteorological records, since year 2004 there has been an increase in frequency of extreme events in the country, and the hydro meteorological are the ones that have affected more different ecosystems, as well as the most vulnerable population in several priority watersheds at the national level.

Water security is now recognized as a global security challenge. It has also been recognized that water, food, energy and climate form a nexus. The impact of climate change on water security is accepted as an important issue. Climate change is disrupting the global water cycle and will increase the frequency and severity of disasters. The Intergovernmental Panel on Climate Change (IPCC) 5th Assessment predicts more frequent and more severe droughts, floods and storms, intensified glacier melting and sea level rise, all of which will cause and contribute to increasing numbers of disasters worldwide and Panama is not the exception.

Panamá is probably one of the best examples at the global scale of a water driven country. Water management is key for the country's socioeconomic and environmental operation. It's key for the operation of the canal, backbone of nation´s economy, which sustains logistics, transportation and financial services, pillars of the national economy. Potential complementary sectors such as power and tourism, are also directly related to water management, both for using the resources and ecosystem services (water supply, scenic beauty, recreational uses, others). From this perspective, water resource management is the base of the country's economic, social and environmental sustainability. Water management in Panama takes place based on an integrated water resources management approach and watershed approach, without taking into consideration neither the climate change dimension nor risk management, which have, in the case of the Republic of Panama, a hydro-meteorological origin.

The people of Panama need access to accurate information and sound advice on how best to respond to this challenge, through adaptation and mitigation efforts. This Adaptation Program Proposal, based on water management to advance towards climate change adaptation, seeks to

fulfill this need and serve as a national baseline to systematically address, monitor and evaluate adaptation to climate change at the national and local scales.

This Adaptation Program aims to address this condition by situating water management at the center of the adaptation efforts, promoting climate resilience and vulnerability reduction through enhancing food and energy security, based on an integrated water resources management approach that highlights the water-energy-food-climate change adaptation nexus. To do this, the Program will focus efforts in two river watersheds -Chiriquí Viejo and Santa María-; both prioritized in light of its water resources, its importance for energy and food production at a national scale, and the existence of unsolved conflicts among water users. Concrete adaptation measures will be implemented through climate proof water management, productive initiatives based on the climate smart agriculture approach in prioritized sites accordingly to social and climate vulnerability. Complementary actions include: fully operational EWSs, analysis to promote renewable energy and EBA activities and financial sources to fund the initiatives; an adaptation knowledge platform based in development of adaptation skills in different sectors, systematization of lessons learned in adaptation projects, and a national system for climate data to monitor hydro meteorological activity as well as the effectiveness of adaptation efforts.

The overall objective of this programme is to establish climate resilience water management to enhance food and energy security at the national level, including an integrated and community based approach in the Chiriqui Viejo and Santa Maria Watersheds. Specifically, the programme will be addressing the following objectives: a) Increasing climate change and variability adaptation capacity in agriculture, livestock and energy production sectors; b) establishing climate resilient water management instruments with integrated and community based approach; c) strengthening local national capacity for monitoring and decision making to reduce and respond to risks associated to climate change; and d) raising awareness and establish a knowledge exchange platform to respond to and to reduce impacts of climate related events.

The proposed adaptation programme is fully aligned with public policy priorities defined by the national government, particularly the National Integrated Water Resources Management Plan 2010-2030 (PNGIRH by its acronym in Spanish) and the recently approved Water Security National Plan 2015-2050 “Water for all” (WSNP). At the national level, the convergence in time of the current Adaptation Program with efforts to implement the WSNP, an Energy Plan 2015-2050, and the National Pact for Agriculture, offers a unique momentum for developing synergies opportunities between mitigation and adaptation agendas, for conservation and restoration of ecosystem services relevant to the population and agriculture, through the proposed Adaptation Program.

The Programme includes globally accepted adaptation practices and methods such as the ecosystem based adaptation, vulnerability analysis and non-regret adaptation measures to promote concrete adaptation activity in particularly vulnerable geographical areas of the country; fully operational EWSs; irrigation projects, among other concrete adaptation actions. In parallel, by addressing the water-food-energy-climate change nexus, the Program aims to provide knowledge to improve the decision-making process to grant water rights based on climate data, helping to strengthen water governance in areas with unsolved social conflicts among users.

Based in the previous statements, the Ministry of Environment of Panama, Panamá´s designated authority to the Adaptation Fund, endorses the Concept Note for the full scale programme proposal "Adapting to climate change through integrated water management in Panamá", presented by Fundación Natura, National Implementing Entity of Panamá.

The proposal presents an Integrated Approach to Climate Change Adaptation by:

1. Implementing an "inter-sectorial" approach, as opposed to interventions solely designed from one sector perspective. This is what we have named as the "water-food-energy-climate nexus approach", which is being implemented in the country for the first time at a national scale.
2. The programme aims to deliver results, in parallel, at the national / local / sectorial scale. In this regard, projects/activities included in the programme that will be implemented at a local scale -watershed or sub-watershed- have been designed ensuring that "knowledge products" will be generated to support adaptation knowledge expansion and facilitate replication in other geographical areas of the country. Examples of national scale deliverables are: a new national map for agriculture and livestock production based in climate and water management data (2.3. b); technical document with recommendations to improve the water concession processes, considering climate change data (2.2a, b). Local scale products include installation and operation of EWS (3.2.b), irrigation systems (1.2.b), agroforestry systems (1.2.a), among others. Sectorial scale products generated include, for example, promotion of the Microfinance for ecosystem based adaptation approach, a brand-new concept to Panamanian financial sector (1.5).
3. The programme is based in a complementary/synergy approach, providing in the ground implementation linkages/opportunities to 3 current national scale planning processes: the water security national plan; national energy programme and national pact for the agriculture sector. Using the climate change dimension debate, the programme will serve as a "think tank" to promote/discuss synergies among these processes, which are being conducted currently, mainly with a sectorial perspective.
4. The programme presents a balanced menu of capital/technology/equipment intensive processes (National System of Climate Data 3.1 a, 3.3); on the ground adaptation activity (for ex: EWSs 3.2.b and EBA measures 1.2); influencing long term/national scale public policy (recommendations to update water granting process for hydropower generation by producing technical documents based on climate dimension (2.2); new national zoning map for agriculture production (2.3.b), among others.

For the reasons mentioned above, the proposed Adaptation Programme for Panama is conceived as a transformational process for the country, that will strengthen adaptive capacity at all levels, contributing to the popularization of adaptation knowledge and installing adaptation measures at a larger scale, which is currently nonexistent, due to a logic of isolated/sectorial projects.

Interventions with national and sub-national level impact and reach

Based on National Communication to UNFCCC and strategic instruments

National Plan for Water Security

1.1.a Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems:

i. Carry out a diagnostic for system design.
ii. Install water harvest systems and train beneficiaries.
iii. Monitor and maintenance.
iv. Develop a technical document with guidelines to replicate this climate change adaptation technology at national level

2.3.a Design 2 district plans for water security, incorporating climate information (1 at each watershed, SMRW and CHVRW).

National Plan for Energy

2.2.c Develop a technical document with criteria with incumbent authorities to consider during the process of granting water use permits for agriculture and power generation -based on information and findings from the environmental flows analysis and climate data at national level.

2.2.d Review current concessions on both watersheds, based on the technical document (product 2.2.c), in order to determine recommendations for improving or restoring the water cycle.

1.5.b Develop 4 business plans (2 for each watershed) to establish and operate mini-hydro energy projects, including the correspondent farm management plan, informative prospectus to access financing sources for climate change adaptation activities, and technical assistance offered to obtain such financing. Design a technical recommendations document to replicate this experience at national level.

National Plan for Agricultural Sector

2.3.b Complement current technical analysis to elaborate a new national map for agriculture and livestock production in the country, based on climate and water management data generated by the program.

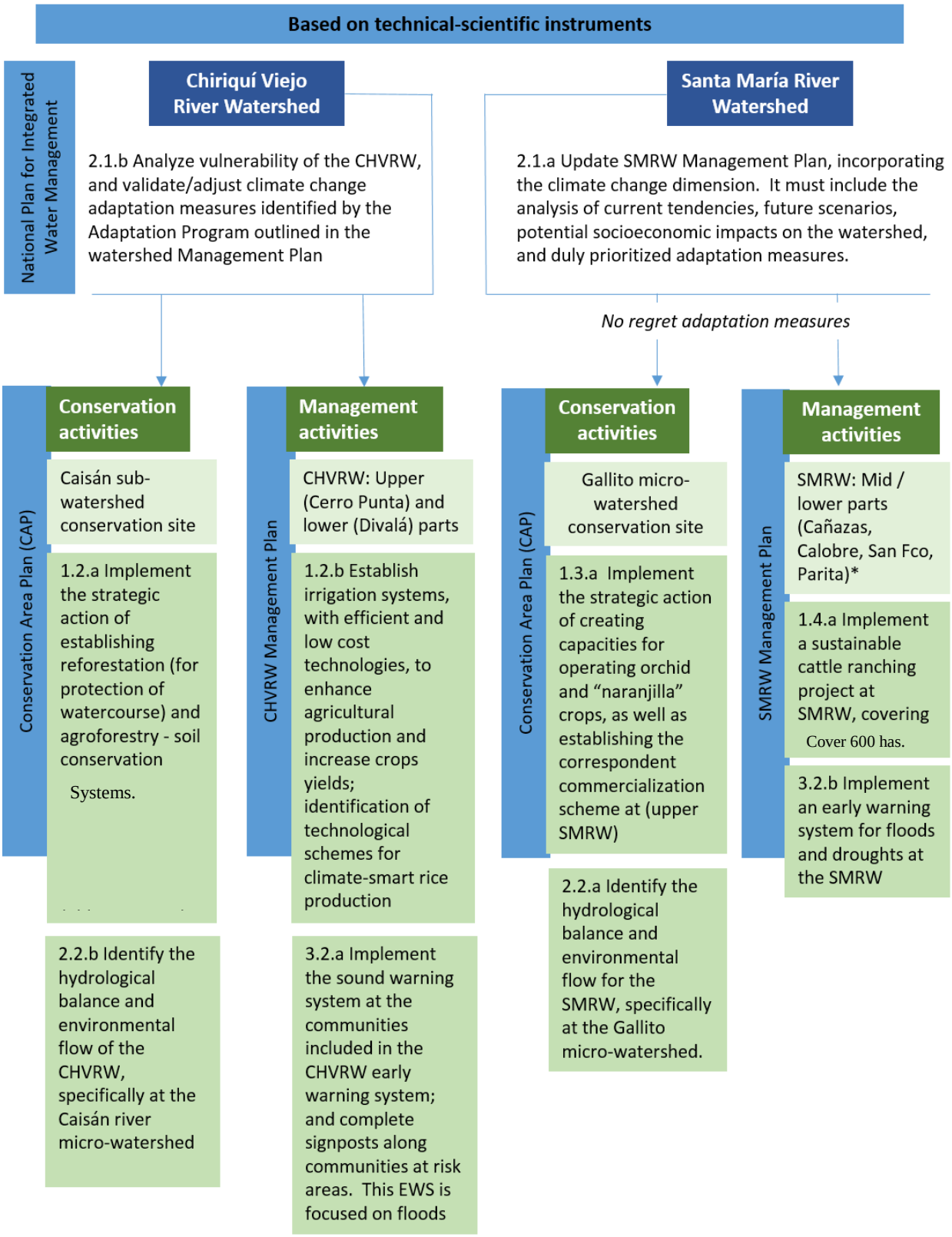
1.5.a Conduct a review on current credit products offered to agriculture and energy sectors; including technical recommendations on climate financing instruments

1.5.c Socialize the concept of Microfinance, based on ecosystems and climate change adaptation. It includes:

i. Development of Microfinance Institutions mapping for both watersheds;
ii. Informative/instructional meetings on Microfinance for Ecosystem-based Adaptation (MEbA) with Microfinance Institutions, and identification of those interested/willing to participate in the training and technical assistance,
iii. Selection of 2 Microfinance Institutions (one at each watershed) to develop the training and technical assistance in order to design and offer one finance product.

Transversal activities: those from outputs 3.1, 3.3, 3.4, and 4.1-4.5

Interventions with local level impact and reach



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GLOSSARY

ICCDD	International Convention to Combat Drought and Desertification
ANAM	National Authority for the Environment
CAC	Central American Agricultural Council
CATHALAC	Water Center for the Humid Tropics of Latin America and The Caribbean
CATIE	Tropical Agricultural Research and Higher Education Center
CEPAL	Economic Commission for Latin America and the Caribbean
CHVRW	Chiriquí Viejo River Watershed
CIAT	International Center for Tropical Agriculture
CREHO	Ramsar Regional Center for Training and Research on Wetlands
ENSO	El Niño - Southern Oscillation
ETESA	Electric Transmission Company
EWS	Early Warning Systems
FAO	The United Nations Food and Agriculture Organization
GDP	Gross Domestic Product
IADB	Inter-American Development Bank
IDIAP	Institute for Agriculture and Livestock Research of Panama
IIAC	Inter-American Institute of Agricultural Cooperation
IICA	Inter-American Agricultural Cooperation Institute
INEC	National Institute for Statistics and Census
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resources Management

LAC	Latin American Countries
LMGP	Land Management General Plan
MEbA	Microfinance for Ecosystem-based Adaptation
MIDA	Ministry of Agriculture Development
NTU	Nephelometric Turbidity Unit
PNGIRD	National Policy for Integrated Disaster Risks Management
PNGIRH	Republic of Panama's National Integrated Water Resources Management Plan 2010-2030
RGIS	Rice Grow Intensive System
SINAP	National System of Protected Areas
SINAPROC	National Civil Protection System
SMRW	Santa María River Watershed

ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGAMME INFORMATION

Project/Programme Category:	Full scale programme
Country/ies:	Panama
Title of Project/Programme:	"Adapting to climate change through integrated water management in Panama
Type of Implementing Entity:	NIE
Implementing Entity:	Fundación Natura
Executing Entity/ies:	Ministry of Environment; Ministry of agriculture; ETESA
Amount of Financing Requested:	US9,967,559

Note: The key executing entities are the Ministry of Environment, Ministry of Agriculture, and ETESA among few other executers that will be selected for specific outputs and activities based on the short list (such as Wetlands International, CATIE, Technological University of Panama, UNACHI, IDIAP, CATHALAC, CREHO) and public calls for some consultancy services identified in the budget and in the table describing the implementation arrangements by products and executing entities.

Project / Programme Background and Context

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

A. Brief information on the problem the proposed project/programme is aiming to solve

The Republic of Panama is home to 3.5 million people, a world-famous canal and a modern financial sector that contributes to the country's strong economic performance. At the same time, despite boasting the highest per capita income in Central America, rural poverty in Panama is quite high; in 2003, 54 percent of non-indigenous rural residents were poor, and 22 percent were extremely poor. Barriers to poverty alleviation include limited economic opportunities, a deteriorated natural resource base, an inequitable land tenure system, lack of access to microfinance and structural constraints that impede competition in the agriculture sector. Panama is classified as a developing country with a per capita income Gross Domestic Product (GDP) of US $7155 (2009). Widespread poverty and inequality have negative spillover effects on the environment.

Panama is considered one of the most biologically diverse countries in the world, and more than 12 percent of Panama's landmass is protected. Nonetheless, poverty pressures have driven many to exploit the natural resources of the Mesoamerican Biological Corridor[1] in harmful ways. In addition, deforestation is a growing concern, as forests cover 40 percent of Panama's territory. Panama ranks 14th among countries most exposed to multiple hazards based on land area. Panama has 15 percent of its total area exposed and 12.5 percent of its total population vulnerable to two or more hazards. In addition, Panama ranks 35th among countries with the highest percentage of total population considered at a relatively high mortality risk from multiple hazards. Climate change threatens to increase vulnerability of both human and ecological systems in Panama. The agriculture, water resources, forestry, coastal zone management and health sectors will be particularly impacted. More frequent and intense storms, floods, and droughts are causing huge economic losses and affecting the livelihoods of the poorest and most marginalized members of society in particular[2].

Panama's economic growth has been one of the largest ones in Latin America for the past decade, with an average GDP growth above 8 percent between 2006 and 2012.

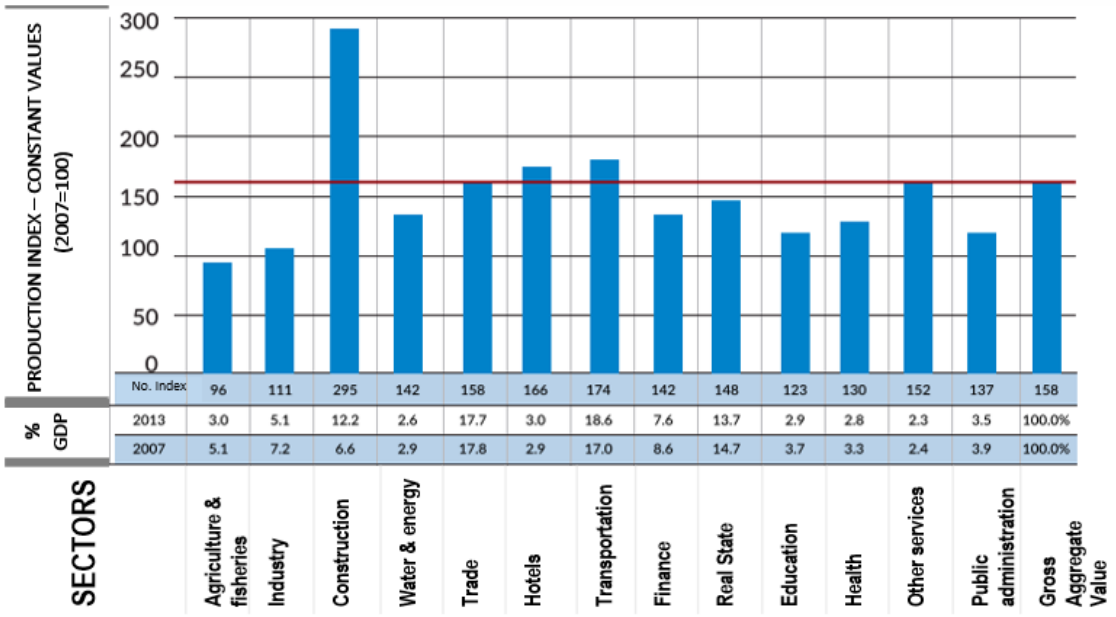
[1] The Mesoamerican Biological Corridor (MBC) is one of the largest bioregional conservation programs in the world. The core idea behind this program is the creation of a series of protected wildlife corridors stretching from southern Mexico to eastern Panama to protect over 769,000 km2 of land. It became an official initiative in 1997 during a presidential summit, describing it as "a territorial planning system consisting of natural protected areas under a special regime whereby core, buffer, multiple use and corridor zones are organized and consolidated in order to provide an array of environmental goods and products to the Central American and global societies, offering spaces for social harmonization to promote investments in the conservation and sustainable use of natural resources".

[2] World Bank. Climate Change Knowledge Portal. Panama Dashboard.

Compared to other countries of the region, Panama had a relatively favorable development during the global financial crisis with 3.2 percent growth in 2009. However, in 2010 the economy went back to its own pace with 7.6 percent growth, for a GDP expansion of 10.6 percent in 2011, 10.5 percent in 2012, 7.9 percent in 2013 and 6.2 percent in 2014, for a GDP of B/35,642.2 million and approximated growth of 6 percent in 2015. This strong economic growth has represented an improvement in social indicators. Poverty rate went down from 48.5 percent in 2002 to 27 percent in 2011, while extreme poverty went down from 21 percent to 11 percent during the same period. However, inequality remains relatively high in Panama (Gini's coefficient of 0.53 in 2011) and also some challenges for public provision of social services, remain.

Panama has a diversified economy, with no activity exceeding 25 percent of total participation. This diversification is considered as one the strengths of the Panamanian economy. However, there are some sectors that have always shown more dynamism in Panama: logistics, transportation, storage, communications and construction, as shown in the next figure.

Figure 1. Structure and sectorial growth of Gross Aggregate Value. Period 2007-2013
(in percentage of growth indicators at constant values. 2007=100)



Source: General Comptroller of the Republic of Panama. INEC.

Traditionally, service activities have remained close to 75 percent of the GDP. In this composite, the logistics sector has a significant weight, because of trade activities associated to the Panama Canal. Based on work productivity of specific sectors of the Panamanian economy, the power, gas and water supply which represents a productivity 88 percent higher than the total average, shapes itself as a potential sector for boosting the multiplying effect for generating future economic growth engines.

According to the Government's Strategic Plan 2015-2019, the main driving elements of the economy in the short term will likely be associated to the operation of the Canal's third set of locks, the expansion and extension of tourism activities and the development of food and agriculture activities. The Plan indicates that for the 2007 to 2013 period the activities in primary and secondary sectors (agriculture, livestocking, silviculture and fishing, and manufacturing industries) have significantly reduced their already small input to the GDP: from 16 percent to 11 percent if we look at them as a whole. The decrease in participation, seen both in agriculture and in industry, has been much more noticeable in the primary sector (excluding mines and pits); therefore, it is the only economy sector with cuts in value generation in absolute terms. In 2014 "only the GDP of agriculture, livestocking, hunting and silviculture went down, due to climate adverse effects and because of a lower demand at the international market of some export fruits such as pineapple".

The World Bank Analysis for the Country Diagnostic in 2015 identified five policy priorities that Panama may consider to sustain its recent track record on growth, poverty reduction and shared prosperity. Growth prospects for Panama are good in the near term with projections for 2014-2019 around 6 percent based on sustaining high levels of investment. However, a number of potential impediments are emerging and could slow growth over the medium to long term if left unaddressed. First, infrastructure, specifically energy, is creating bottlenecks to growth. Second, weaknesses in education and a shortage of skilled labor may be limiting growth and concerns about quality and high drop-out rates from secondary education have been identified as challenges in the education sector. Third, weak public sector institutions may slow down growth, notably if the challenges of transparency, pockets of low efficiency, and weaknesses in the regulatory framework remain unaddressed. In terms of building an inclusive society, the analysis shows that the indigenous have benefited least from Panama's excellent growth performance. Therefore, addressing the challenge of their inclusion has been identified as a fourth priority area. Finally, water management has emerged as fifth priority area. As climate change, could lead to increased variability in rainfall, careful water management will decide the sustainability of the successful operation of the Panama Canal as a major pillar of economic activity.[3] (Underlining added)

According to the Republic of Panama's National Integrated Water Resources Management Plan 2010-2030 (from now on, the PNGIRH by its acronym in Spanish), in Panama the main activities for water use are: human intake (606.62 hm^3), hydroelectric power generation (50,000 hm^3), Panama Canal lockage's (2,580 hm^3), agricultural and livestock production (105 hm^3), industrial production (2.2 hm3) and touristic recreation (1.3 hm^3). According to water balances of 2008 in 10 of the country's priority watersheds located in the Pacific (excluding the Panama Canal watershed which has daily balances), only one watershed (Anton's river watershed) would show water shortfall, while the other watersheds would present a situation that ranges from equilibrium to water abundance.

[3] The World Bank Analysis for the Country Diagnostic in 2015.

This abundance scenario is relative, since the "relative resources abundance hides a series of regional and seasonal limitations, specifically those limitations associated to the Arco Seco (the most arid region of the country) watersheds".[4]

The National Plan for Integrated Water Resources Management of the Republic of Panama 2010-2030 estimated the future water demand in the country, based on current uses. Water demand was projected for the next twenty years, at priority watersheds, taking into consideration a series of water demand scenarios coming from diverse socioeconomic scenarios, which represent the different development courses the country may face in the upcoming years (continuism, sustainability, implosion). The scenario showing greater growth in water resources use is sustainability, mainly because of an increase in water demand for hydropower, associated to a more efficient power generation (that takes advantage of the country's hydroelectric potential). To a national scale, the water resource availability assumes that the requirements of several sectors shall be satisfied with the current water supply in the country. Demand estimation in the sustainability scenario shows greater water demands at the Chiriquí Viejo and Chiriquí rivers, presenting the highest percentages of the total general water that has been granted in concession (31.35% and 15.27 percent respectively). It is important to point out that these two watersheds have characteristics which make them suitable for hydroelectric development, therefore the high percentage of granted volume (…). The sectorial analysis considers that, the main watersheds for the agricultural sector are those of the Santa Maria and Grande rivers, given the importance of the irrigation system in both. For the agro-industrial sector, the highest granted water volume corresponds to the Chiriquí Viejo watershed, with 77.4 percent out of the total granted at the national level for this sector. This watershed also had the highest concession volumes for hydroelectric (32.94 percent) and agriculture and livestock sectors (10.57 percent), compared to other studied watersheds (underlining added).

The relative water abundance scenario (current and future) has not escaped the existence of serious conflicts due to water use that tend to worsen, in quantity and intensity. In Panama, the most common conflicts for water use and availability are those that take place between one or more users going to the same sources without the corresponding permits; inappropriate planning, management and distribution of watershed concessions; access ban to communities -by property owners- at water catchment sources; construction of dams for hydroelectric projects which can affect resource availability downstream from the dams. During the last years, there have been conflicts because of water use, especially regarding water resources availability, enough to satisfy drinking water, agricultural use and hydroelectric generation demands. The Chiriquí Viejo river watershed currently represents one of the areas with higher conflict level among the different groups of water users for hydropower generation and agricultural livestock production.

This relative water abundance scenario and increasing conflicts it's aggravated by climate variability and extreme weather events, mainly droughts and floods, where users and authorities have a lack of means and information in order to face them timely and

[4] National Plan for Integrated Water Resources Management of the Republic of Panama 2010-2030.

effectively. According to statistical and meteorological records since year 2004, there has been an increase in frequency of extreme events in the country, and the hydro meteorological are the ones that have affected more different ecosystems, as well as the most vulnerable population in several priority watersheds at the national level.

The country experiences a series of extreme weather events including intense and protracted rainfalls, windstorms, floods, droughts, wildfires and ENSO/El Niño-La Niña events. Between 1982 and 2008, Panama was struck by 32 natural disaster events, with total economic damages totaling an estimated US $86 million. In addition, loss of human lives during these events totaled 249. Given the expected variability in precipitation, it is crucial to improve water storage capacity to utilize excess water from wet years. Increased periods of high temperatures might produce recurrent heat waves that could create severe health impacts including the proliferation of diverse pathogens, increased dehydration and other respiratory diseases. After 2015 the threat of climatic variability begins to be the principle driving force behind the risk of an increased tendency of greater extreme events. This would require integrated assessments and development planning that closely integrate disaster risk planning and climate change adaptation, in particular for food security, energy access, and sustainable development. The poorest populations, included vulnerable indigenous populations, will not, and indeed, cannot adapt if this will require looking beyond their immediate food security needs. Thus, the potential impacts of climate change on Panama most vulnerable population should be prioritized (World Bank. Climate Change Knowledge Portal. Panama Dashboard).

The Ministry of Environment (former National Authority for the Environment-ANAM) is working on small scale climate change adaptation and mitigation measures, which should be scaled-up to better prepare vulnerable groups and sectors for higher rainfall and longer dry seasons. To achieve this, there is a need to better integrate national disaster risk management into water resource management planning in priority watersheds. Enhanced information and decision support capacity across key sectors along with improved early warning and monitoring systems is required to build the ability to forecast and plan for a future in which the occurrence of extreme events could be the new norm.

Given its central role in the economic engine of Panama, as well as being a key component for other growth sectors and the livelihoods of the poor, adequate water resources management emerges as a vital priority area under sustainability. Water resources management has been also prioritized as a key issue in Panama´s GEO Report 2014. Water resources management through an integrated watershed approach is also one of the current five strategic guidelines of the Ministry of Environment of Panama.

The water-energy-food-climate change adaptation nexus in Panama. According to Global Water Partnership, Panama is considered as one of the countries in the world with ultimate water resources, more than 50.000 m3 per capita. Panama not only has the

Interoceanic Canal, but also has a theoretical renewable energy capacity of approximately 30 times its current annual power generation[5].

The country has a traditional agricultural and livestock sector, with a contribution to the GDP of 2.0 percent to 1.2 percent during the last years. It is estimated that the population is growing faster than agricultural production, which real value was $688.8 million in 2007 and $683.5 million in 2011. This means that, during this period, there was an increase of the annual average of 0.5 percent; while the Panamanian population grew an annual average of 1.8. This unequal growth between agricultural and livestock production, and population has a direct impact in food security. Consequently, the country increases dependency on imports, and becomes more sensitive to external factors such as scarcity and international inflation, and particularly to weather variations. About 250,000 people are dedicated to agricultural and livestock production in the country.

Regarding energy matters, the country's maximum demand is 1,612 megawatts, while the system has an installed capacity over 2,811,179 megawatts. According to data from the National Energy Secretariat, each year is necessary to add 100 MW of power in order to satisfy the increasing power demand in the country. This represents an investment of approximately $400 million a year. Panama's power matrix depends on oil products by 40 percent, and on renewable energies by 60 percent, mostly hydroelectric. From the environmental standpoint, this scenario of a 5 percent annual demand growth, coexists with a large scale hydroelectric development situation which has caused unsolved water use conflicts (confronting users' groups demanding human rights, access to water, autonomy and equality matters). The water sector has been impacted by very long droughts, which frequencies and intensities would be affected by variability and climate change projections. Droughts, combined with other factors, recently resulted in power rationing situations.

Water is necessary for food production. In Panama, irrigated agriculture land represents only 4.9 percent compared to the total country's area; the rest of farming lands in Panama are irrigated by rainwater. But changes in precipitation patterns and increasing food demand trigger increased irrigation needs. This, combined with urbanization expansion, is rising pressure on water sources, particularly in rural areas. Water is also necessary for power generation. Hydroelectric power provides 58 percent of the country's power demand, and it is believed that some hydroelectric potential has not been developed yet. Energy is necessary for food production; harvest, transportation, processing, packing and commerce use significant power resources. At the same time, energy is necessary for access to water sources: for example, energy is necessary for water distribution and irrigation.

One of the greatest challenges for reaching sustainability in agriculture is to ensure the sector adapts to climate change and contributes to its mitigation. Water is a key resource

[5] IADB. Blogs IADB.org. What is the renewable energy potential in Mexico and Central America? http://blogs.iadb.org/cambioclimatico/2014/11/13/cual-es-el-potencial-de-la-energia-renovable-en-mexico-y-centroamerica/

for this purpose, thus it is necessary to focus efforts towards adaptation of agriculture to climate change. This could be possible through the integral management and rational use of water resources based on strong scientific principles and respecting the laws, traditions and culture of communities dedicated to agriculture. Increases in annual average temperature and reductions in precipitation expected for year 2030 due to the effects of climate change will have significant impacts on agriculture all over the country. As a consequence, it is probable that areas suitable for crops sustaining agriculture exports and peasant's food security will change in the future. Some areas will gain productive suitability for certain crops, and others will lose it. The capacity of a rural population to adapt to these changes, either positive or negative, depends on their access to basic services, including water security, access to information, resources for innovation and capacity to maintain healthy ecosystems.

Besides the water-energy-food interactions, because of the characteristics of its economy, the Republic of Panama has an additional level of dependence on water resources.

Water, Panamá's fuel. According to the abovementioned, The World Bank Analysis for the Country Diagnostic in 2015 states that, "successful Canal operations depend on the availability of adequate water supply all year round. The risk of lacking water availability in critical months is evident: the peak of Canal traffic coincides with the lowest rainfall period. Droughts threaten the consistent water supply for the Canal operations, such as the risk posed by the drought of this year to limit the size of ships passing through. At the same time, big storms threaten to flood its infrastructure, as has famously occurred in an unprecedented closure in December 2010."."

Climate change could lead to increased variability in rainfall, thereby affecting Canal operations. First, climate change may result in changes in rainfall, which per the recent Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report (2014) cites a trend of increasing precipitation over most of Panama. Fabrega et al (2013) analyzed the projected hydroclimatic patterns for Panama, where the study projects an increase in precipitation over all four regions of Panama for the 2075-2099 period: Bocas del Toro, Veraguas, Panama Canal and Darien. Future precipitation appears to increase for all regions by at least 5 percent, except for some areas at Bocas del Toro region. Increments greater than 15 percent were projected for the most populated areas in Panama, located next to the Canal. However, another predicted change is higher variability, including increased occurrence of extreme weather events. Overall, climate change-induced weather extremes could lead to costly slowdowns that would make the Canal a less-efficient shipping route and cause a ripple of delays.

In addition, adequate water management underlies the country's ability to generate hydropower for different uses. (underlining added) Hydropower generation is the most water-intensive sector in Panama, utilizing 50,000 hm^3 per year to operate. During several recent extended dry seasons, the metropolitan areas suffered from electricity rationing. It was needed to import -from the Central American Electrical Interconnection System- the equivalent of a month of energy usage for 100,000 families; given low water levels at

hydroelectric dams. The growing economy and related rise in demand for hydropower is faced with limitations on hydropower investments in specific areas. This increases the need to safeguard available opportunities, such as in the Bocas del Toro region, where rainfall patterns are not predicted to increase much, and ensure that the upstream watersheds remain healthy.

Sustaining its forest, biodiversity and coastal resources is also critical for tourism and rural livelihoods. Tourism is a growing industry in Panama, which in 2010 consumed 1.3 hm^3 of water, while many of the large tourist resorts on the Pacific coast rely on groundwater resources. In 2013, tourists spent approximately US$4.5 billion in Panama, much of it linked to the forest, biodiversity and coastal resources which attract increasing numbers every year. The amount of water needed to sustain the health of Panama's ecosystems is yet unknown. When granting water resource concessions, the ANAM, now the Ministry of Environment, established 10 percent of overall water flow in watersheds as the necessary amount of water for ecological protection. Nonetheless, it recognizes that this number does not represent the true amount of water necessary for conservation. While agriculture consumes much less water and plays a smaller role in the economy (3 percent of GDP), the livelihood of the rural poor depends on it, and subsistence farmers have much less coping mechanisms in the face of extreme weather and climate risks. The National Plan for Integrated Water Resources Management identifies the direct discharge of sewage into water bodies -without prior or sufficient treatment- as the main contamination source in Panama. The second main contamination source identified is the dumping of solid waste into water bodies. This is followed by diffuse contamination from agriculture (pesticide and fertilizer run-off) and detergent use in cities. Finally, deforestation is also listed as a source of contamination as erosion causes sedimentation and high turbidity levels on water bodies."[6]

In summary, water management its key for the country's socioeconomic and environmental operation. It's key for the operation of the canal, which sustains logistics, transportation and financial services, pillars of the national economy. Potential complementary sectors such as power and tourism, are also directly related to water management, both for using the resources and ecosystem services (water supply, scenic beauty, recreational uses, others). From this perspective, water resource management is the base of the country's economic, social and environmental sustainability. Water management in Panama takes place based on an integrated water resources management approach and watershed approach, without taking into consideration neither the climate change dimension nor risk management, which have, in the case of the Republic of Panama, a hydro-meteorological origin.

Climate change is disrupting the global water cycle and will increase the frequency and severity of disasters. The Intergovernmental Panel on Climate Change (IPCC) 5th Assessment predicts more frequent and more severe droughts, floods and storms, intensified glacier melting and sea level rise, all of which will cause and contribute to increasing numbers of disasters worldwide and Panama is not the exception.

[6] Panama locking in success. A systematic country diagnostic. World Bank. January 2015.

This Adaptation Program aims to address this condition by situating water management at the center of the adaptation efforts, promoting climate resilience and vulnerability reduction through enhancing food and energy security, based on an integrated water resources management approach that highlights the water-energy-food-climate change adaptation nexus. To do this, the Program will focus efforts in two river watersheds (Chiriquí Viejo and Santa María -*see maps 1 and 2*); both prioritized in light of its water resources, its importance for energy and food production at a national scale, and the existence of unsolved conflicts among water users. Concrete adaptation measures will be implemented through climate proof water management, productive initiatives based on the climate smart agriculture approach in prioritized sites accordingly to social and climate vulnerability. Complementary actions include: to identify renewable energy potential in these areas, and an adaptation knowledge platform based in development of adaptation skills in different sectors, systematization of lessons learned in adaptation projects, and a national system for climate data to monitor hydro meteorological activity as well as the effectiveness of adaptation efforts.

At the national level, the convergence in time of the current Adaptation Program with efforts to move forward with a National Plan for Water Security, an Energy Plan 2015-2050, and the National Pact for Agriculture, offers a unique momentum for developing synergies opportunities between mitigation and adaptation agendas, for conservation and restoration of ecosystem services relevant to the population and agriculture, through the proposed Adaptation Program.

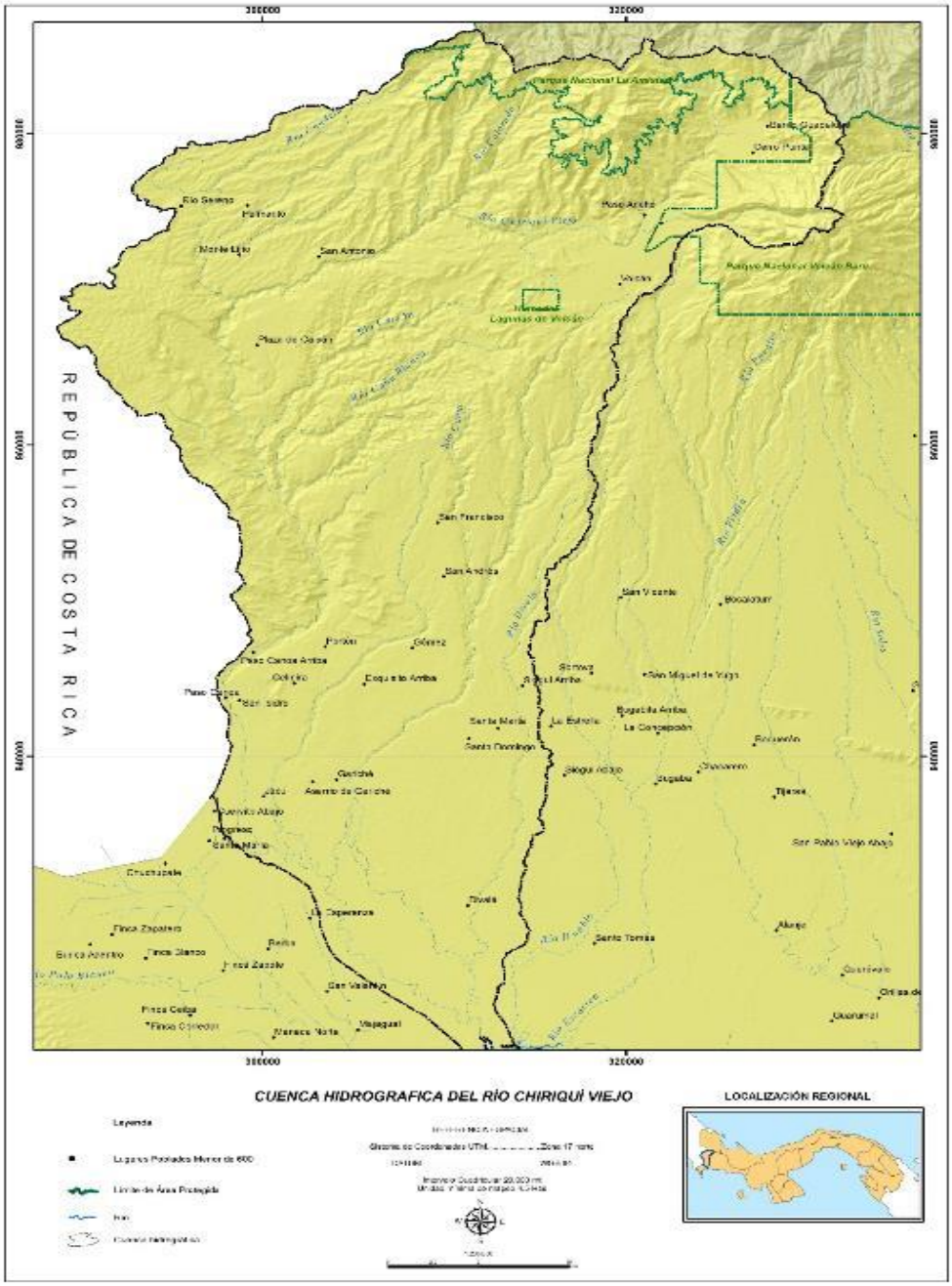
Regarding the National Plan for Water Security, in August 2015 the Government of Panama declared a nationwide state of emergency and ordered the establishment of a High Level Water Security Commission for the elaboration of a 15 year Plan that would increase the country's capacity for water use and management. The plan shall include alternatives for reducing impacts related to climate change in all river watersheds.

On the other hand, the Ministry of Agriculture Development has indicated the need for actions tending to face the impacts of climate change in the sector. These are emerging efforts and need to be strengthened and scaled to the national level systematically. Some actions taken to be highlighted are: the Drought Plan; the Project for Strengthening Disaster Risk Management for the agriculture and livestock sector; climate change awareness activities; training on systems for rainwater collection and use. Likewise, activities for including the climate change variable have been undertaken with support from international organizations. These activities include: awareness on mitigation, adaptation and food security, climate-smart agriculture approach with French cooperation, and base line determination about water and soil sustainable management through the Resilience Project, both with support from Inter American Agricultural Cooperation Institute (IICA).

Regarding the National Energy Plan, the process also began in August 2015 through a national dialogue on energy as a plural and participative debate scenario in order to define a roadmap for the next 35 years. The process has 3 phases: the first one began with the reception of proposals presented by residents of the Azuero provinces, Veraguas, Bocas

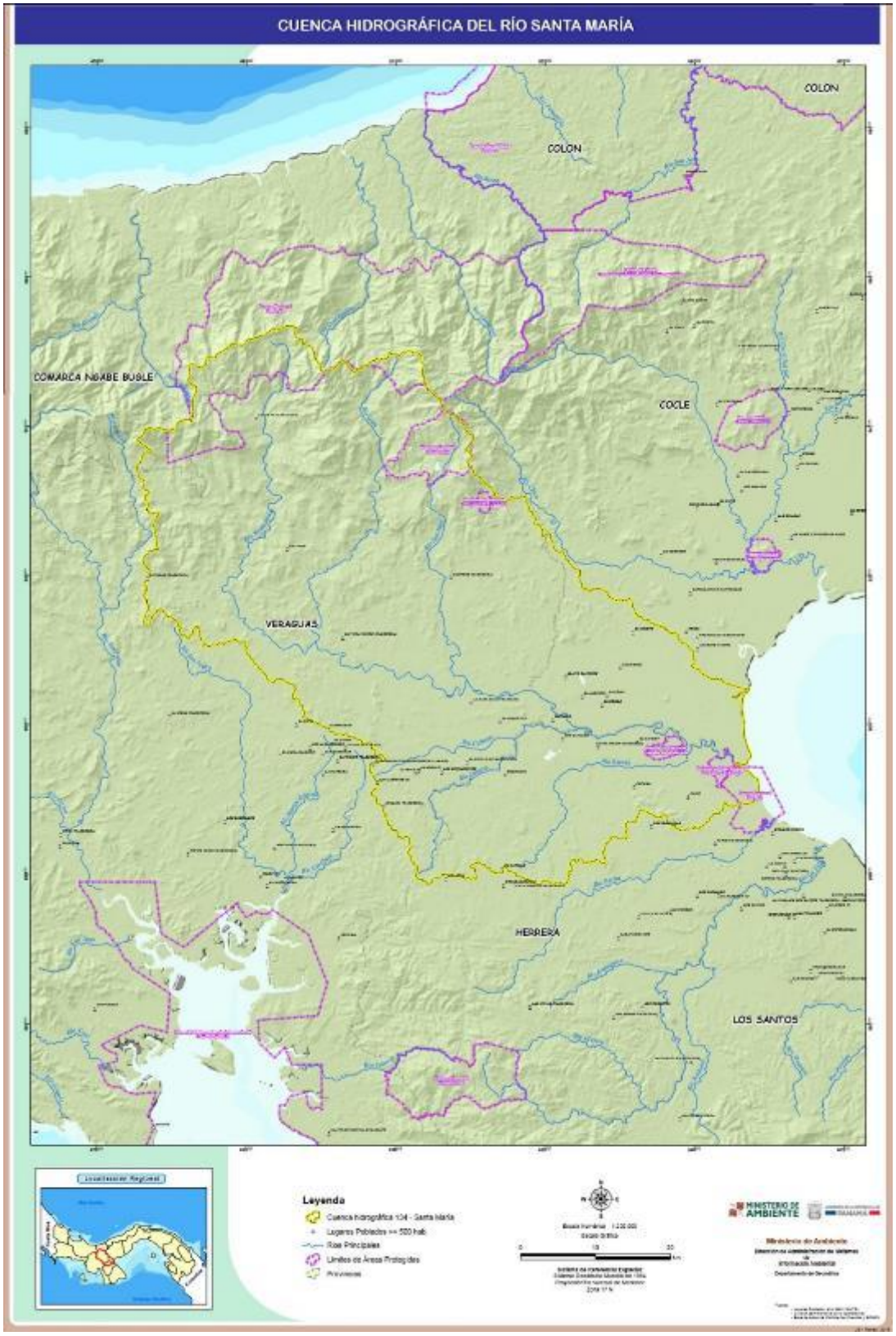
del Toro, Chiriquí, Darien, Coclé and the Ngäbe Buglé indigenous territory; the second phase includes dialogue table sessions in Panama City to end in January 2016; the third and final phase is the elaboration of the National Energy Plan and its delivery to the Executive Body. Besides, a virtual platform would be established for the population in general to have active participation in the process.[7]

Map 1. Chiriquí Viejo River Watershed



[7] Website of the National Energy Secretariat. http://www.energia.gob.pa/Plan_Energetico_Nacional

Map 2. Santa María River Watershed



b. Economic social, development and environmental context in which the project would operate

b.1 Physical context. According to Panama's Environmental Atlas 2010 and Panama's GEO Report 2014, the main physical characteristics of the Republic of Panama are the following: Panama is an isthmus with a total terrestrial area of 74,733.4201 km², and 683.2674 km² territorial waters, for a total of 75,416.6875 km², with a slight inverted and laying "S" shape.

The country is at the final portion of the Mesoamerican isthmus, which connects North America with South America. Politically, Panama is divided into 10 provinces, 75 districts, 631 counties and five indigenous territories: Emberá- Wounaan, Ngäbe-Buglé, Guna Yala, Guna of Madungandí and Guna of Wargandí as of 2009.

The landscape is a mountainous terrain that ranges from irregular areas extending from Panama towards the west and the Caribbean; to hills and vast savannas towards the Pacific. The lowlands of Panama cover most of the country, about 70 percent, with heights below 700 meters. Much of the Panamanian population lives in these hot and lowlands. This group includes: the lowlands and southern plains; hills and plains of central isthmus; the eastern depressions; lowlands and northern plains. The region with hills areas reach altitudes between 90 and 460 meters. They consist of fertile, well-drained plains and valleys. This region is densely forested and scrub and there are some creases, ridges and high plateaus, although quite scattered.

The remaining 30 percent of Panamanian territory, in turn, consists of highlands that exceed the 1,500 meters' elevation. These lands are composed of igneous, metamorphic and sedimentary rocks. Among these, there is the Baru volcano, the Central mountain range, the eastern arch of the north, the eastern arch of the south, and massive volcanic chains and south. Tabasará or the mountains of Cordillera Central, extending the Costa Rican Talamanca mountain range, enter Panama from the west and has an average elevation of 1,525 meters. In the east, the Cordillera de San Blas and then the mountains of Darien, on the border with Colombia, make a lower mountain range, with an average of 915 meters.

South of these and near the Pacific coast are the mountains of Maje and Sapo, with low-lying hills, as Chucano Hill (1,439 meters) and Cerro Piña (1,581 m). The connection between the Panamanian and Colombian Andes takes place in the Highlands of Aspavé and Quia at the east of Darien. On the Pacific coast, separating the Gulf of Chiriquí and the Gulf of Panama, lays the Azuero Peninsula, comprising a set of small mountains and hills, with average elevations like Cerro Hoya (1,559 m). The maximum elevation is the Barú volcano in the Chiriquí province, which reaches 3,475 m; followed by Fabrega (3,335 m), Itamut (3,279 m), and Echandí (3,163 m) hills in Bocas del Toro, Santiago in the Ngäbe Bugle (2,121 m), and Tacarcuna mountain (1,875 m) in the province of Darien, among others.

Panama´s hydrography is characterized by the existence of about 500 rivers; 350 at the Pacific Ocean side and 150 at the Caribbean Sea side. The Pacific Rim covers 70% (53,000 km^2) of the country, and the Caribbean edge is about 30 percent (21,000 km^2). The Continental Divide is constituted by a series of mountain ranges that extend from east to west. Overall, the rivers that run into the Caribbean are short and their waters are usually oriented regularly towards the coasts. The average length of the rivers at the Caribbean edge is 56 km, with an average gradient of 2.5 percent.

At the Pacific coast, the average length of rivers is 106 km, with an average gradient of 2.27 percent. Among the most important rivers are: the Chucunaque (231 km), the longest in the entire country; Tuira (230 km), with the greatest water flow; the Bayano (206 km); Santa Maria (173 km), and Chagres (125 km). The latter is considered the most important river because of its impact on the economy, and because it is vital for the operation of the Panama Canal. Meanwhile, the largest reservoirs or lakes are Gatun, with 423.15 km^2; Bayano, with 185.43 km^2; and Alajuela with 57 km^2.

Panama has two large coastal areas. The Caribbean coast has 1,287.7 km in length, and the Pacific Ocean coast has an area of 1,700.6 km. Beyond these coasts there are 1,518 islands (1,023 in the Caribbean and 495 in the Pacific), as well as islets and cays. The main islands are: Coiba (493 km^2), Isla del Rey (234 km^2) and Cébaco (80 km^2). Panama is a maritime country with a territorial sea of 12 nautical miles; and an Exclusive Economic Zone of 200 nautical miles, with an area of 319,823.867 km^2, which exceeds the continental and insular territory.

b.2 Socio-economic context. Panama is considered an upper middle income country. In 2014, GDP at market prices (current US$) was $46.21 billion, for a total population of 3.868 million.

Panama has had one of the highest economic growths in Latin America during the recent decade, with an average GDP growth of more than 8 percent between 2006 and 2012. Compared to other countries of the region, Panama had a relatively favorable growth during the global financial crisis with 3.2 percent growth in 2009. However, in 2010 the economy went back to its own rhythm with 7.6 percent growth, in order to reach a GDP expansion of 10.6 percent in 2011, 10.5 percent in 2012, 7.9 percent in 2013 and estimated growth of 7.3 percent in 2014. This strong economic growth translates into better social indicators. Poverty rate went down from 48.5 percent in 2002 to 27 percent in 2011, while extreme poverty went down from 21 percent to 11 percent during this period. Nevertheless, inequality relatively high in Panama (Gini's coefficient of 0.53 in 2011) and challenges remain for the public provision of social services. For example, boys and girls in indigenous communities, have significantly less access to basic education, energy and sanitation services compared to boys and girls from urban areas. The Panama Canal expansion and a series of megaprojects have pumped more vitality to the economy and it is expected they boost its sustained growth. This represents a unique opportunity to move forward into reduction of poverty and inequality.

Panama's exceptional growth performance over the past decade stems from an open and competitive economy. Panama's real growth since 2001 has averaged 7.2 percent, more than double the average for LAC. The country has been one of the few that have been able to catch up with the U.S. in terms of per capita GDP in recent years and its growth rate displayed low volatility in international comparison. The economy is one of the most open in the region and is well integrated into the global economy. It has done well in leveraging its geographical position, including through the Panama Canal, transforming itself into a well-connected logistics and trade hub and a financial center. Through continuous improvements in infrastructure, Panama has established a port network that is on par with major international logistics hubs and an airport network that allows the country to function as a major regional passenger hub for connecting passengers between North, Central and South America. Thus, the country has consolidated its position as the most competitive economy in Central America and second after Chile in LAC, according to the 2014-15 Global Competitiveness Report.

In recent years, five main elements have explained this growth performance: (i) the transfer of the Canal to Panama which has allowed it to benefit from the growth of world trade; (ii) the successful management and expansion of the Canal that spilled over to growth in specific sectors; (iii) the increasing role of public investment; (iv) the parallel increase in FDI and private investment; and (v) a stable macroeconomic environment. [8]

Panama has made significant progress on the poverty reduction front over the past years. Between 2007 and 2012, a period including the years of the Great Recession, Panama managed to reduce poverty (using the national poverty line) from 39.9 percent to 26.2 percent, and extreme poverty from 15.6 percent to 11.3 percent. Thus, of a population of about 3.6 million people, the number of Panamanians living below the national extreme poverty line declined by slightly more than 150,000 people and those living below the moderate poverty line declined by close to half a million people.[9]

Considering this economic boom, besides the application of social programs, such as the 100 at 70 Program, universal scholarship and the Network of Opportunities, among others, the country has experienced a substantial improvement in economic and social conditions of the population; extreme poverty is reduced. Nonetheless, there is no doubt that the inequality breach persists, especially among Panamanian indigenous populations and inequality increases with more vulnerable population segments, especially children, youth, women and elderly within these populations [10]

b.3 Environmental and Climate Change Context

i. **National circumstances**. The emergence of the Panamanian isthmus 3.1 to 3.5 million years ago, not only united North America and South America, but also separated the Pacific Ocean from the Caribbean Sea, greatly contributing to global climate modification and an increase in planetary biodiversity. Panama enjoys great

[8]Panama locking in success. A systematic country diagnostic. World Bank. January 2015
[9] Idem.
[10] GEO Report Panama 2014.

though unequally distributed water wealth, generated by its rainfall regimen; and a hydrographic network comprised of 52 watersheds collecting water from some 500 rivers.

Its hydrologic stock is the second highest in Central America after Belize (CCAD, 2005). In the year 2000, forest extension, not including altered forests, covered an estimated 45% of national territory. In 1947 forest cover was 70%. Although 25% of the country's soil has natural agricultural vocation, national statistics show that current use does not necessarily coincide with this potential. In 2000 agricultural production and subsistence farming occurred on 36.6% of national territory (ANAM, 2004). Panama is also blessed with a great wealth of species of plants, birds, reptiles, amphibians, mammals, marine and freshwater fishes as well as endemic species. Of the 25 countries with greatest abundance of flowering plant species, Panama ranks 19th, and 4th in North and Central America. The isthmus is also an important bridge for migratory flow of birds, mammals and reptiles between North and South America (ANAM, 2004).

Categories comprising the National System of Protected Areas (SINAP, for its acronym in Spanish) include terrestrial and marine parks, protected forests, and wildlife preserves, some with internationally recognized management categories such as world heritage sites, biosphere reserves, and wetlands of international importance. In 2006, SINAP contained 66 protected areas occupying 34.43% of Panamanian territory. In the last decade, the number of inhabitants rose from 2,329,329 (1990) to 2,839,277 (2000). Population growth is expected to slow down during the next 25 years as a direct consequence of the overall decrease in fertility rate and gross birth rate at the national level. There has been a drastic shift in the proportion of the population residing in urban areas, from 36% in 1950 to 62.2% in 2000, generating over demand of natural resources and their services and affecting ecosystem capacity in general.[11]

ii) IWRM approach and watershed approach. Panama is considered one of the countries with the largest water resources, approximately 35,000m3 of renewable freshwater resources per capita (FAO, Aquastat)**.** In Panama, water resources management takes place with two approaches: integrated water resources management and watersheds (IWRM) approach. Even though the resource's general framework goes back to 1960, there are several recent regulatory instruments which establish this approach for managing the resource. Particularly, in 2002 when Law 44 of August 5, 2002 was enacted, it established the especial administrative regime for management, protection and conservation of the Republic of Panama's watersheds. This law defines the watershed concept as the area with biological and geographical delimited characteristics, where the human being interacts, where surface and underground waters flow to a natural network through one or several continuous or

[11] Second National Communication to the United Nations Framework Convention on Climate Change. Executive Summary.

intermittent flow channels, which at the same time meet at a larger course that may discharge to a main river or natural or artificial deposit at a mangrove or directly to the ocean. The attachment to the integrated approach is also included in the sector's recent planning instrument: The Republic of Panama's National Integrated Water Resources Management Plan 2010-2030. This Plan indicates that "in recent years, the water management topic takes a new direction due to the occurrence of extreme natural phenomenon linked to water resources, such as floods, droughts, besides others of anthropogenic origin such as water pollution and water resources use conflicts, among others, which demanded and still demand effective and immediate attention."

The Plan considered 11 priority watersheds at the national level including the following rivers Chiriquí Viejo; Chico/Piedra; Chiriquí (Sub watershed of the Alanje river and Sub watershed of the David river); Guararé; La Villa; Santa María; Grande (Sub watershed of the Zarati river and Sub watershed of the Nata river); Anton; Pacora; Bayano; Chucunaque (underlining added).

The estimation of future demand in the sustainability scenario included in the Plan, shows that the greater water demands are in Chiriquí Viejo and Chiriquí river watersheds, presenting higher percentages of the total granted water (31.35 percent and 15.27 percent respectively). It is important to point out that these two watersheds present characteristics mostly appropriate for hydroelectric development, therefore the high percentage of granted volume (…). The sectorial analysis determined that for the agriculture sector, the main watersheds are the Santa María and Grande rivers, given the importance of the irrigation system in both. For the agro industrial sector, the highest volume of granted water corresponds to the Chiriquí Viejo river watershed, with 77.4 percent of the granted total at the national level for this sector. This watershed also presents the highest concession levels for hydroelectric (32.94 percent) and agriculture livestock (10.57 percent) sectors, compared to the other watersheds (underlining added).

The structure of the Plan has five axes, coordinated with public policies and the National Strategy for the Environment, approaching limitations faced by Panama for a water resources integrated management. These axes are:

- Water resources sustainability.
- Water and development.
- Water and society.
- Vulnerability and adaptation to climate change.
- Institutionalism and water governance.

Objective of strategic axis 4, vulnerability and adaptation to climate change, is to: Promote actions for adaptation and mitigation to climate change, compatible with conservation and recovery of water watersheds and natural resources. There are 2 strategies to achieve this objective, one for the application of adaptation mechanisms and the other one for mitigation.

The 2015-2030 programmed actions of the adaptation strategy are the following:

- To diagnose and identify water watersheds in critical condition.
- To design programs to combat drought and desertification based on the International Convention to Combat Drought and Desertification.
- To reduce socio-natural risks related to water in priority watersheds (short and long term), and include territorial environmental regulation and administration of such watersheds as environmental management techniques. This is a way to add a permanent prevention practice to existing efforts on preparation and mitigation, in line with integral risk management.
- To elaborate climate change scenarios in the Republic of Panama.
- To classify areas according to environmental risks that could cause flooding and/or mudslides within water watersheds; to issue rules and recommendations in order to establish operation, control and follow up measures, using the necessary contingency funds.
- To transform, renew and upgrade national meteorological services through the creation of a National Hydro-meteorological Institute, according to the guidelines of the World Meteorological Association, of which Panama is signatory.

iii) Climate change scenarios in Panama. Climate change scenarios have been generated focusing on the provinces of Veraguas, Coclé and Herrera, in the central region of the country. Modeling infers that climate in the regions studied has undergone changes with respect to temperature and rainfall regimens. In the future temperature is expected to be 1°C to 4°C warmer, with greater tendency toward 2°C to 3°C. Precipitation will also present changes ranging from 10 percent increase to 10 percent decrease.[12]

Table 1. Climate scenarios: implications for disaster risk reduction

CLIMATE SCENARIOS: IMPLICATIONS FOR DISASTER RISK REDUCTION
• Given the expected variability in precipitation patters, it's crucial to improve water storage capacity in order to take advantage of excess volume during wet years. • More frequent high temperature periods may cause heat waves causing severe impact on health, including pathogen proliferation, increase dehydration and other respiratory problems. • After 2015, the threat associated to climate vulnerability could turn to be the main cause behind risk to bigger extreme events. This may require integral assessments and planning for development including planning for disaster risk and adaptation to climate change considering food security, access to energy sources and especially sustainable development. • The poorest populations, including vulnerable native populations, will not be able to adapt if doing so implies an effort beyond their food security needs. Climate change potential impacts on the most vulnerable populations in Panama shall be prioritized.
Source: Country's Climate Profile for Adaptation (World Bank, 2012).

[12] Idem.

"Results of weather trends for 2080 show a large increase of annual average precipitation under the climate change scenario A2, and precipitation shows an 80% increase, which may reach between 60 and 70% in January, April and May. Model predictions are uncertain but is clear that the future climate presents more extreme event variability and intensity. However, the number of extreme precipitation events may be reduced for 2080, according to the scale reduction study (PRECIS), thus, this type of event (with more than 40 mm rainfall a day) would go down by half, under the A2 emission scenario. The sea level rise is expected to reach 35 cm by the end of the century.

Based on studies from CEPAL (2020), various models have shown a consistent trend towards a weather temperature increase in Panama, from records of the 1950 to 2006 period and according to climate change scenarios A2 and B2. Results point out a temperature increase in the summer, for scenarios A2 and B1. This increase is projected for 0.5°C to 1°C and 1°C to 2.5°C, respectively. The change tends to be more evident in central and western provinces, including the province of Panama, approximately for 2020. However, close to 2050, especially to 2080, the temperature, under scenario A2 shows values of 1.5°C to 4.5°C, while under B1, increases only between 0.7°C to 2.6°C for the same period."

Table 2.
Weather trends for 2080 regarding temperature and rainfall for the Republic of Panama

Temperature	They are expected to go up during the dry season	0.4°C to 1.1°C by 2020 ▲ 1.0°C to 3°C by 2050 ▲ 1.0°C to 5.0°C by 2089
Rainfall	Uncertainty in rainfall projections for the dry season	-7% to +7% by 2020 ▲▼ -12% to +5% by 2050 ▲▼ -20% to +9% by 2080

Source: Climate Change Knowledge Portal. World Bank. Panama Dashboard. Climate Future. [13]

iv) Vulnerability to climate change. Panama is part of the Central American Isthmus. The risk tendencies in the region are complex, Central America is the second most vulnerable region in the world to weather-related risks; after the Asian southeast.

13
http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=PAN&ThisTab=ClimateFuture

According to the EM-DAT CRED database from 1970 to 2011, the 69.7 per cent of the disasters in Central America have been caused by hydro meteorological events being flooding, 55 per cent, storms and hurricanes, 33 per cent, droughts, 10 per cent, and extreme temperatures, 2 per cent. The following chart shows the recorded events in the region.

Table 3. Evaluation and registered hydro meteorological events in Central America 1970-2011

COUNTRY	CEPAL	EM-DAT	DESINVENTAR	
	Assessments	Registered events	No. Records	Period
	Large	Large, medium, small	Large, medium, small	
Guatemala	5	38	5,467	1988-2011
El Salvador	9	31	8,528	1900-2012
Honduras	3	54	13,112	1915-2012
Nicaragua	10	37	842	1994-2012
Costa Rica	4	37	14,116	1968-2012
Panama	1	32	5,711	1929-2012
TOTAL	32	229	47,776	

Source: Regional report on the vulnerability status and disaster risks in Central America.

The occurrence of climate-related disasters in Latin America has already increased by a factor of 2.4 since 1970. Panama experiences a series of extreme weather events including intense and protracted rainfalls, windstorms, floods, droughts, wildfires, earthquakes, landslides, tropical cyclones, tsunamis and ENSO/El Niño-La Niña events. Between 1982 and 2008, Panama was struck by 32 natural disaster events, with total economic damages totaling an estimated US $86 million. In addition, loss of human life during these events totaled 249.[14]

“The country is frequently affected by hydro-meteorological events, such as droughts, floods and mudslides, as several areas show severe conditions, prone to soil and environmental degradation (particularly, the Arco Seco, the Veragüense Savannah, the Township of Cerro Punta and the Ngäbe Buglé Indigenous territory). Hydrological studies indicate that during the periods of ENOS, in its warm phase, known as El Niño, there is a reduction in the artificial lakes levels that feed the Panama Canal system, and the droughts tend to exacerbate or become stronger, during the occurrence of

[14] Panama Dashboard. World Bank. Climate Portal http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCode=PAN&ThisTab=NaturalHazards

those periods. In the case of El Niño of 1982-1983 and 1997-1998, severe droughts affected the Panama Canal watershed and caused the restriction on the ships' transit due to the low water volume of the watershed's system. The last drought event happened on July 2012, in three districts of the province of Los Santos, where the crops and pastures were severely damaged, leading to declaration of a state of emergency by the Panamanian Government.

During the last decade flooding events caused severe difficulties to the agricultural sector in Panama, but also have affected and increased the damages that occurred in the urban areas of the country. Between 2000 and 2006, the flooding caused the greater human and economic impacts in Panama. For this reason, 62,678 persons were subject to some type of impact associated with eight flooding events, with associated losses for an estimated cost of US $8.8 million".[15] Impacts of "El Niño" and the event known as "La Purísima" are particularly important in this context:

"El Niño-La Niña events". "From 1982 to 1983, ENOS severely affected the agriculture, with losses of US$14 million in livestock and of US$6 million in crops. Then again in 1997 -1998, this phenomenon produced losses that reached US$40 million. As example, only the dairy production lost 7.4 million of liters, which translates into US$1,847,263. Due to ENOS, the agriculture GDP decreased in 3.7%. The drought event of 2001 caused the profit reduction in several crops as well as their production area, due to the uncertainty of the producers regarding the possible changes in rainfall patterns for that period. The dairies were affected again, reducing their volume in 10.4 million of liters and loosing 2,500 heads of cattle. Then, the seasonal crops in Coclé and Herrera were affected by droughts during critical periods of production (July, August, September and October); when the greater volume of rainfalls is expected, prior to the crop season. As reported by the Ministry of Agriculture Development (MIDA), the more severe effects of the drought and ENOS in Panama were registered in Herrera, Coclé, Veraguas, the west and east of the Province of Panama".[16] In September 2015, the National Congress approved a set of water preventive measures to address the impacts of Fenómeno del Niño. "The document includes specific actions such as reducing watering gardens, a national campaign to encourage savings in water consumption, the suspension of permits burning of forests and the ban on non-essential activities, among others. The Minister of Environment, Mirei Endara, said these measures are preventive strategy that tries to avoid panic and to promote efficient management of water resources in the context of climate crisis being experienced, aggravated by El Niño and its damages to multiple productive sectors".[17]

"La Purísima". In December 2010, Panama experienced the longest three-day rainstorm in the history of the Canal and received a historic amount of 760 mm of

[15] Draft document. Conceptual note. Final draft of the Panama financing proposal to submit to the Adaptation Fund. May 2013.
[16] Idem
[17] La Estrella de Panamá. September 12, 2015 http://laestrella.com.pa/vida-de-hoy/planeta/panama-actua-frente-nino-para-35-anos/23891297

rainfall in 24 hrs. The intense rain led to 500 landslides, which impacted approximately 9,000 people and caused a surge in turbidity of the city´s water source to 700 NTU, causing the principal potable water plant that services Panama City to collapse. Thus, parts of Panama City were left without water for 50 days. Canal operations were stalled for 17 hours, and for the fourth time in its history, the Panama Canal Authority had to open the lock drains to lower water levels. In addition, the company charged with operating the Bayano Dam had to open its gates given that the watershed was reaching its maximum capacity. This action resulted in the flooding of the town of El Llano in Chepo. Residents had to be evacuated and lost approximately US$6 million in agricultural production and household constructions. The total cost of La Purísima was estimated at US$150 million[18].

v) Guidelines for action in climate change adaptation and mitigation.

The Second National Communication to the UNFCCC (2012) states that "the emphasis on climate change as crosscutting theme should be taken into account in sectors that can be strategic for national growth given their relevance for the current economy, such as: energy, sustainable agriculture and food security, environmental education, land-use planning and ordering, marine resources, sustainable tourism, integrated water resource management and transport."

Two sectors that have been prioritized in terms of climate change action in Panama are agriculture and energy.

In 2014 CIAT and CATIE[19] jointly conducted a climate change vulnerability analysis for the agriculture sector in Panama: *The Agriculture in Panama and the climate change. Where are the adaptation priorities?* The base for this analysis was the classification of the country districts according to their main crops. The study was aimed to answer the following key questions: How are the principal crops in the country distributed? Would suitable areas to continue the production be gained or lost? How does the capacity of the rural population vary to deal with the adaptation challenge?

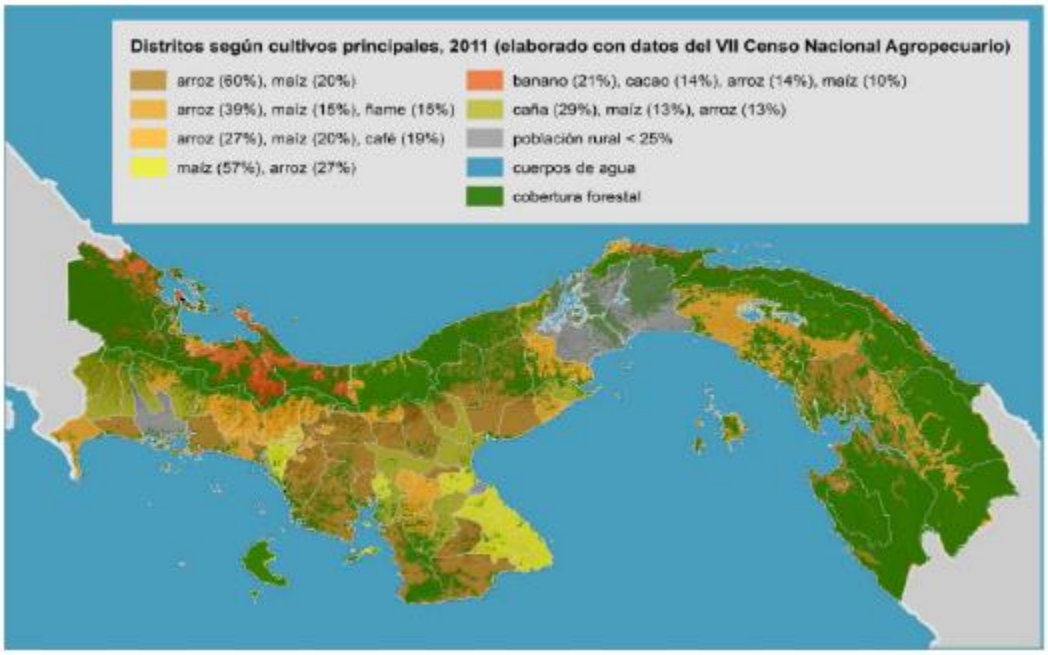
The study indicates that Panama is in the tropical region where the major climate changes are anticipated, part of which have already been perceived in the last half of the past century. Considering the A1 B1 emissions' scenario, it is estimated that for the year 2030 the annual average temperature of the country would have increased 1.3°C, with a maximum value of 1.4°C and a minimum of 1.1°C. In the provinces of Bocas del Toro, Chiriquí and the Ngäbe-Buglé Indigenous territory, the temperature increase will be higher. The changes will be lower to the east of the province of Colon and Panama and the north of Darien, as well as in the Guna Yala Indigenous territory. This increase in the annual average temperature will be accompanied with changes in the rainfalls. Although some climatological models indicate that the rainfalls will increase, most of them indicate that they will decrease. In any case, even if the annual

[18] Panama locking in success. A systematic country diagnostic. World Bank. January 2015
[19] The Tropical Agricultural Research and Higher Education Center (CATIE).

average does not significantly change, the changes in the rainfall patterns cause the distribution to be different in the areas suitable for crops.

The results indicate that it is anticipated that 21 of the 69 districts that are included in the analysis could lose suitable areas for agriculture. These districts are in the Emberá - Wounaan Indigenous territory and in the provinces of Coclé, Darien, Herrera, Panama and Los Santos; they lose suitability because they currently have several crops that are sensitive to the anticipated climate changes. As for the items, the study indicates that the rice, coffee, beans, and plantain will be especially sensitive.

Map 3. Agriculture map for the Republic of Panama



Source: The Agriculture in Panama and the climate change. Where are the adaptation priorities? Summary.[20]

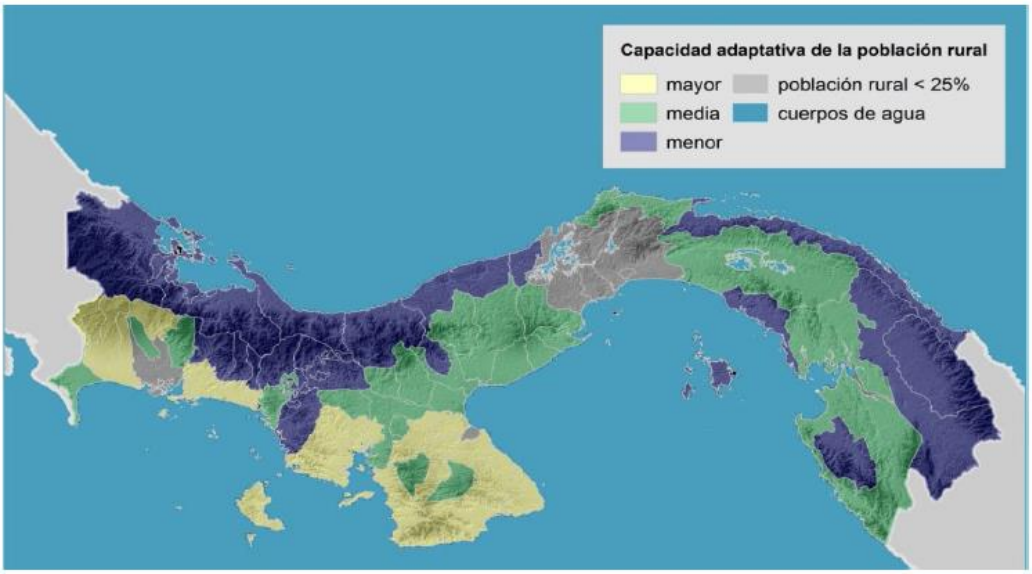
The legend shows the combination of main crops, considered as such because together they occupy at least 60% of the cultivated land in each group of districts. The first thing highlighted is that rice is the main crop in most part of the districts (43), along with corn and coffee. Some districts (8) of the east area of the province of Los Santos have the same combination but the other way around, being corn the most important crop (the underline is added). As for the rice, it is indicated that the modeling of the rice's suitability, which represents 36% of the cultivated area in the country, has results

[20] The Agriculture in Panama and the climate change. Where are the adaptation priorities? Claudia Bouroncle1, Pablo Imbach, Peter Läderach, Beatriz Rodríguez, Claudia Medellín, Emily Fung. Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), 2Centro Internacional de Agricultura Tropical (CIAT)

with a high level of uncertainty. Consequently, it must be treated with caution. According to the preliminary results, only 10 districts, in Coclé, Herrera and Los Santos would lose suitable areas for their production. The surface of the rest of the districts would have an average 2% of suitability profit. This point is important to be considered, given the importance that this grain has for the internal consumption of the country.

The study also analyzed the adaptation capacity of the different communities; it concluded that there are differentiated levels of adaptation capacity to the climate impacts due to the differences in access to basic services, information to renovate resources to start-up the innovation, as working capital and organization. The analysis indicated that, in general terms, the districts with less adjustment capacity are mainly located in the Atlantic coast, where a high proportion of the population has lower satisfaction of their need needs such as housing, water, sanitation and education in relation to the national average.

Map 4. Adaptation capacity for the rural population in the Republic of Panama



Mapa 5. Distritos del país clasificados de acuerdo con indicadores de servicios básicos, acceso a información y otros recursos para la innovación, provenientes de los últimos censos de población y vivienda y agropecuario (INEC Panamá 2010, 2011).

Source: INEC Panama 2010, 2011.
Note: lighter colors indicate higher adaptation capacity, while darker colors indicate lowest adaptation capacity.

As key aspects to consider, the study indicates that the agricultural sector's adaptation requires:

- Work at different levels, form the parcel or property to the national government. In this respect, it is important the support the development of a National Adaptation Plan with the cooperation of different national actors.

- A complimentary analysis of the livestock sector is relevant since it is impacting the change of soil use and contributes to the emission of greenhouse gases.
- The restructuring and diversification of the production systems; aspects which cover the selection of more resistant cultivars and crops and the use of agroforestry systems to improve soil quality, water retention and acquisition of alternative products.

On its part, the MIDA has also started the process of incorporating the scope of climate change in the sector's management. From November 24 to 26, 2015, took place in Panama city, the First Consultation Workshop for the formulation of a Climate Change National Plan for the agricultural area, supported by the Environmental Unit of the MIDA, under the sponsorship of the Spanish Agency of International Cooperation for the Development, with the collaboration of the Tropical Agricultural Research and Higher Education Center, the Food and Agriculture Organization of the United Nations (FAO) and the Inter American Institute of Agricultural Cooperation (IIAC). The purposes of the workshop were to: a) Identify the priority items and axis of action of the Climate Change Plan for the agricultural sector; b) Harmonize the lines of action of the national agricultural sector's institutions, dedicated to strengthening the resilience of the production systems; c) Determine the role that the non-governmental institutions, cooperation agencies, private companies and local actors can play; d) Define a working road map.

The prioritized crops were: rice, corn, beans, coffee, livestock, agribusiness and poultry, as shown in the following chart.

Table 4. Prioritized produce as a result of the First Consultation Workshop for the formulation of a Climate Change National Plan for the agricultural sector – November 24-26 2015.

Rice	Corn	Beans	Coffee
• Essential part of the basic food basket. • Crop of greatest demand at the national level. • Methane producing. • Susceptible to plagues and diseases. • Deficient item in the country.	• Essential part of the basic food basket. • Crop of greatest coverage at the Arco Seco. • Susceptible to plagues and diseases. • Deficient item in the country.	• Essential part of the diet. • Very susceptible to plagues and diseases	• Important crop for agroforestry system in river watersheds •

Live stocking	Agroindustry	Poultry

• 30% of soil under agriculture and live stocking use. • Main producer of greenhouse gases • Vulnerable to weather changes and water stress	• Provides added value to agriculture and live stocking production. • Depends on water and energy resources	• Greatly depends on energy, water and bean supply. •

Source:
Draft document. Report of the first consultation workshop for drafting a climate change national plan, for the agricultural sector. March 2015.

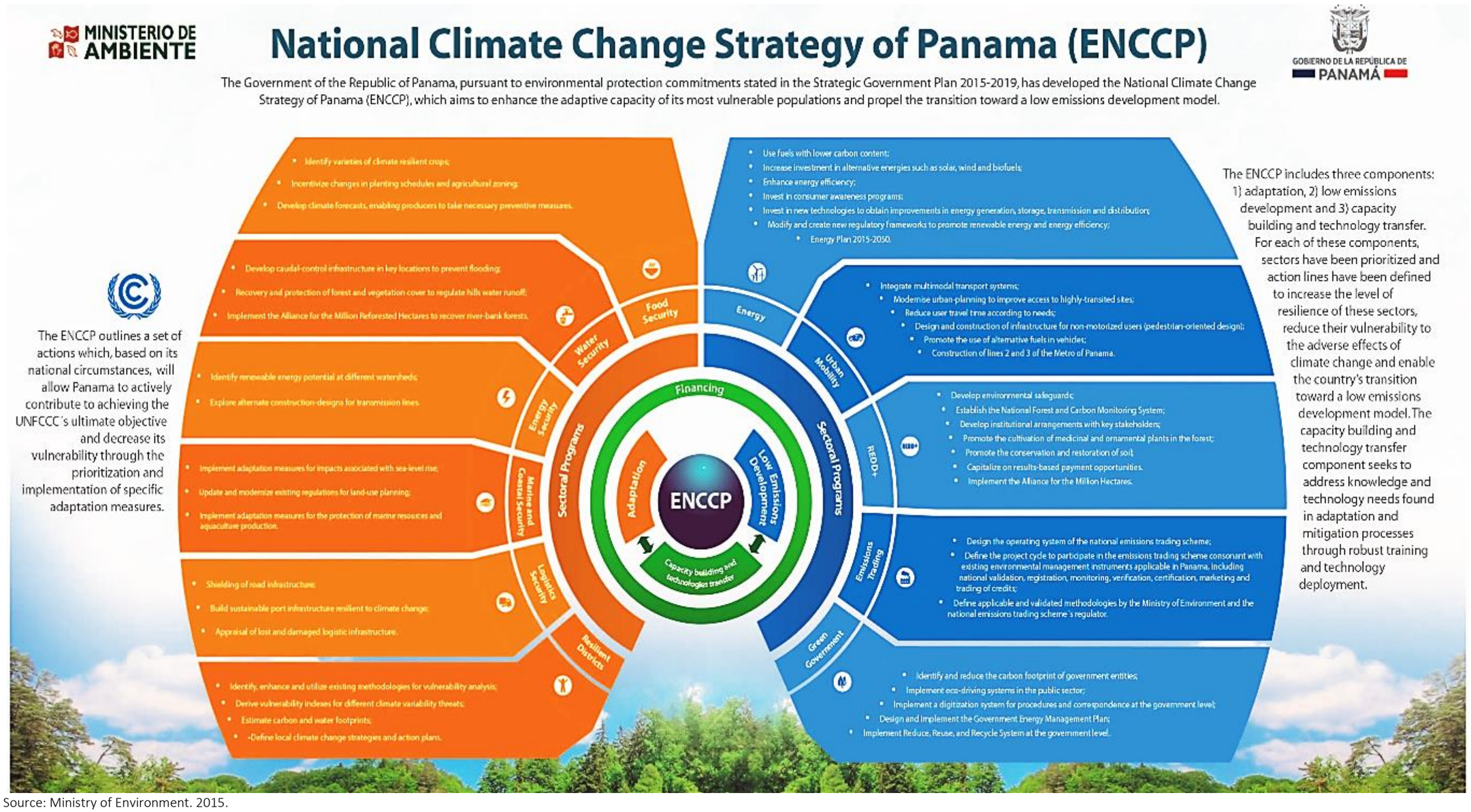
Regarding the energy sector, a sectorial analysis from the climate change perspective is still pending.

In addition, these two sectors have been prioritized as well from the Mitigation perspective. "To achieve the country´s goal of reducing carbon emissions, two sectors of national development must be prioritized: energy and agriculture. In the energy sector, the pursuit of sustainability must be compatible with three basic principles: competitiveness, supply security and environmental protection. It is necessary to assess how the different energy sources can help mitigate climate change by conducting an analysis of the different alternative energies and technological options for adjusting them to the country's situation. The agriculture sector offers a mitigation opportunity through the creation and strengthening of capacities and technology transfer; changes in the management of farmlands (conservation, agroforestry, rehabilitation of farmlands and degraded pastureland); general improvement in the nutrition and genetics of grazing livestock; technologies for collection and storage of manure; and conversion of emissions into biogas." [21]

This approach is consistent with the National Climate Change Strategy of Panama developed by the national government pursuant to environmental protection commitments stated in the Strategic Government Plan 2015-2019. This latter plan aims to enhance the adaptive capacity of its most vulnerable populations and propel the transition towards a low emissions development model, as shown in the next figure.

[21] Second National Communication to the United Nations Framework Convention on Climate Change Executive Summary

Figure 2. National Climate Change Strategy of Panama (ENCCP)



Source: Ministry of Environment. 2015.

vi) Intervention areas of the Program. The intervention geographical areas of the proposed Adaptation Program have been defined regarding the following criteria:

- Importance from the hydrological resources point of view, classified as priority watersheds according to the PNGIRH.
- Its current/future importance for food and energy production (water-food-energy nexus) at the national level.
- Existence of an information base line regarding environmental and climate management, including vulnerability.
- Existence of management and/or planning instruments.
- Conflicts between users for access to the water resource.
- Adaptation capacity

Climate change adaptation reasoning/rational behind the selection of the CHVRW and SMRW, based on their vulnerability to climate change.

1. Clarity of the water-energy-food-climate change nexus. To evidence the nexus approach, it is necessary to demonstrate the importance and interaction of the 3 sectors at the watershed level. Both watersheds comply with this criterion.

2. The Programme proposed rationale and geographical areas are aligned with climate change related ongoing processes, to enable public policy impacts. Yes.
   - Thematic focus areas (food security, water security and energy security) explicitly listed as sectorial adaptation programmes in the climate change national strategy
   - Alignment with climate change strategic action lines included in institutional planning, specifically in MIDA and ETESA.

3. Severity of climate variability or climate change impacts.
   - Yes, the proposed programme includes intervention in the SMRW, located in the region known as the Arco Seco, declared as emergency area by the national government due to severe droughts associated to ENSO and climate change impacts.

4. Presence of both ecosystem values that are viable in the long term and climate change stress.
   - Yes. Ecosystem values and climate change threats previously identified in and in the Watershed management plan of the CHVRW and in conservation area planning processes in both watersheds. CHVRW and SMRW do present ecosystem conditions that enable both conservation and restoration efforts.
   - Output 1 includes activities previously identified in Conservation Area Planning processes as follows: i) Conservation Area Plan for the Rio Gallito micro watershed, located in the SMRW, province of Veraguas. Fideco 2015; ii) Conservation Area Plan for the Rio Caisan sub watershed, located in the CHVR watershed, province of Chiriqui. Fideco 2015

5. The Programme proposed geographical areas builds upon previous climate change analysis and/or planning processes.
6.
   - Yes, climate change importance/vulnerability of both watersheds is identified in national official documents and initiatives. The proposed programme is not conducting tailor made prioritization processes, but identifying climate change considerations in previous planning processes:
     - Second national communication to the UNFCCC. SMRW explicitly included as a prioritized watershed due to climate change. (http://unfccc.int/resource/docs/natc/pannc2.pdf , p. 79-83)
     - National Integrated Water Resources Management Plan 2010-2030 includes both watersheds in the list of 11 prioritized watersheds at the national level. Listing CHVRW and SMRW as the most critical ones in terms of scenario of future demand. http://www.cich.org/publicaciones/pnh2010-2030.pdf
     - CHVRW Plan Management officialised in May 2014 included a climate change vulnerability analysis, which served as a basis for the management programmes proposed. Climate change adaptation and risk is one of the programmatic focus of the Plan. Outputs included in the programme for CHVRW, correspond to activities outlined in the climate change adaptation programme of the management plan.

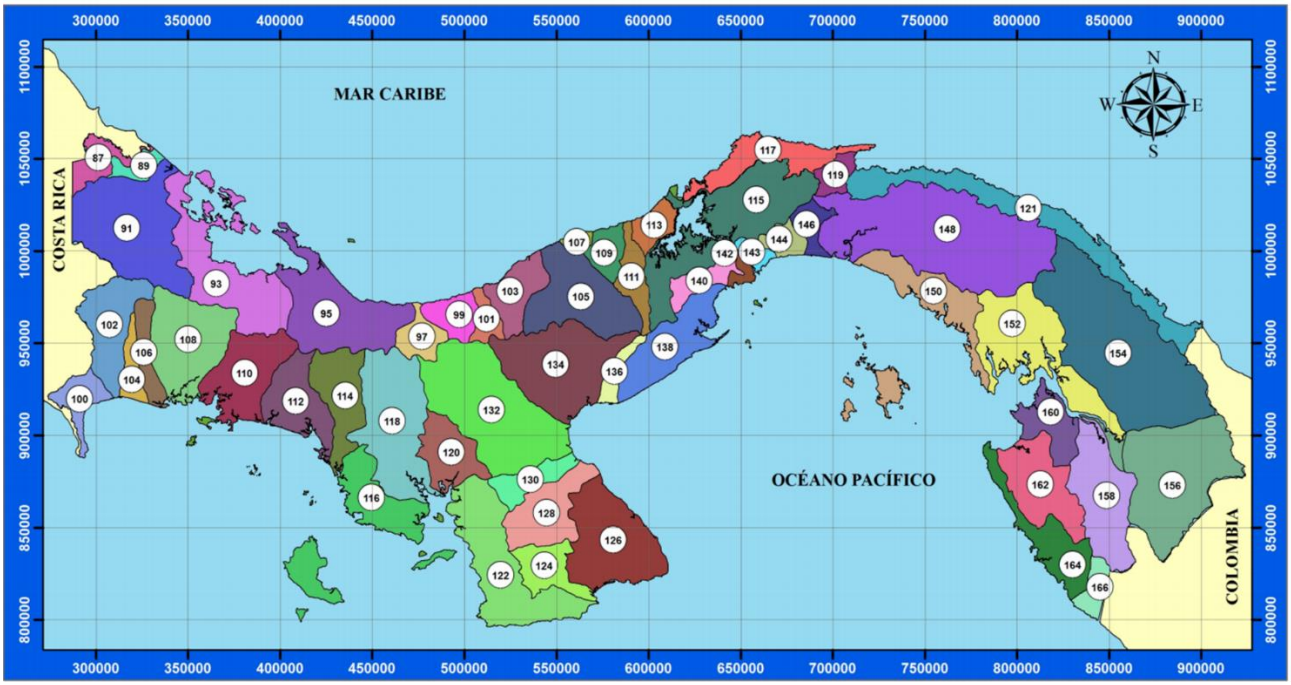
7. Capacity strengthening process. Presence of local stakeholders with existing capacity to implement climate change adaptation action and deliver results.

- Yes. List of stakeholders engaged with environmental management issues included in both watershed management plans and conservation area plans.
- F. Natura`s proven experience working in partnership with key stakeholders in both watersheds.

Considering the afore-mentioned criteria, the Program will focus on the following geographical areas (see map 5):

- Chiriquí Viejo River watershed. Watershed No. 102)
- Santa Maria River watershed. Watershed No. 132)

Ma 5. Number of watersheds at national level)



Regarding point No. 3 above, Severity of climate variability or climate change impacts, these watersheds are vulnerable with respect to climate change-related impacts and risks, and are among in the most vulnerable to climate change in the country.

According to the Dry and Degraded Lands Diagnostic of 2009, which supports the National Plan to Address Drought and Desertification, there are four critical areas subject to processes of drought and land degradation. Among these are the SMRW (as part of the region called Arco Seco and the central savannah of Veraguas), and the upper part of the CHVRW (its upper part Cerro Punta).

The SMRW management plan and the consultation process carried out in recent months for the installation of a watershed committee ratify the climatic threat under which population lives at this territory, especially at the middle and lower parts of the watershed. A threat for droughts previously identified in 2009 by the Atlas for Dry and Degraded Lands of the Republic of Panama. On the other hand, climatic models have determined that at the lower part of the SMRW, for a return period of 100 years, the levels of water in the river can increase from 1.30 m to 4.30 m above the normal average levels; specifically, in areas with elevation lower than 30 meters above the sea level. These results were projected on a digitized map 1: 50,000, and the affected areas are mostly in agricultural production regions.

In conclusion, there is variability pattern in the watershed climate, which is most noticeable in the middle and lower parts. It should be noted that in the period of 5 years has always been an El Niño year at least. The average precipitation behavior during this period is strongly influenced by the degree of severity of this phenomenon. The analysis of temperature data show that the lower part of the basin has undergone changes in

temperature over time in general. During ENOS years, areas with high temperatures they are higher at the lower part, but the upper part of the watershed also continues to be affected. At the upper and middle part of the SMRW, communities are increasingly vulnerable to intense precipitations. This population has low income levels, poor housing conditions, and practice subsistence agriculture. At the national level, a family needs US$427.00 monthly income to fulfill alimentation needs. At most of the SMRW, population is far from meeting this basic need, with monthly incomes from US$60.90 per household, to US$292.70 per household (according to the National Census for Population and Housing 2000).

With regards to the CHVRW, data from hydrological balances of the area show that water scarcity is very low during the dry season in the watershed, especially the upper part. However, during the rainy season, superficial waters cause a critical erosion problem. During the last years, according to the watershed management plan, there is evidence of an increase of 1.3 Celsius degree in minimum temperature through the CHVRW. Common extreme events include forest fires, storms, floods, droughts, electrical storms, and strong winds. In the last years, most common events are floods and forest fires. Given the predominantly agricultural use of the lands (53.8%), it is evident the scarce permanent vegetation cover, which added to a lack of soil conservation practices, cause erosion and alteration of the hydrological patterns, increasing run-off and sediments transportation. The CHVRW has been identified as a critical area of the country in terms of climate change, given its vulnerability for seasonal flows modifications, changes in water quality, sediments transportation dynamic, modification of the landscape (due to deforestation, agriculture, and increase in erosion process associated to land use changes), and habitat fragmentation.

Finally, the climate change importance/vulnerability of both watersheds is identified in national official documents and initiatives. The proposed programme is not conducting tailor made prioritization processes, but identifying climate change considerations in previous planning processes:

- Second national communication to the UNFCCC. SMRW explicitly included as a prioritized watershed due to climate change. (http://unfccc.int/resource/docs/natc/pannc2.pdf , p. 79-83)
- National Integrated Water Resources Management Plan 2010-2030 includes both watersheds in the list of 11 prioritized watersheds at the national level. Listing CHVRW and SMRW as the most critical ones in terms of scenario of future demand. http://www.cich.org/publicaciones/pnh2010-2030.pdf
- CHVRW Plan Management officialised in May 2014 included a climate change vulnerability analysis, which served as a basis for the management programmes proposed. Climate change adaptation and risk is one of the programmatic focus of the Plan. Outputs included in the programme for CHVRW, correspond to activities outlined in the climate change adaptation programme of the management plan.

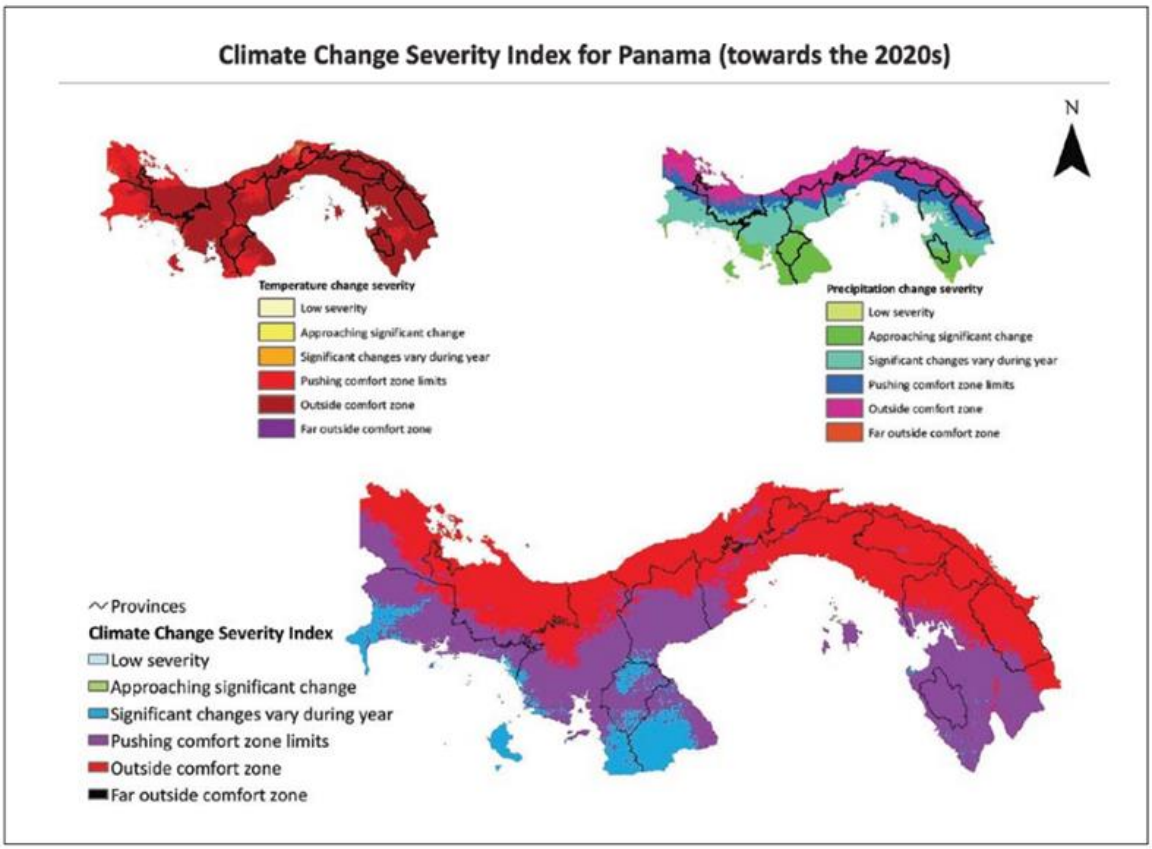
Important fact:

According to the National Action Plan to Combat Drought and Desertification (2004), there is a total of 2.1 million hectares subject to processes of drought and soil degradation comprising 36 districts, 277 corregimientos" and 20 watersheds mostly affected areas by soil degradation are Arco Seco, the Ngobe-Bugle region, the savannah of Veraguas and the village of Cerro Punta. In this area inhabited in the year 2000 approximately 516,000 people, most living in poverty and extreme poverty. Also in these areas are 14 protected areas covering 123,000 hectares. As recognized by the National Action Plan, these areas are subject to rigorous demands of productivity (as almost 35% of the land comprises areas for farming exploitation) involving abuse and misuse of agrochemicals, unsustainable farming practices, overgrazing, burning, logging, erosion and low soil fertility.

Similarly, the National Plan for Integrated Water Management of Panama 2010-2030, states that "according to statistical records and records weather since 2004, have increased the frequency of extreme events in the country, being those of hydro meteorological origin which they have affected most diverse ecosystems, as well as the most vulnerable population in several priority watersheds nationwide. Similarly, the agricultural sector has been affected by extreme events, accompanied by low temperatures and unseasonal rains in Azuero Peninsula, where they have generated losses in livestock and export crops such as watermelon and cantaloupe in the provinces of Los Santos and Herrera.

General Circulation Models (MCG) (which are a tool for climate research and its fluctuations), as well as all possible scenarios for temperature and precipitation in 2080 (period which supposes the largest activity of greenhouse gas emissions and most notorious effect and changes in the future climate) shows warmer temperature scenarios. 80% of the options registers a oscillation likely between 2 and 3 ° C. Precipitation also present changes with greater variability and uncertainty, according to the results: about 10% increase and 20% decrease. However, if considering the trend of 80% of the projections, a variation range between 10% increase and at least 10% reduction can be expected. Projected changes are of the same order to the dispersion magnitude associated with them, since there are models that project slight variations in precipitation and, to a lesser extent, changes in temperature"

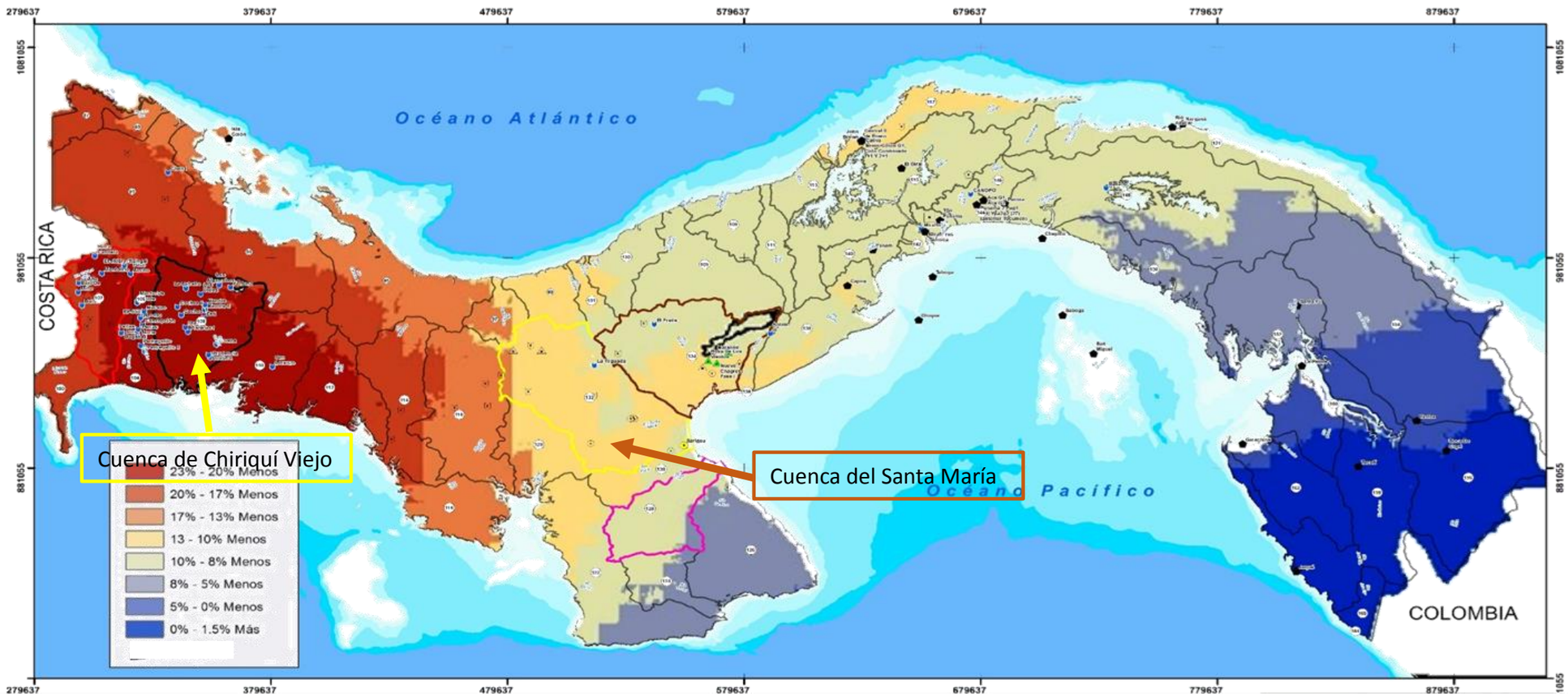
Map 6. Climate change severity index for Panama



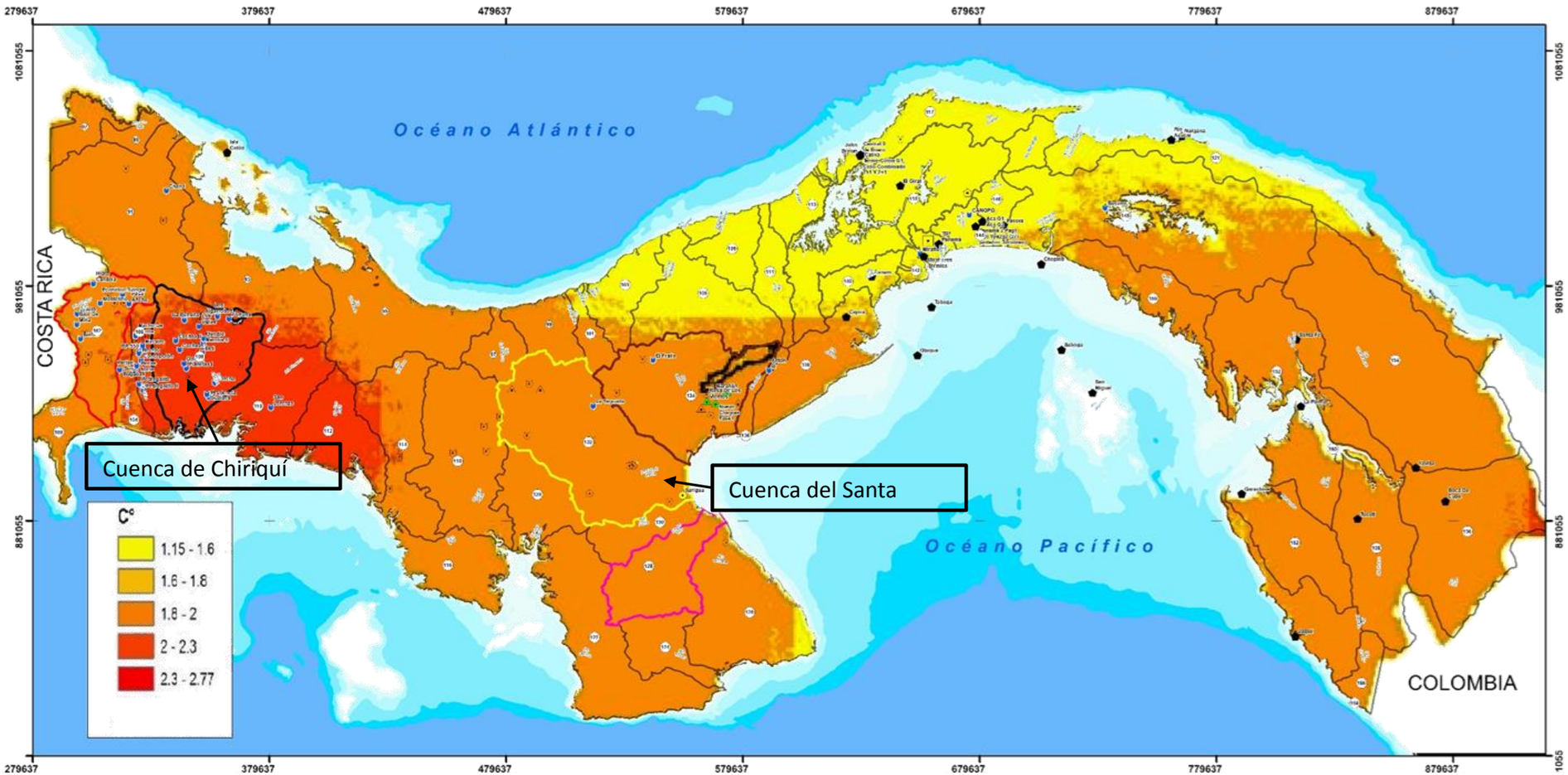
As shown in the map 6 above for both watersheds, CHVRW and SMRW, the climate change severity index towards 2020 indicates significant changes vary during year.

As indicated in the map provided by Min. of Environment (see map 7), both watersheds are in areas where significant changes in temperature and rainfall patterns are expected. Please note particularly the case of SMRW where current scenario is of scarce rainfall, the map shows additional reduction in the range of 13%-8%, representing a major threat not only for production activities but also for domestic and human consumption purposes. In the case of the CHVRW the situation in terms of precipitation anomalies is event worst in the range of 23%-20%. For temperature patterns, both watersheds present expected increase in the range of 2ºC, highly critical scenario, considering particularly the area of the SMRW, where cattle ranching activity is currently suffering the impacts of droughts and caloric stress.

Map 7 a. Precipitation anomalies (%) under the Climate Change scenario regionalized for Panama by 2050, using RCP8.5



Map 7 b. Temperature anomalies (° C) under the Climate Change scenario regionalized to Panama by 2050, using RCP8.5.



Furthermore, in response to comments made by the AF Board Secretariat Technical Review CR2, MiAmbiente (Designated National Entity of Panama for the AF) released a technical note to reconfirm the rationale behind the selection of the two target regions in terms of the strategic priority for the country.

"Technical Note"
Panama Priority Basins regarding Climate Change
Santa Maria River and Chiriquí Viejo River Basins

*The **Santa Maria** river basin is located in the central region of the country, in an area known as the Arco Seco, presenting yearly rain patterns of less than 1,000 mm; during the last decade the dry season lasted seven months, significantly affecting water production for human consumption and agricultural and livestock production, situation aggravated by inappropriate soil management and use practices (logging, burns, overgrazing, cultivation of non-suitable soils, etc.). These number of factors results in production losses (even the whole production) and generation of low income for producers.*

Additionally, the Santa Maria river basin is located in an area where the impacts of climate change are also present, basically related to average temperature rise and precipitation pattern changes. This kind of scenario boosts the impacts on agriculture and livestock if the appropriate measures are not implemented in order to face this new climate reality.

According to the last test run for climate scenarios in Panama, (Third National Communication on Climate Change) changes expected for the Santa Maria river basin range from 8% to 13% precipitation reduction and temperature increase of up to 2°C, for year 2050, which represents and imminent impact in the basin and mainly in water production of human consumption and agricultural and livestock production, in addition to the basin's current high vulnerability.

Looking at this scenario and considering that the Santa Maria river basin is an agicultural production basin, it is necessary to identify and implement actions that would allow reducing vulnerability and increase adaptation capacity face to climate change adverse effects and therefore ensure and improve the basin's production conditions.

*The **Chiriquí Viejo** river basin is located in the western side of Panama, specifically to the west side of the Chiriquí province, close to the border with Costa Rica. Its main river, Chiriquí Viejo, is 161 km long and the basin has a surface area of 1.376 km². This basin is primarily used for power generation with hydroelectric plants, as well as for agricultural and livestock production.*

Precipitation and temperature projected values for this basin would cause impacts of great magnitude which pose a risk of food production for national supply, as well as for power generation, since 40% of the country's supply is produced here.

The higher, medium and lower basin sections present bio geophysical and meteorological characteristics for agricultural, livestock, power, and touristic activities development, among others.

According to the last test run for climate scenarios in Panama, (Third National Communication on Climate Change) changes expected for the Chiriquí Viejo river basin range from 17% to 23% precipitation reduction and temperature increase of up to 2.7°C, for year 2050, which represents and imminent impact in the basin and mainly in water production of human consumption, operation of hydroelectric plants and agricultural and livestock production.

The high section of the basin represents an important area for agricultural and livestock production, more than 25% of items such as coffee, vegetables and citruses are harvested here, it is also important for milk and meat production, therefore is a relevant region for supply at the national level. The higher and medium part of the basin provide for power generation through hydroelectric plans and the lower basin is for agricultural and livestock production.

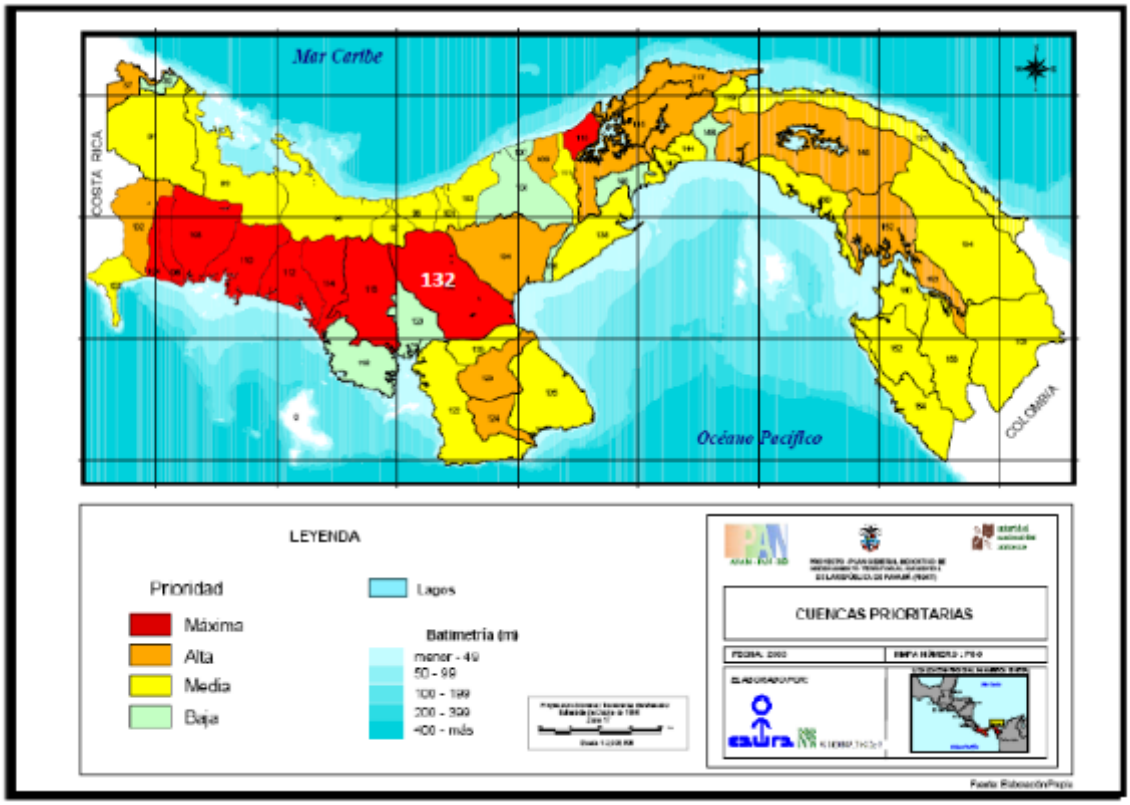
These characteristics give the Chiriquí Viejo basin a priority position for water resources management, which is the driving force for human development through it.

Together the Chiriquí Viejo river and Santa Maria river basins cover a population of 114,281 inhabitants (Chiriquí Viejo 48,316 and Santa Maria 65,965) according to the 2010's population and housing census (INEC 2010), these two basins are particularly important for food supply at the national level, since together they provide almost 40% of the national supply, therefore it is important to strengthen and increase these basin's resilience face to climate variability and climate change, which would allow improving integrated water management in order to increase the country's food security and power security."

Below there is a brief outline of both watersheds

Santa Maria River watershed. This watershed (see maps 2 and 8) has an Integral Management Plan of the upper, medium and downstream areas from July 2009. According to the Management Plan, the Santa Maria River watershed (identified as number 132 in the hydrological system of Central America) is located in the Pacific divide in the provinces of Veraguas, Cocle and Herrera. The watershed's total drainage area is 3,400.63 Km^2 and it is divided into 12 subwatersheds. From its source to its mouth in the sea (Parita Bay) the length of the main river is 168 Km. The watershed's average elevation is 200 msnm, and the highest point is located in the Central Mountain Range with an elevation of 1,528 msnm. In the proposal of the Land Management General Plan (LMGP) of Panama it is considered that that the Santa María River watershed is among the ones with higher priority.

Map 8. Geographical location of the Santa María River Watershed



Source: Land Management General Plan (LMGP) of Panama, ANAM, 2006.

Table 5. SubWatersheds in SMRW

Cuadro No.1 Subcuencas de la Cuenca del Río Santa María

	Subcuenca	Superficie (km^2)	%
Parte Alta	Subcuenca Río Gatú	489.62	14.40
	Subcuenca Río Corita	182.13	5.36
	Subcuenca Río Bulabá (Mulabá)	344.80	10.14
	Subcuenca Río Higuí - Cuay	130.41	3.83
	Zona de Intercuencas San Francisco	229.26	6.74
Parte Media	Subcuenca Río Cocobó – Río Las Guías	376.31	11.07
	Subcuenca Río Santa María Parte Media	199.17	5.86
Parte Baja	Subcuenca Río Cañazas	450.22	13.24
	Subcuenca Río Santa María Parte Baja	417.55	12.28
	Subcuenca Río Estero Salado	97.21	2.86
	Subcuenca Río Escotá	366.00	10.76
	Zona Marino Costera	117.95	3.47
Total		**3,400.63**	**100**

Fuente: PMCA del Río Santa María PRODESO - CATIE

The land area of the Upper Basin of the Rio Santa Maria is 137,536.87 ha and has a population of 18.091 inhabitants, distributed in five districts, 16 “corregimientos” townships and 221 inhabited villages. The total population, 54.91% are men and 45.09% they are women; showing a population density of 1315 inhabitants per km2. The middle and lower parts of the Santa Maria River basin have a population of 57.390 inhabitants, distributed in three provinces (Veraguas, Herrera and Coclé), nine districts and 42 townships. Of the total population, 47.6% are women and 52.4% men.

Table 6. Political administrative division.

Cuadro No 35. División político-administrativa

Provincia/ Comarca	Distrito	Corregimiento
Localidades ubicadas en la parte alta de la cuenca		
Comarca Ngöbé Buglé	Ñürum	1. El Paredón
Veraguas	Santa Fé	1. El Alto
		2. El Pantano
		3. Santa Fé
		4. El Cuay
		5. Gatú o Gatuncito
	San Francisco	1. San Francisco
		2. Remance
		3. San Juan
		4. San José
		5. Los Hatillos
	Calobre	1. Chitra
		2. La Yeguada
	Cañazas	1. Los Valles
		2. El Aromillo
		3. San Marcelo
Localidades Ubicadas en la Parte Media del Río Santa María		
1. Veraguas	1. Calobre	1. La Yeguada
		2. Monjarás
		3. El Cocla
		4. El Potrero
		5. La Laguna
		6. Barnizal
		7. La Raya de Calobre
		8. La Tetilla
		9. Las Guías
		10. Calobre Cabecera
	2. San Francisco	1. San Francisco Cabecera
		2. Los Hatillos
		3. Corral Falso
	3. Santiago	1. Canto del Llano
		2. Urracá
2. Coclé	4. Natá	1. Capellanía
Localidades Ubicadas en la Parte Baja del Río Santa María		
1. Veraguas	1. Santiago	1. Santiago Cabecera
		2. San Martín
		3. Carlos Santana
		4. La Raya de Santa María
	2. Atalaya	1. Atalaya Cabecera
		2. San Antonio
		3. La Carrillo
		4. Montañuela
2. Herrera	3. Ocú	1. Ocú Cabecera
		2. Peñas Chatas
		3. Los Llanos
		4. Llano Grande
	4. Parita	1. Parita Cabecera
		2. París
		3. Potuga
		4. Cabuya
	5. Santa María	1. El Limón
		2. Chupampa
		3. Los Canelos
		4. Santa María Cabecera
		5. El Rincón
3. Coclé	6. Aguadulce	1. El Roble
		2. El Cristo
		3. Aguadulce Cabecera
		4. Pocrí
		5. Barrios Unidos

Fuente: Consorcio PRODESO-CATIE. Año: 2007-2009.

Regarding land use, it varies depending of the watershed section. In the upper river basin the predominant farming systems are mainly based on traditional agriculture and livestock activities, especially ranching. Traditional farming involves cutting and burning of stubble, secondary or primary forest, planting subsistence crops (basic grains, roots and tubers, vegetables) for one or two years and subsequent abandonment or conversion to pasture. There perennial crops deeply rooted among producers, especially coffee, orange and other fruit. These agricultural systems form the basis of food security for most populations of the Upper River Basin Santa Maria. Livestock is scarce and practiced as a form of capitalization and savings for family emergencies, except interbasin area, where there are farms that incorporate more intensive management practices for commercial purposes. Poultry farms are few and high technological level. In pig farms, an average level of technology is evident.

In the other hand, generally, and according to the data obtained in the 2001 Census of Agriculture, in the middle and lower section of the watershed an important cattle activity, mainly represented by production of cattle is developed. This indicates that agricultural activity is not the only one that strengthens the economy of this region, livestock is also a basic activity of the basin. Of 202,367.82 hectares covering the middle and lower basin, the 42.78% of that area is occupied by grassland areas used in the breeding and fattening of cattle. Almost 12% corresponds to the annual crop production and the rest to other activities, including the production of permanent crops, being rice production one of the most important. Other important crops include sugar cane, corn, beans.

The Santa Maria River Watershed is integrated within a social and environmental context of important natural systems, which work in an interrelated manner. The main aspects to consider in the watershed's management are:

- In its upper area, we find the Santa Fe National Park and the La Yeguada Forestry Reserve (in the limits). Both present favorable protection and conservation conditions for the internal interrelationships in the watershed's upper area and to the bottom area of it. In this part of the watershed (upper), we find the higher hydropower potential, eco touristic and conservation development; however, as a response to the demands of the rural communities, it is possible the production development through agroforestry systems, although there is a limited productive capacity of the soils.
- In its middle area, the watershed relates to neighboring watersheds, whose communities relate to the hydrological system (as it is the case of the demand for drinking water of the Santiago de Veraguas city) and in its territorial environs there is an important potential for agricultural activities (irrigation of agricultural lands for industrial crops and livestock).
- In its lower area, the watershed relates to the marine coastal system of the Parita Bay, mangrove and touristic activities. The potential and the conservation of this system shall depend of an adequate land management in the watersheds' upper and middle areas. Altogether, the lands on the middle and bottom area, as well as

the required environmental services, shall depend in great degree of the protection, conservation and sustainable production actions that are applied in the watershed's upper area.

- Between the middle and lower parts, it is located the Pan-American highway, which connects the Santa Maria River watershed's area with Panama's capital city and with the cities and provinces to the West (border with Costa Rica).

According to the Management Plan, "the summary of the problems and potentiality of the Santa Maria River watershed are mainly caused because of the lack of a permanent vegetation cover in fragile lands, as well as the inadequate use of soils with intensive crops which generate negative impacts such as erosion and loss of fertility. However, based on the analyzed information (primary data and participative assessment), it can be concluded that this territory is not in a critical situation regarding the natural resources sustainability, but must take immediate measures to manage. There would be not possible rehabilitation or restoration if in the short or medium term the necessary actions are not taken.

From the social perspective, if the situation becomes more critical, the limited opportunities to improve the communities' quality of life, is a situation of merit to catalyze management actions of the watershed with the socioeconomic development. This is accentuated by a possible situation of low percentage of land tenure in the area and the lack of work. The watershed has potentiality related to the use of environmental services, mainly resulting from the availability of water in quantity and quality; also in the long term, the ecotourism alternative is important to be considered. There is also potential to use water in the irrigation of downstream crops and in the same sub watersheds.

It is important to note that the water's greater potential is for the hydroelectric generation; however, this matter deserves serious consideration. As the study presented, the population does not identify this potential in the participatory assessments. It is noted on the other hand, that between the local organizations there are a few "against the dams or related projects". In fact, from the technical perspective and based on information analyzed, besides from justifying the watershed's management to contribute with the improvement of the quality of live, the other important reason is to guarantee the quality and amount of water for hydropower generation, as the agriculture potential is lower, and the forestry potential is even more promising. The hydropower potential in turn must be part of a regional and national strategy, but without detriment to the local development and the basic needs of the population. This connotation shall be part of a process of concepts' clarification, awareness and strengthening of the capacities to manage and negotiate future project of any nature in the watershed.

Geographically this watershed of the Santa Maria River belongs to the region known as "*Arco Seco of Panama",* which is one of four critical regions exposed to drought and soil degradation in the country, with excess logging and clearing activities, as well as for other techniques equally harmful. This context has turned into environmental degradation,

damages and chronic loss of productivity in livelihoods, including dairies and agricultural and livestock subsistence activities, the latter, performed by the poorest families. Regarding agricultural production items, in the Arco Seco takes place the greatest corn production (77 percent of the national returns are produced in Herrera and Los Santos); rice (the Arco Seco provides 30 percent of the national production of this grain, having Cocle and Herrera the greater number of flooded rice -40 percent of the total). This Arco Seco region is particularly affected by the negative effects of the El Niño phenomenon.

Climate change data for the SMRW.

Specific information of climate change scenarios for this watershed is not available. In 2004 in the context of the project, Capacity Development for Stage II of Climate Change Adaptation in Central America, Mexico and Cuba, the Santa María river basin was studied to increase knowledge about future vulnerability in the region and create capacity to formulate suitable strategies, policies and measures in the prioritized sector: water resources and their relation to agriculture. The final report of this study is not available. Nevertheless, important pieces of information can be obtained from the Watershed Management Plan approved in 2009 and recent technical documents. It is important to note that the Management Plan does not include a Climate Change dimension or component per se.

- Floods: After running the program, the downstream levels of the Santa Maria River were determined, leading to the conclusion that for a return period of 100 years, levels can increase from 1.30 m to 4.30 m above the normal average levels; specifically, in areas with elevation of 30 meters down. These levels were projected on a digitized map 1: 50,000, and the affected areas mostly involved agriculture production areas. According to the digital map there were no large or medium-sized populations affected, but this may not show the reality that there are small communities that develop on the banks of the river.

- Droughts: An analysis of the data of rainfall and temperatures in the same study conducted in recognition of the vulnerability of 2004, notes the presence of El Niño. However, the areas most affected by drought are in the middle and lower part. When analyzing the data of precipitation every 5 years, it was noted that if there is variability in their behavior, which is most noticeable in the middle and lower basin. It should be noted that in the period of 5 years has always been an ENSO year at least. The average precipitation behavior during this period is strongly influenced by the degree of severity of this phenomenon. The analysis of temperature data show that the lower part of the basin has undergone more changes in temperature over time in general. During ENSO years areas with high temperatures are mainly in the lower part, while the upper part of the basin continues to be affected.

- Extreme events. As indicated in the National Plan for Hydric Resources Integrated Management 2010-2030, an additional element in Panama regarding inter-annual weather variability is to understand the behavior of the extreme events of rain and temperature. Using the SDSM scheme and data of the GCM Hadley Center, with scenarios A2 y B2 and the climatology observed in Divisa in the SMRW. The change simulations indicate increase in the minimum temperature of the central region, considering Divisa, in the range of 0.5ªC in 100 years for the scenario B2 and 0.75ªC for scenario A2.

According to the information provided by MIDA personnel of the central level and the regional office of *Herrera and Los Santos,* communities particularly affected in their productive capacities due to the water management and the climate variability *include the areas of Cañazas, Calobre, San Francisco and Parita*[22]

During technical reviews conducted by F Natura with MIDA technicians the districts of Ocu and Santa María were also identified as being affected in their productive capacities due to climate change.

Chiriquí Viejo River Watershed. The watershed (see map 1) has a Management Plan from 2014. According to the Management Plan, the Chiriquí Viejo River watershed (identified as number 102 in the hydrological system of Central America) is located in the Pacific side of the Province of Chiriquí. The watershed's total drainage area is 1,339.4 Km^2. From its source to the mouth in the Pacific Sea (river discharges in the Charco Azul Bay) the main river's length is 161 Km. The watershed's average elevation is of 1,100 msnm, the highest point located at the Baru Volcano, at the north-east part, with an elevation of 3,474 msnm.

The proposal of the General Land Management Plan (LMGP) of Panama considers that the Chiriquí Viejo River watershed is among the ones with higher priority. According to the LMGP national zoning, the middle and bottom area of the Chiriquí Viejo River watershed is located in the land production and forestry protection category, from a global perspective; it is possible that at a local scale, the differentiation in use can be adjusted.

The Chiriquí Viejo River watershed is integrated in a social and environmental context of important natural systems that work in an interrelated manner. The main aspects to consider in the watershed's management are:

- In its upper part, we find the Baru Volcano National Park and the La Amistad International Park, both have favorable conditions of protection and conservation, for the watershed's internal interrelationships and towards the bottom. This part of the watershed has the highest hydropower potential, eco touristic and conservation

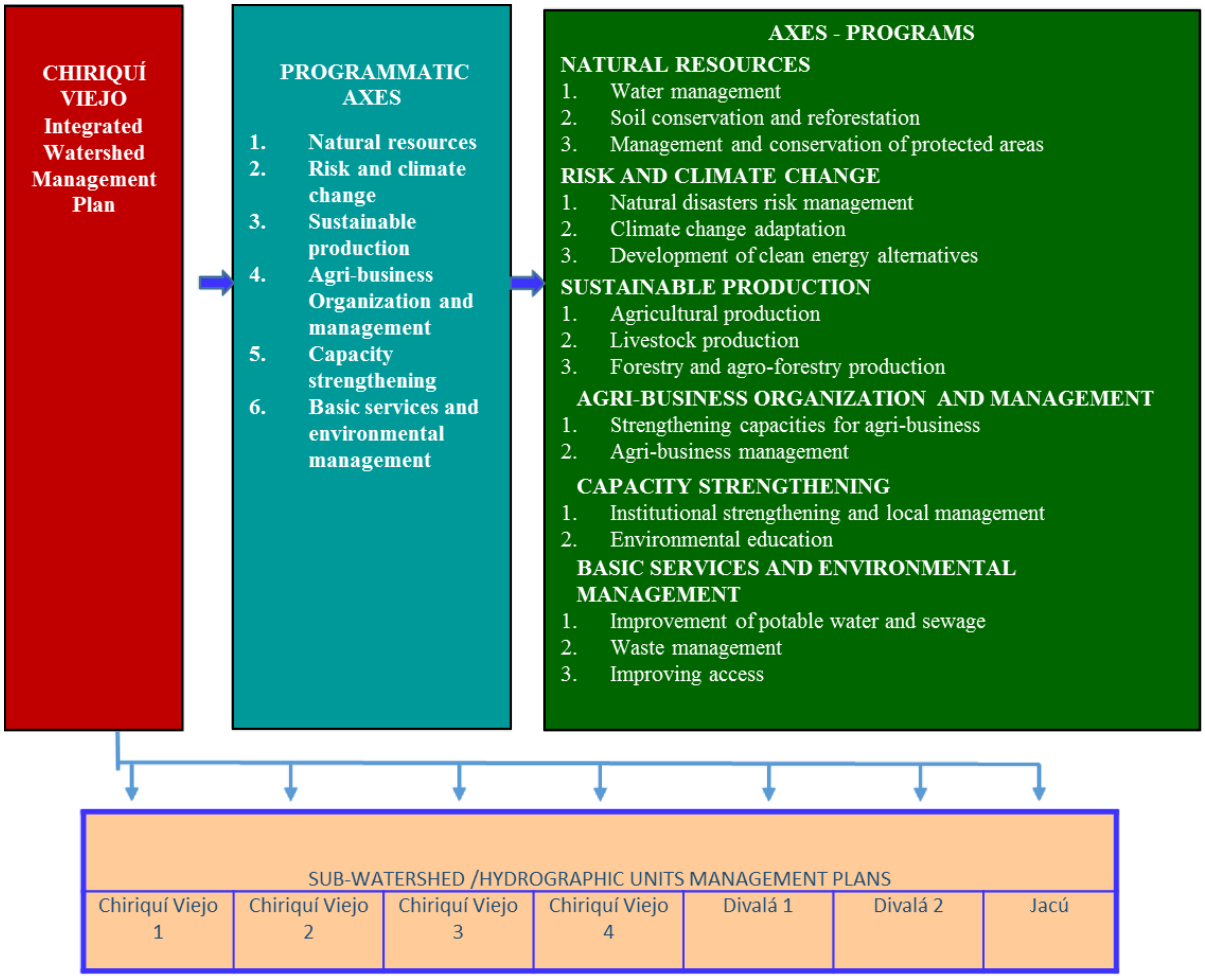
[22] Work meeting held at the Ministry of Environment on December 30, 2015.

development, there are important vegetal crop areas, mainly potato and onion. Cultivated in fragile soils, the erosion risk and the release of sediments is high. Furthermore, if the higher part is not covered by good vegetation, the water infiltration for the groundwater recharge could decrease.

- In its middle area, the watershed has a significant potential for agricultural activities, with important dairy and coffee production (with possibility of irrigation of agricultural lands for crops and livestock). In some sub watersheds and micro watersheds there is potential for the hydropower use, some of them already under development.
- In its bottom part, there are crop areas of oil palm and plantains, the watershed is linked with the coastal marine system of the Charco Azul Bay and mangrove. The potential and the conservation of this system will depend on an adequate management of the watershed's upper and middle areas. The middle and bottom areas, as well as the required environmental services will depend to a great extent on the implementation of protection, conservation and sustainable production measures in the watershed's upper and middle areas.
- The main driving force of the superficial water resource defines three important channels (Chiriquí Viejo River, Jacu River and Divala River) and other secondary; these have been modified in their gallery forests, producing fragility to the rivers and creeks' aquatic ecosystem. The riparian forests' recovery is an important task in the watershed's management.

The Management Plan of the Chiriquí Viejo River watershed is organized based on axis, programs and projects. The six axes of the Plan's structure are related to 17 programs. In the watershed, seven (7) sub watersheds have been identified; in each of them the projects that are later integrated to form the integral management plan's programs are defined. Hereafter we introduce the scheme of the programmatic structure of the Management Plan for Chiriquí Viejo River Watershed.

Table 7. Programmatic structure of the Chiriquí Viejo Integrated Watershed Management Plan



Source: Chiriquí Viejo Integrated Watershed Management Plan.

The management Plan integrates measures both to face climate variability, and to contribute to the climate change's mitigation and adaptation. This axe, as well, shall consider the linkage with the other axis (natural resources, sustainable production, organization and agribusiness management, strengthening of capacities and basic services, and environmental management) that allow to integrate the vulnerability analysis of these considering the climate change; as well as the implementation of the adaptation measures identified in products 2 and 3.

To obtain effective results, it will be encouraged -at the national level- the inter-institutional coordination, participation and integration, related to the climate change risks' theme. The institutions at the national level shall have active participation in this

process. In each of the projects it is recommended, as far as possible, to include indicators that consider the monitoring of the variables related to the change and the climate variability. The principal institutions involved are: ANAM, SINAPROC[23], MIDA, IDIAP[24], Ministry of Health, Municipalities.

Climate change data for the CHVRW. Specific information for this watershed is included in the Management Plan approved in 2010, in the following terms:
Current situation:
Precipitation: Board with two distinct seasons: i) dry season: January- April and ii) rainy season: May-December. Annual average rainfall of 3474 mm. In the past 35 years, minor precipitation events have occurred during January month and most during the month of October.
Temperature: With minimum average values of 17.8 ° C and maximum 35.5 ° C and an average annual temperature of 28 ° C. In recent years, it is shown an increase of the minimum temperature of 1.3 ° C.
Extreme Events: Include forest fires, floods, tidal waves, droughts, thunderstorms and strong winds. Floods, strong winds and forest fires events have been most often occurred in recent years.
Trend Situation:
General: Changes in seasonal rainfall, increase in air temperatures, more frequent torrential rains, droughts and strong winds.

- Precipitation: Under 17 global climate models decreased precipitation (± 7% in 2020, -12 to +5% in 2050 and -20 to + 9% in 2080) is evident. Impacts on water resources, agriculture, forestry and health sector.

- Temperature: 17 models of global climate analyzed, projected increases in temperature from 0.4 ° C in 2020and up to 5 to 2089. Impacts on water resources, agriculture, forestry and health sector.
- Extreme events: It is expected higher occurrence of forest fires, floods, tidal waves, droughts, thunderstorms and strong winds are expected. They will affect agricultural activities, protected areas and infrastructure.

The climate change adaptation program in the Plan. The watershed's climate change is an element which links all the actions proposed in the Management Plan. It is important that both, the production and the conservations actions, include climate change as a preventive factor. Therefore, the temperature change, increase in the wind speed, intensity and rainfall's duration, are decisive to identify the solutions to the negative impacts of climate change. The crop losses due to the lack of water, new diseases in the crops, the lack of water for human consumption; are some of the concerns of the watersheds' villagers, thus they expect to have adaptive measures to overcome those threats. These measures will require of education and experiences from local stakeholders, following complementary strategies such as the exchange of experiences and the assessment of good practices.

[23] National Civil Protection System (SINAPROC).
[24] Institute for Agriculture and Livestock Research of Panama (IDIAP).

In the Chiriquí Viejo River watershed, the adaptation to climate change is a program that will facilitate the assessment of options on water harvesting, protection of watershed recharge areas and protection of water sources. Such activities will require the participation of the farmers, users and the community in general. These adaptation actions to the climate change try to:

- In the short term, achieve a clear understanding of the climate change within the population.
- In the medium and long-term, implement adaptation actions, with participation of local stakeholders.
- In the long-term, have the appropriate information for adaptation to climate change, communicating and standardizing the experiences.

The program covers the whole watershed, with special attention to critical areas affected by elements of climate change (that undergo hydrological stress, lack of water, diseases, etc.). Its general purpose is: apply adaptation measures to climate change to minimize and/or control the losses of agricultural crops and guarantee water availability for the community basic uses and for farmers. The strategies include:

- Inform farmers and community of the existence of adaptation measures alternatives to deal with climate change.
- Train local stakeholders in the use of adaptation measures (the exchange of experiences is an important alternative to consider).
- Provide technical assistance and transfer of technologies, regarding adaptation measures recommended for the watershed.
- Develop guidelines for the implementation of climate change adaptation measures, compatibles with the characteristics of the land.

According to the Plan, this results in a group of specific projects at a total cost of US$3.1 million, thus:

- Improvement of the agricultural production through irrigation system.
- Introduction of new plant species.
- Biological control of pests.
- Protection of the water sources.
- Protection of watershed recharge areas.
- Water harvesting.

According to information delivered by MIDA officials of the central level and technical coordinators of the *Chiriquí* Regional Office, communities within the *watershed* require *priority actions* due to conflicts and vulnerabilities associated to the water and climate management for different productive uses *are*: Dival*á*, Chiriqu*í* Viejo, La Esperanza, Baco, Progreso, Corotu, Acerri*o; Caisá*n, San Antonio, *Bajo Chiriquí* and Santa Clara.[25]

In order to obtain broader impacts of the Adaptation Program and avoid dispersion, when possible, we propose the intervention activities in the 2 selected watersheds to be mainly

[25] Information provided during the work meeting at the Ministry of Environment on December 30, 2015.

oriented to 3 key products of the agricultural area in both parts: rice and coffee production and livestock. The criteria to select these produces include:

- Importance of the item in the agricultural area; in function of the area dedicated to its production;
- Existence of baseline environmental and/or climate information that serves as reference.
- Possibility of identifying co-benefits of mitigation and in other areas, for example, health sector.

The importance and impact of these products due to climate change effects have been particularly identified by the Ministry of Agricultural Development of Panama. This was discussed and submitted during the VII meeting of the Technical Panel on Climate Change of the Central American Agricultural Council (CAC) in September 2015, held in Panama. During this meeting, there were highlighted -as characteristic elements of the national weather condition- the rainfall's decrease in the Pacific side; an increase in the Caribbean side; and the enactment of the Cabinet Resolution to declare an emergency state to deal with the adverse impacts of the El Niño Phenomenon 2015-2016.

The provinces identified as affected by drought are Los Santos, Herrera and Veraguas with the following losses reports, and affected productive activities:

Table 8. Crops affected by droughts

Region	Produce	Loss (B/.)
Los Santos	Rice, corn, squash	30,589.16
	Cattle raising	360,910.05
Herrera	Rice, corn, plantain, coffee, squash, cassava, yams, otoe, cantaloupe, watermelon, and sweet pepper	496,202.44
Veraguas	Mechanized rice	1,566,950.00
	Cattle raising	213,153.00
	Total	2,667,804.59

Table 9. Effects of droughts per activity and zone

ACTIVITY	WEATHER CONDITION	ZONES	EFFECT
Mechanized rice	Drought	Los Santos, Herrera and Veraguas	Decrease in production / pest attack
Corn	Drought	Herrera and Los Santos	Decrease in production / pest attack
Bovine beef cattle	Drought	Los Santos and Veraguas	Decrease in body weight - 30% Animals' death
Goat farming	Drought	Los Santos	Animals' death
Dairy cattle	Drought	Los Santos	Decrease in milk production

Source: Presentation made by the MIDA during the meeting of the Technical Panel on Climate Change of the Central American Agricultural Council (CAC). Panama, September 2015.

Expected impacts of climate change in water resources are listed in the above mentioned 2010-2030 Plan as follows:

- Increased demand for electricity cooling (residential or industrial), given the increase temperature. This can result in a greater need for energy sources to meet the additional demand.
- Increased demand for water for domestic use, because of high temperatures.
- Decreased products agricultural yields, due to the scarcity of rainfall and increased temperatures
- Decrease in Agricultural production yields associated with reduced availability of water for irrigation.
- Over-exploitation of water sources and pollution because of reducing the flow rate (increasing the concentration of pollutants).
- Increased erosion because of the loss of plant and forest coverage, because of the increase temperature and lower rainfall.
- Increased evapotranspiration affecting water regime
- Migration of human groups, species of flora and fauna, due to competition for access to water sources.
- Possible decrease in quality and quantity of water resources, because of the largest and least amount of rain, as indicated by the current climate change scenarios.

The main climate change impacts / concerns perceived by water users at the AP consultation workshops conducted in April 2016 were:

- Lack of water for human consumption (quality/quantity)
- Impacts on agriculture activity and productivity. Major losses
- Vulnerability to disasters and extreme events
- Droughts and floods
- Habitat and species loss because of changes in temperature and rainfall
- Potential displacement and migrations
- New insects, vectors and diseases
- Impacts on national economy, particularly Panama Canal, hydroelectric sector, others.

Project / Programme Objectives

List the main objectives of the project/programme.

The overall objective of this program is to establish climate resilience water management to enhance food and energy security at the national level, through an integrated and community based approach in the Chiriquí Viejo and Santa Maria Watersheds.

Specifically, the program will be addressing the following objectives:

a) Increasing climate change and variability adaptation capacity in agriculture, livestock and energy production sectors.
b) Establishing climate resilient water management instruments with integrated and community based approach.
c) Strengthening local national capacity for monitoring and decision making to reduce and respond to risks associated to climate change
d) Raising awareness and establish a knowledge exchange platform to respond to and to mitigate impacts of climate related events

Project / 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 sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well defined interventions / projects.

Table 10. Project components, activities, expected concrete outputs, and the corresponding budgets.

Project / Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
1. Increase climate change and variability adaptation capacity in agriculture, livestock, and energy production sectors	1.1 Concrete adaptation measures implemented for household water security	Enhanced climate change resilience for improved food, water, and energy security in target watersheds	**US$ 4,326,541**
	1.2 Pilot climate smart farming projects implemented		
	1.3 Pilot diversified financing and income source models implemented in vulnerable population areas		
	1.4 Concrete adaptation measures implemented for sustainable cattle ranching		
	1.5 Enhanced sectorial support through climate financing instruments		
2. Establish climate resilient water management instruments with integrated and community based approach	2.1 Analysis for climate change vulnerability done in prioritized areas at the Chiriqui Viejo and Santa Maria River Watersheds	Improved water governance and natural resources management in prioritized watersheds by mainstreaming climate change data	**US$515,000.00**
	2.2 Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress		
	2.3 Increased hydrological security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security		

Project / Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
3. Strengthened local national capacity for monitoring and decision making to reduce and respond to risks associated to climate change	3.1 Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds	Increased preparedness in target watersheds and reduced risk for disasters among vulnerable communities nationwide	**US$2,801,000**
	3.2 Established an early warning system to identify in advance, the necessary measures in case of hydro-climatic events that could affect food production and power generation	Improved access to data for informed, timely decision-making regarding climate variability risks	
	3.3 The NSCD interfaced and equiped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information		
	3.4 Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts*		
4. Rising awareness and establish a knowledge exchange platform to respond to, and to mitigate impacts of climate change related events	4.1 Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures	Improved institutional capacity, knowledge management, and awareness on climate change adaptation	**US$754,870**
	4.2 Strengthened professional capacities for the climate data analysis and processing, for different sectors involved		

Project / Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
	4.3 Strengthened professional capacities on water resources management by incorporating climate change adaptation approach		
	4.4 Systematized and disseminated experiences on climate changes adaptation, nationwide		
	4.5 Portal for Climate Change Adaptation in Panama, implemented		
Total Direct Costs			8,397,411
Project/Programme Execution cost (9.5 per cent)			797,754
Total Project/Programme Cost			9,195,165
Project/Programme Cycle Management Fee charged by the Implementing Entity (8.4%)			772,394
Amount of Financing Requested			9,967,559

Projected Calendar

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

Table 11. Milestones for the proposed program

Milestones	Expected Dates
Start of Project/Programme Implementation	First semester 2017 (May 2017, tbc)
Mid-term Review (if planned)	Nov 2018 (e)
Project/Programme Closing	May 2020 (e)
Terminal Evaluation	Ago 2020 (e)

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Project / programme components

Describe the project / 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.

A1. Programme components

1. **INCREASE CLIMATE CHANGE AND VARIABILITY ADAPTATION CAPACITY IN AGRICULTURE, LIVESTOCK, AND ENERGY PRODUCTION SECTORS**

Expected outcome:
Enhanced sectorial support through climate financing instrumentsEnhanced climate change resilience for improved food, water, and energy security in target watersheds

Expected Concrete outputs:
1.1 Concrete adaptation measures implemented for household water security
1.2 Pilot climate smart farming projects implemented
1.3 Pilot diversified financing and income source models implemented in vulnerable population areas
1.4 Concrete adaptation measures implemented for sustainable cattle ranching
1.5 Enhanced sectorial support through climate financing instruments

2. **ESTABLISH CLIMATE RESILIENT WATER MANAGEMENT INSTRUMENTS WITH INTEGRATED AND COMMUNITY BASED APPROACH**

Expected outcome:
Improved water governance and natural resources management in prioritized watersheds by mainstreaming climate change data

Expected concrete outputs:
2.1 Analysis for climate change vulnerability done in prioritized areas at the Chiriqui Viejo and Santa Maria River Watersheds

2.2 Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress

2.3 Increased hydrological security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security

3. STRENGTHENED LOCAL NATIONAL CAPACITY FOR MONITORING AND DECISION MAKING TO REDUCE AND RESPOND TO RISKS ASSOCIATED TO CLIMATE CHANGE

Expected outcomes:

Increased preparedness in target watersheds and reduced risk for disasters among vulnerable communities nationwide

Improved access to data for informed, timely decision-making regarding climate variability risks

Expected concrete outputs:

3.1 Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds

3.2 Established an early warning system to identify in advance, the necessary measures in case of hydro-climatic events that could affect food production and power generation

3.3 The NSCD interfaced and equipped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information

3.4 Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts*

4. RISING AWARENESS AND ESTABLISH A KNOWLEDGE EXCHANGE PLATFORM TO RESPOND TO, AND TO MITIGATE IMPACTS OF CLIMATE CHANGE RELATED EVENTS

Expected outcome:

Improved institutional capacity, knowledge management, and awareness on climate change adaptation

Expected concrete outputs:

4.1 Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures
4.2 Strengthened professional capacities for the climate data analysis and processing, for different sectors involved
4.3 Strengthened professional capacities on water resources management by incorporating climate change adaptation approach
4.4 Systematized and disseminated experiences on climate changes adaptation, nationwide
4.5 Portal for Climate Change Adaptation in Panama, implemented

Description of how these activities contribute to climate resilience and connections among the different components

THE AP is inspired by the nexus approach as described by FAO in the document "The Water-Energy-Food Nexus A new approach in support of food security and sustainable agriculture" (Rome 2014). General concept: As demand grows, there is increasing competition for resources between water, energy, agriculture, fisheries, livestock, forestry, mining, transport and other sectors with unpredictable impacts for livelihoods and the environment (FAO 2011c). Large-scale water infrastructure projects, for instance, may have synergetic impacts, producing hydropower and providing water storage for irrigation and urban uses. However, this might happen at the expense of downstream agro-ecological systems and with social implications, such as resettlements. Similarly, growing bioenergy crops in an irrigated agriculture scheme may help improve energy supply and generate employment opportunities, but it may also result in increased competition for land and water resources with impacts on local food security. In this context, the Water-Energy-Food Nexus has emerged as a useful concept to describe and address the complex and interrelated nature of our global resource systems, on which we depend to achieve different social, economic and environmental goals. In practical terms, it presents a conceptual approach to better understand and systematically analyse the interactions between the natural environment and human activities, and to work towards a more coordinated management and use of natural resources across sectors and scales. This can help us to identify and manage trade-offs and to build synergies through our responses, allowing for more integrated and cost-effective planning, decision-making, implementation, monitoring and evaluation.

As indicated in the text above, the current AP envisions to promote a more coordinated management across sectors and scales, by presenting a suite of interconnected climate change related outputs and activities, engaging operatively entities that have traditionally worked in a sectorial pattern, for ex. Min of Environment and MIDA. The scale of the intervention is also enlighten by the nexus concept, by promoting results at different scales; at the very local level (for ex. Output 3.2, 2.3a, 1.1) and in parallel to nationwide products (for ex. 3.1, 2.2, 2.3b).

This approach is also consistent with the 2030 Agenda for sustainable development (SDGs), which explicitly promotes an integrated approach opposed to the traditional silo and sectorial approach

An operative practice to make visible or emphasize the nexus approach is to establish in the ToRs of each output the need to clearly indicate the extent to which the output contributes to improvements in the other dimensions of the nexus. For ex. Output 1.4 related to agrosilvopastoral which belongs to the food security arena, is to provide results/interaction in climate change adaptation results (evidenced by cattle management best practices fo face drought; water (decreasing water footprint of the cattle production by increasing efficiency in the use of the resource); in the energy arena, promotion of use of biodigesters to produce biofertilizer and biogas rich in methane, as a renewable energy source from cattle manure to evidence energy efficiency and reduce methane emissions.

An integrated approach to climate change adaptation through enhancing water management is the heart of the proposed intervention. The purpose of using the water-food-energy-climate nexus is precisely to facilitate the transition to an integrated or systemic approach. The project solely will not install this change, but will serve as a catalyst to move public institutions and water users towards this road.

These sectors have been managed separately, with different visions and a complete exclusion of the climate change dimension, whose mainstreaming is a new task and approach in Panama. This AP looks forward to establishing this new dynamic. The programme is conceived as a holistic process, tackling different streams of the adaptation action as described in the literature. The thinking behind is based in the following premises that jointly define the connections among components:

The Programme addresses Panamá´s main issue considering the climate change adaptation agenda: water management. Using water as an entry point, we aim to influence land use (through best practices based in non-regret adaptation measures model, reason why the Programme has privileged the EBA route, rather than adaptation through gray infrastructure) and energy sector (providing technical products to orient decision making process related to granting water concessions for hydro energy development, which is the basis of unsolved conflicts among users). This rationale provides the connections between components 1 and 2.

The lack of climate data has been repeatedly listed as one of the weaknesses of Panamas institutional architecture regarding climate change action. The existence of technological platforms such as SERVIR developed by CATHALAC, a network of hydrometeorology stations managed by ETESA, climate data generated by research institutions such as Smithsonian Tropical Research Institute located in Panama, among others, has not provided the national framework and operative linkages to transform data into useful, coherent, permanent, validated and timely information for decision making processes, for public and individual purposes. By completing the stations network supporting ETESA`s planning and including the correspondent connection-node with the MIDA, the AP aims

to tackle this issue and initiate a climate driven process, different to the existent one, which is designed mainly to serve the energy sector. Consequently, component 3 represents a major challenge, which goes far behind from acquiring and installing stations, but creating capacities and nexus within and outside ETESA-MIDA and other institutions, organizations and end users, to actually use the data as an information resource for other sectors, particularly the agriculture sector. Based on this, component 3 is closely related to the productive actions that will be implemented in component 1. Synergies will not occur naturally, and that they will have to be somehow pushed or systematically driven by Fundación Natura as program leader. Connection between components 3 and 1 is key to prove that a policy and operative dialogue between Ministry of Environment, MIDA and ETESA is possible and necessary.

The different projects, even those based in implementing in the ground activities, must generate knowledge products in addition to the "technical reports". For example, activity 1.1 related to water harvesting systems will generate a technical document (manual or guideline) describing the techniques, alternatives, conditions and other technical requirements, that could be used to replicate the experience. The purpose of generating technical documents based in the experience, is a strategy to facilitate knowledge sharing during and after the AP implementation. Fundacion Natura is responsible for including the generation of these knowledge products as a requirement in the correspondent TORs. This requirement provides connection with component 4, in the way that all components will be producing information that will serve as material for the adaptation knowledge sharing process. This is a new process in the country and adaptive learning to design and operate the knowledge platform and communications strategy is part of the implementation challenges of this AP. Based on this, connections among components 1, 2 and 3 with component 4 are strong and evident.

The AP has been designed by Fundacion Natura in close interaction with MIDA (representing the food security dimension); ETESA (representing the energy dimension) and the Ministry of Environment (representing the water and climate dimension of the nexus). The rationale is that in addition to the complementarities among components, there is no dependence among them. The reason is to secure implementation of the components during programme life cycle. Previous experience in designing and implementing complex projects in Panama, suggests that delays due to institutional changes is a potential risk (as identified in the risk analysis). Creating dependence among components and activities maximizes the risk of under execution, principally if considering that culture of inter-institutional "operative" coordination among these sectors is incipient, although traditionally included in the speech.

Following a detailed description of each component and its activities.

Component 1. Increase climate change and variability adaptation capacity in agriculture, livestock, and energy production sectors

Table 12. Description of component 1

Project / Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
1. Increase climate change and variability adaptation capacity in agriculture, livestock, and energy production sectors	1.1 Concrete adaptation measures implemented for household water security 1.2 Pilot climate smart farming projects implemented 1.3 Pilot diversified financing and income source models implemented in vulnerable population areas 1.4 Concrete adaptation measures implemented for sustainable cattle ranching 1.5 Enhanced sectorial support through climate financing instruments	Enhanced climate change resilience for improved food, water, and energy security in target watersheds	**US$ 4,326,541**

Expected concrete outputs

1.1 Concrete adaptation measures implemented for household water security, Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems

Climate change threat:
Altered seasonal patterns of precipitation, worsening seasonal water scarcity for multiple uses.

Technical specifications of the solution:
Install at least 50 water harvest systems, in situ and ex situ, 25 in each watershed (SMRW and CHVRW); train beneficiaries on the installation, use, and its maintenance. To do this, a diagnostic will be conducted for systems design, and based on a rapid needs assessment it will be defined the location and specific technical solution for each site. Particular attention will be given to communities that have experienced severe and recurrent droughts at the CHVRW and SMRW, which are facing significant rainfall variability scenarios (according to MIDA´s data base of loss and damages. In addition, the systems will be installed and beneficiaries trained. A technical document (knowledge product) with guidelines to replicate this technology at national level will be produced.

For in situ WHS, these will be preferably established (depending on the initial assessment) for orchards and crops at CHVRW, using soil conservation measures, mainly terracing-contour agriculture, which is a traditional practice, particularly in this area. The technique is called “microcaptación”: it consists of dividing the cropping areas in parts; one with crops and other without crops (runoff in areas without crops is deposited in the adjacent planted areas –where it infiltrates and plant roots can absorb it). During public consultations, main concerns were risen by the communities over the misunderstanding that this solution implied construction of dams or related infrastructures; which is not the case –and the concern was solved.

For ex-situ WHS, this will be established (again, depending on the initial assessment) for domestic use, storing water from rooftops in cisterns, particularly in the SMRW. At least 5 of the 25 systems will be established at community places, such as schools. The water harvested through these systems will be used for sanitation purposes, irrigation of yard orchards, and where possible, for human consumption. In the case of human consumption, a basic membranes filtration system (for physical treatment-such as slow sand filtration) and chlorination/boiling methods will be used according to the MINSA recommendations for small household basic water treatment.

In both cases, technical solutions will be implemented following the recommendations and specifications of the manual: “Captación y almacenamiento de agua lluvia, opciones técnicas para la agricultura familiar en América Latina y el Caribe” (FAO, 2013). For

RWH systems that will supply water for human consumption, the project will coordinate with Ministry of Health (MINSA) to apply the water safety plans methodology described in the 3d edition of the WHO Guidelines for Drinking Water Quality.

Also, in both cases, beneficiaries will be chosen based on the criteria: a) Inventory of producers per region and location maintained by MIDA; b) MIDAs institutional registry/statistic of loss and damages in production per region of the country -this baseline information is not available online, but it is maintained and updated separately by MIDA regional offices; c) communities located at municipios where district water security plans will be developed (out 2.3 a); and d) according to the approximate volume of rainfall (amount and intensity) available according to recorded data by nearest hydrological station, as well as quality and quantity of water available from other sources; and e) household size and per capita water requirements.

For the installation of the rainwater harvest systems, preference will be given to female headed households. This will require gender disaggregated information which will be obtained through local instances and confronted with statistical information available. Especially participation of women will be encouraged, as the main administrators of household water needs and uses.

This solution will escalate and build on lessons learned by the MiAmbiente and MIDA's SCALL system, which has been implemented to socialize the concept by installing them at schools and health centers, and based on particular requests from beneficiaries, and not as a part of a climate change strategy. Furthermore, it is worth mentioning that this concrete adaptation measure proposed by the program differentiates from SCALL systems in that none of latter was installed at the prioritized CHVRW and SMRW; nor does it include the possibility for RWH for human consumption. Also, the proposed solution where possible, will establish an adaptation measure suitable to make more than one use of the harvested water (an example would be to use water from dishwashing to irrigate yard orchards), depending on the characteristics of each particular system and site.

Clear link between the climate change threat and the solution:
In view of seasonal water scarcity and more variable rainfall patterns (in intensity and frequency), the solution will bring an adaptation measure to the household level, by taking advantage of volumes of water available during rain events, to be used rationally for human consumption, household uses, and crops irrigation. The experience of these pilots will be documented, and replication in other areas of the country will be encouraged at the institutional level.

Measures to mitigate environmental risks:
For microcaptación systems, there is a risk of harming crops due to excessive water contained by the barrier of the terrace during extreme rainfall, as well as the risk for excessive run-off and subsequent erosion or excessive saturation -waterlogging. The design of the adaptation solution will follow the guidelines on the specific range of slops, crops distribution/combination, terrace sizes and construction; to minimize possible soil

loss, reduce the impact of run-off during high-intensity rainfalls and ensure maximum benefit for increasing crops yield. Soil tests will also be conducted to ensure the quality and physical characteristics are suitable to the solution. Where necessary, additional measures will be put in place to enhance soils with low permeability (for example, by adding organic material and loosening earth).

For combined household systems, filters and cisterns will require maintenance to prevent contamination. During the training that will be part of the solution implementation, a detailed instruction with calendars will be transferred to beneficiaries. Coordination will be made for the MINSA technicians to verify on a semester basis the condition of the RWS. To ensure quality of the system, the RWH system will include a valve to prevent the first rainfall of a period to be stored, allowing it to wash the rooftop. As part of the design of each system, proper quality of the rooftop (in terms of condition and the type of material it is made up) will be assessed to comply with the structure required. Water quality tests for treated water will be part of the installation process, and thorough training in the treatment process will be ensured to beneficiaries.

Additional description and context for the activity:
Water security is the population's capacity to safeguard (1) the sustainable access to sufficient amounts of water of adequate quality for life support, the human well-being and (2) the socio-economic development, for (3) guaranteeing protection from contamination transmitted by water and disasters related to water, and (4) for the ecosystems' conservation (5) in a peaceful and politically stable environment (UN-Water, 2013).

As a mean to contribute to water security, the Programme includes the installation of at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW).
Train beneficiaries on the installation, use, and maintenance of water harvest systems.
To do this, programme activities include:

a) Conducting a diagnostic for system design. A rapid needs assessment will be conducted to define the location and specific technical solution for each site. During the assessment, particular attention will be given to the areas in SMRW located in the Arco Seco region, which are facing significant water scarcity scenarios.
b) Install water harvest systems and train beneficiaries, based in the rainwater harvesting integrated approach, as explained below.
c) Monitoring and maintenance.
d) Elaboration of a technical document (knowledge product) with guidelines to replicate this technology at national level

Training process and dissemination of the technical document will be conducted in coordination with the correspondent municipalities, to facilitate long-term sustainability and replication at the district level.

In the context of this output activities, the Programme will promote reflection among participants regarding new storage and conveyance of water. Through this activity, there

shall be a link between this Adaptation Program and the process of the National Plan for Water Security for 2030 that the National Government is developing. The link shall take place through showing how the water harvesting projects, known as adaptation measures, directly contribute to the water security purpose at family and farm level.

The programme will include both in situ and ex situ water harvesting techniques. In situ to increase the amount of rainfall stored in the soil by trapping and storing it in the desired location, using soil conservation measures, mainly terracing, which is a traditional practice, particularly in the Chiriqui Viejo area. Ex situ water harvesting will be developed as well, storing water in natural and artificial reservoirs, particularly in the SMRW, which are facing dramatic water scarcity scenarios due to the ENSO oscillation.

This activity will build upon previous recent experiences promoted by the Panamanian Government, particularly the SCALL initiative. This concept is being also promoted by MIDA, particularly oriented to those producers with no access to irrigation systems in Chiriqui Province and Arco Seco.

The climate change additionality /innovation through the Adaptation Programme is given through the **integrated approach** that will orient this activity:

- ✓ Promoting the concept of rainwater multi-purpose utilization
- ✓ Making visible the associated services to rainwater utilization as income generating activity
- ✓ The RWH is much more than the system installation, it includes:
    - Knowledge transfer (income generating activities that could be linked to rainwater harvesting, emphasizing women participation)
    - Raise awareness about rainwater environmental services: energy production, aquifer recharge, food security
    - Potential for Flooding & draught prevention

Specific aspects/details of the solution:
The solution design includes:

- Magnitude/scope: 50 water harvest systems installed and operating (25 in each watershed)
- Location: In CHVRW: Plaza de Caisan and other areas of. In SMRW: Upper section: multipurpose reservoirs for domestic and production. In the middle section with cisterns for domestic use and in the lower section and urban areas for small commercial activities and agriculture.
- Beneficiaries: A number of beneficiaries will be located in the districts where the water security plans will be developed; Commitment to participate in water source conservation initiatives implemented by the project to foster an EBA approach; Socio economic vulnerability (confirmed with Conditional Cash Transfers CCT programme)
- Targets: Promote water harvesting for domestic and commercial uses. The project includes harvesting for human consumption (exceeding the current SCALL

programme which is limited to a one-time domestic purpose before it is being discharged. The project also envisions to enhance RWH use in small commercial income generating activities such as car wash, replicating the experience of a cooperative located in the SMRW.

- Technical specifications: The suggested approach to improving and maintaining the quality of water delivered in the RWH is not to impose a set standard, but rather to insist on adequate measures of sanitary protection, systematic monitoring and treatment. Technical solutions include both alternatives: cisterns with filters for human consumption and domestic use; and reservoirs with geo-membranas for productive use
- The project will coordinate with Ministry of Health (MINSA) and WHO to apply the water safety plans methodology described in the 3d edition of the WHO Guidelines for Drinking Water Quality.
- Technical standards applied by the SCALL will be observed.

Highlights of the consultation process:

A significant number of participants declared that they were not familiar with these systems, particularly in CHVRW. Some were confused with major reservoirs similar to the hydro dams.

Beneficiaries should be participating in the conservation efforts to consolidate results and should meet socio economic and climate vulnerability conditions

Preference should be given to women regarding training for installation and maintenance

Important fact:

Even though RWH has a long history and has been used by many ancient civilizations, this practice is not widely spread in Panama. An evidence of this situation is that Min. of Environment-CATHALAC and MIDA water harvesting programmes were launched recently in 2009-2010 and 2015, respectively. No more than 40 systems have been installed.

(http://laestrella.com.pa/economia/productores-ponen-esperanzas-cosecha-agua/23888753)

Output Summary:

Table 13. Summary of output 1.1

Adaptation measure	Water harvesting systems at household level
Definition	Water harvesting refers to redirection of rainwater and storm water runoff, and storage for productive use (agriculture, drinking water and more). Harvesting rain is a practice that has been around for centuries to support agriculture and cope with seasonal water availability. When water supply becomes limited, practical solutions can fill the gap. Rainwater harvesting systems provide distributed storm water runoff containment, while simultaneously storing water that can be used for irrigation, flushing toilets, washing clothes, washing cars, pressure washing, or it can be purified for use as everyday drinking water.
Scope:	Local, replicable at the national level
Adaptation benefits	These systems will contribute to **increase food security and resilience to drought**, as well as to reduce the need for irrigation water and energy use for water transport.

	Location and technical characteristics to be defined based upon current climate change available data from Hidromet.
Technical solution	In situ water harvesting systems, particularly in CHVRW Ex situ water harvesting systems, particularly in SMRW
Adaptation plus	Will enable linkage between adaptation action and the Water Security National Plan

Additional adaptation reasoning:

Table 14. Additional adaptation reasoning for output 1.1

Type of measure	CC risk or impact identified	Expected result on the ground	Difference with business as usual water management or agricultural best practices
Water harvesting systems widely accepted in climate change literature as adaptation measure	Altered seasonal patterns of precipitation and run-of; unsustainable water consumption; severe water scarcity situation for human consumption and production	Improved water access for households (using quantity and quality indicators). Increased water supplies to meet demand	Linkage with participation in VIA analysis, district water plans, water sources conservation projects and restoration of hydrological cycle in prioritized areas. The project will promote reflection among participants regarding new storage and conveyance of water

1.2 PILOT CLIMATE SMART FARMING PROJECTS IMPLEMENTED

This output promotes good practices for climate-smart agricultural production in the CHVRW, to increase communities' resiliency and adaptive capacity through the climate management of the water, through forest conservation/agroforestry management (1.2.a) and climate resilient irrigation systems (1.2b).

The proposed adaptation activities include conservation and management actions. Conservation actions proposed meet the ecosystem based adaptation approach.

1.2.a Establish riparian reforestation and agroforestry projects with coffee and soil conservation systems at the Caisan river (CHVRW). (*Riparian buffer reforestation and coffee agroforestry)*

RIPARIAN BUFFER REFORESTATION:

Climate change threat:

Altered seasonal patterns of precipitation and run-off, worsening the erosion and sedimentation. With gallery forests, this solution will help restore the river flow by infliltration from trees, in addition to prevent soil loss near the river banks and reduce sedimentation.

Technical specifications of the solution:

Establish 6000 lineal meters of riparian reforestation at Caisan river sub watershed as soil conservation measure. This activity will be conducted in the Middle and lower section

of the subwatershed, particularly the community of Guabito, where the riparian buffers that were useful to conserve and protect from soil erosion have been eliminated and as a result the main tributary and some secondary have burst its banks, destroying some roads. As a consequence, riparian buffers are narrow or inexistent, where the pastures have reached the river banks because of the advance of livestock. Remaining forests cover 3236.4 hectares, accounting for 49.6% of the total area of the basin of the river Caisán. Stubbles cover 1910.1 hectares, accounting for 29.3% of the surface.

Considering the regulations of the Forestry Law, the establishment of the riparian buffers will take into account the width of the channel and at each side a line of forest equal or greater to the channel width will be established, which in any case will be less than 10 meters and a zone of up to 100 meters from the banks of the lakes or natural reservoirs. Among the species that will be used to establish the gallery forests are:

- ✓ arborescents ferns and Cyathea genus Alsophila the espavé (wild cashew), laurel (Cordia alliodora), balsa (Ochroma pyramidale), cedar (Cedrela odorata) and fruit such as mango (Mangifera indica).
- ✓ Similarly, we also find these species in the area: Cordia alliodora, Cecropia peltata, Croton lechleri, Acalypha diversifolia, American Diphysa, Erythrina berteroana, Psidium guajava and Pithecellobiun, being on the branches of these trees many epiphytes, all they considered as listed vulnerable species and Appendix II of CITES.

Procedures:

- ✓ Development of community nurseries for the production of seedlings. These plants must have an acceptable agronomic state at the time of planting in the field. Bags will be used to facilitate the transportation
- ✓ The seeds or vegetative material is obtained from the site, running the necessary germination tests
- ✓ Perform soil analysis for conditions of soil
- ✓ The hole digging field will be about 30 cm deep and wide allowing to mix the compost (2.5 lbs / seedling) before entering the camp.
- ✓ The planting design will be “a tres bolillos” allowing greater and faster soil cover thus helping to prevent contamination by erosion.
- ✓ The planted trees will be protected by fences, to avoid damages caused by animals
- ✓ The distance will depend on the site, but a pattern of 3x3m or 4x4m, considering as the minimum the width of the forest line stated by the forestry law.
- ✓ Maintenance of established trees for two years.

Clear link between the climate change threat and the solution:

New plantations will prevent soil loss caused by erosion, and will help regulate hydrological flows, in the event of unpredictable and more intense rain events.

Measures to mitigate environmental risks:

To prevent causing alteration to natural distribution of forest systems, only native species will be used for this type of reforestation. Also, to minimize the loss of fertile soil by erosion, sedimentation, and low plants survival rate, special measures will be ensured in terms of spatial arrangement of the reforested species.

In addition, to prevent contamination of the water course, organic fertilization of plants will be used instead of chemical fertizers.

COFFEE- AGROFORESTRY

Climate change threat:
Altered temperature and precipitation patterns producing: new vectors and diseases (i.e. broca del café and fungies); new wind patterns affecting negatively coffee flowers; and changing cultivation calendar and the plantations cycle.

Technical specifications of the solution
Establish agroforestry systems to optimize production in 20 coffee farms at Renacimiento, of up to 2 hectares each. These systems will include:

- ✓ Facilitate access to new seeds /varieties resistant to climate changes and develop at least 2 demonstration plots within farms in the District of Renacimiento. This will be conducted in close coordination with the Institute for Research in Agriculture (IDIAP for its initials in Spanish).
- ✓ Training in innovative techniques for pest control, especially fungi that are not intensive in the use of agrochemicals.
- ✓ Coffee production with economic and environmental conservation benefits (connectivity and habitat creation) and design that includes trees that protect from the wind and protection of shade coffee, for example guabo and plantain.

Final arrangement of the shaded coffee farms will follow the Guia para la Caficultura Ecológica methodology and the technical standards defined by CATIE (regional specialized knowledge center), which is in line with MIDA´s strategy for caficulture. For instance, some of the aspects to be considered for each case -depending on the final features of the farms- will include the arrangement of the plants inside the coffee plantation (density and distance between each plant and the associated shade specie), the variety of the coffee and associated species to be planted, the process for seedlings production (if not buyed), the actual plantation, and maintenance (replacement of dead seedlings, fertilization, pest control, pruning, etc.).

The agroforestry scheme will include:

- ✓ Facilitate access to new seeds /varieties resistant to climate changes and develop at least 2 demonstration plots within farms in the District of Renacimiento. This will be conducted in close coordination with work directly with the Institute for Research in Agriculture (IDIAP for its initials in Spanish),
- ✓ Training in innovative techniques for pest control, especially fungi, that are not intensive in the use of agrochemicals
- ✓ Coffee production with economic and environmental conservation benefits (connectivity and habitat creation) and design that includes trees that protect from the wind and protection of shade coffee, for example.

Clear link between the climate change threat and the solution:
These agroforestry plantations will make the coffee producers more resilient through improved pest management and natural defense to winds (barreras rompeviento) and rainfall.

Measures to mitigate environmental risks:
To prevent alteration of local ecosystem (by means of introducing exotic plant species), only species (coffee and shade) environmentally suitable for the site will be used for this type of climate change adaptation solution. The species to be used will be approved by MIDA and IDIAP technical specialists. Also, to minimize the loss of fertile soil by erosion, sedimentation, and to increase plants survival rate, special measures will be ensured in terms of spatial arrangement and combination of the reforested species.

In addition, to prevent contamination of soil and water courses, organic fertilization of plants will be used instead of chemical fertilizers (which will be used only when other organic alternatives prove insufficient or ineffective. These agroforestry plantations will make the coffee producers more resilient through improved pest management and high temperatures.

Highlights of the consultation process:
Impacts on Coffee production were emphatically expressed as a major issue across the high lands of the watershed, due to changes in temperature, strong winds and rainfall), changing the planting calendar, particularly in the area of Rìo Sereno. The other coffee production area (Boquete) reported emergence of new pests, causing new diseases, emphasizing the effects caused by fungi.

Other aspects of the technical solution:
- ✓ Magnitude/scope: 6000 lineal meters of reforestation of riparian buffers in the Caisan River and Agroforestry systems;
- ✓ Location: District of Renacimiento: Communities of Caisan, Rìo Sereno, Montelirio, Candela y Santa Clara, which are also buffer zones of the Parque International La Amistad.)
- ✓ Beneficiaries: Small-medium landholders. Willingness to participate in replication activities; Long term legal commitment through farm management plan formalization
- ✓ Target: Strategic areas of the upper watershed in restoration process

These adaptation measures include revegetation with agroforestry and restoration of riparian buffers zones. The protocols will contain: types of species and their characteristics, ecological, planting density (number of units or species by arrangement), planting methods (spatial distribution) maintenance activities, and measures to verify the effectiveness of restoration activities and adaptation benefits to farm owners. Restoration

activities include installing fencing and planting pioneer species to promote natural regeneration.

The strategic areas and farms will be selected according to their contribution to water regulation process, MIDA´s database, information of the Conservation Area Plan and other relevant sources. They could include secondary vegetation located on the edges of water bodies (vegetation), areas adjacent to springs or recharge areas, and surrounding areas. Restoration areas will be selected using predefined criteria (for example, the slope, the presence of springs or woody vegetation in surrounding areas, and owners' willingness to participate) in coordination with the project team, regional and local environmental authorities, and owners.

Verification means will include: (i) maps restored / consolidated areas and field reports; (Ii) reports on the change in coverage and quality restored system; (Iii) restoration agreements signed. The project also includes Monitoring and evaluation system to monitor the effects of adaptation measures in the water cycle. The design of the M&E system includes selection of control areas without adaptation measures. This component will require close coordination with component 3 to obtain relevant climate information. Due to the inherent variability of the hydrological process, effects and adaptation measures may not be measurable during the project cycle.

Output Summary:

Table 15. Output summary for 1.2.a

Adaptation measure	**Protective plantations / Riparian buffers and agroforestry**
Definition	Forest conservation, reforestation and agroforestry management are widely accepted as ecosystem based adaptation measures.
Scope:	Local: Caisan River Sub-watershed in CVRW
Criteria for selection:	Caisan River is 21.5kms long and it is a tributary of the Chiriqui Viejo river in the middle section. The advance of the agriculture and cattle ranching sector at the watershed and sub-watershed level have significantly altered the forest coverage, reducing it to fragments of forest connected by riparian buffers and live fences. In addition, the CHVRW is under intense pressure from the hydropower sector, with 13 hydro projects approved (Public Services Authority, 2014) and 24 future projects under revision. Caisan River sub watershed is threatened by 2 concessions for hydropower generation already in progress. Residents of the Caisan River sub watershed fear that the river will suffer the same irreversible situation affecting the Chiriqui Viejo River, leaving them unprotected and losing their livelihoods, since the Caisan river is their main water source for production. During the dry season most communities face water supply scarcity, having to use pump wells. These water concessions, both at the watershed and sub watershed level, have been granted without considering the climate change variability, since no climatic data is being generated or analyzed; conflicts among water users are not considered either. This sub-watershed is a clear example of a non-coherent water management model, in complete absence of climate change considerations and community vulnerability. To mitigate this scenario, the Ecological Trust Fund of Panama supported the development of a Conservation Area Planning process in 2014, with a participatory

	approach. This CAP is being partially implemented, due to lack of financial resources to implement at the scale needed. In addition to the climate buffering result of the forest conservation and agroforestry, this project will also serve as a mechanism to demonstrate alternatives to improve the extensive cattle ranching model "potrero" that is currently in place.
Adaptation and climate benefits and co-benefits	These systems will contribute to both water management and climate regulation purposes, including drought mitigation. In terms of water management, these systems will contribute to riverine flood and erosion control. Other co-benefits include alternative livelihood possibilities derived from the agroforestry; carbon sequestration, among others.
Technical solution	Plantation and agroforestry management including native and commercial species, emphasizing coffee plantations, including coordination with Institute of Agriculture Research (IDIAP) to facilitate access to new climate tolerant resistant varieties. In addition to the establishment of the new plantations, a sub product will be a recommendation about optimized planting dates, particularly for coffee production.
Adaptation knowledge plus	New protocol/data to measure impact in carbon sequestration and income generation in the long term

Adaptation reasoning:

Table 16. Adaptation reasoning for output 1.2.a

Type of measure	CC risk or impact identified	Expected result on the ground	Difference with business as usual water management or agricultural best practices
Riparian buffers listed as green infrastructure solution and ecosystem based adaptation measure for water management. (Green infrastructure guide for water management. UNEP-IUCN-TNC**. 2014**	Altered seasonal patterns of precipitation and run-off;	Erosion and flood control; water purification and biological control; biodiversity benefits; aesthetic and recreation values to communities engaged in the project; contribution to stabilization of stream flow and water temperature.	EBA approach is not explicitly included in agriculture best practices projects currently conducted in both watersheds

EBA approach:

Forest conservation and protection of water sources are accepted EBA measures, as defined by IUCN.

Table 17. EBA approach as defined by UICN

	Management practices
Climate-buffering	
Diversification	Crop diversification, intercropping and crop rotation within fields; landscape diversification; multiple sowing dates
Moisture conservation	Nurse crops or trees as shade; early spring harrowing to prevent capillary rise and evaporation
Groundwater regulation	Forest or tree protection; protection of water sources
Flood control	Planting and protection of trees in wetlands to regulate water levels and thus protect nearby fields from flooding.

Ecosystem-based practices that increase resilience to climate change and other disturbances
Ecosystem-based Adaptation. A natural response to climate change. IUCN 2009

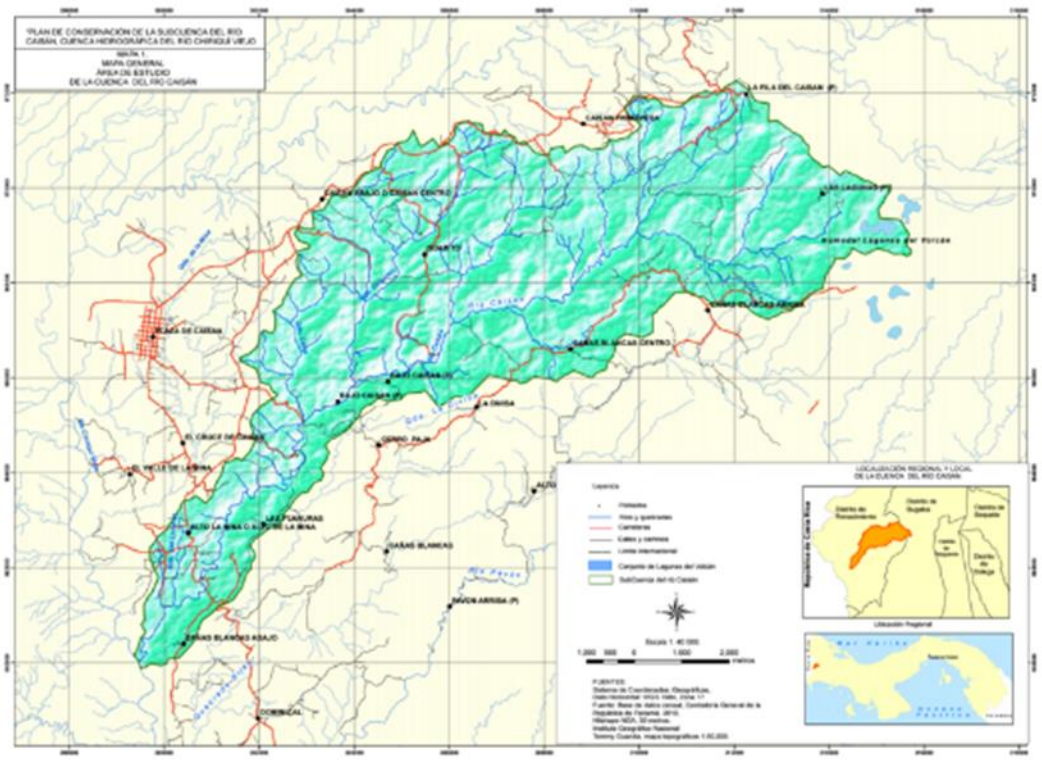
Important fact:

The Caisan River subwatershed encompasses 14 communities in 2 “corregimientos” (10 in Corregimiento Plaza Caisan with 2901 inhabitants and 4 in Corregimiento Dominical with 998 inhabitants, accordingly to data of the Statistics Institute, 2010). Communities directly related to the Caisan River subwatershed are: Caisan Primavera, Caisan Centro Plaza, Plaza Caisàn y Alto La Mina, Caña Blanca Arriba, Caña Blanca Centro y Caña Blanca Abajo. The area of the subwatershed is 6,527.9 ha. In the upper part of the subwatershed the main activities are livestock for milk and meat and in the middle and lower parts are mainly dedicated to small scale agriculture. See map 9 below.

Direct beneficiaries: Small farm owners located in the riparian area of the Caisan River. Selection process pre-conducted for the Conservation Area Plan process. Fideco 2015. This subwatershed encompasses 14 communities in 2 corregimientos (10 in Plaza Caisàn with 2901 inhabitants and 4 in Dominical with 998 inhabitants, accordingly to data of the Statistics Institute, 2010). Communities directly related to the Caisan River subwatershed are: Caisan Primavera, Caisan Centro Plaza, Plaza Caisàn y Alto La Mina, Caña Blanca Arriba, Caña Blanca Centro y Caña Blanca Abajo.

Ecological viability of the Caisan River Sub Watershed calculated using MIRADI software resulted in condition “regular”. The forests as conservation objects were ranked in a “poor” situation (0-15%). By way of this Programme conservation activities will be conducted, generating evidence about the importance/pertinence of the Ecosystem Based Adaptation Approach. Raising awareness about the EBA approach among the farm owners participating in the forest project is a direct benefit of this output.

Map 9. Specific site for implementation



1.2.b Establish 150 hectares of climate resilient irrigation systems, with efficient and low cost technologies, to enhance agricultural production and increase crops yields

Climate change threat:

Altered seasonal patterns of precipitation, worsening seasonal water scarcity for multiple uses. Main climate threat at Divalá is drought associated to El Niño, severely impacting rice production –which is the main crop at this region. Main climate threat at Cerro Punta is landslides during rainy season (May through November) and water scarcity during the dry season (December through April).

Technical specifications of the solution:
Low cost and efficient irrigation systems for small scale farmers as direct beneficiaries installing rice irrigation systems for 5 hectares' farms, at Cerro Punta and Divalá communities, using drip irrigation and micro sprinkler with solar energy (this solution was validated with local farmers and MIDA technical staff).

At Divalá, irrigation system will be complemented with a water footprint analysis of the rice production. The purpose of this activity is to allow identification of technological packages for climate-smart rice production, such as the Rice Grow Intensive System (RGIS- SICA for its initials in Spanish: Sistema Intensificado de Cultivo del Arroz). The SICA System is a proven innovation in more than 50 countries; practiced by 9.5 million producers in over 3.4 million hectares (SRI-Rice, 2014). Instead of a predetermined technological package SICA is performed with flexible practices, but fundamentally based on four principles: a) early Transplant healthy seedlings 8-12 days old; b) Reduction of competition among seedlings (through low seeding: separated by a minimum of 25 cm seedlings); c) Reduced water: Application favoring soil aeration (alternating wet with dry soil, without maintaining the flooded land); d) Adding organic matter to improve soil texture and nourish the crop (application of manure, cover crops, etc.).[26]

Clear link between the climate change threat and the solution:
Main climate threat at Cerro Punta is landslides during rainy season (May through November) and water scarcity during the dry season (December through April). Because of changing rainfall patterns, water availability during this period is becoming more severe to sustain the current hortalizas production. Low cost irrigation system will be designed to address this particular climate change threat. Main areas to install irrigation systems will be the communities of Alto Pineda, Alto Bambito and Alto Tribaldos.

At Divalá, irrigation system will help mitigate water scarcity by rainfall irregularities. Responsive measure: irrigation supply. Complemented by considerations regarding recommendations for shorter cultivation cycle and drought contingency planning. In addition, this system has shown positive results in respect of water reduction with co-benefits in terms of health.

Measures to mitigate environmental risks:
To prevent alteration of local ecosystem (by means of introducing exotic plant species), only species (rice) environmentally suitable for the site will be used for this type of climate change adaptation solution. The species to be used will be coordinated among farmers, MIDA and IDIAP technical specialists. There is a potential risk of leaching of chemical components (if harmful agrochemicals are used). This project will avoid use of synthetic compounds for fertilization and pest management.

Context additional information relevant for the technical solution:

[26] IICA, FONTAGRO, CONIAF. Fact sheet

The need of irrigation systems is identified in the CHVRW Management Plan. It corresponds to Project No. 18 of the Management Plan **"improvement of the agricultural production through irrigation systems**". The purpose of this project is to increase the agricultural production using efficient and low cost irrigation technologies.

This activity was widely discussed during the consultation workshop. In the case of CHVRW the participants expressed the urgent need for the installation of climate proof irrigation systems to support production. There is not an operative one in the present. For the whole watershed, only 3 public systems are under development: Cerro Punta, Bambito (the water concession is pending) (R. Sereno (will be operative in January 2017) and the Project under study for the area of Montelirio (using water from the Brusca River for horticulture). Existent systems are private investment in the upper section, without any consideration of responsibility with the water source. They expressed serious concern about the installation of systems without information about the situation of the source and concern for the situation of the water recharge areas. The participants suggested to review the siting for the irrigation system in Cerro Punta and consider other alternatives, particularly the communities of: Caisán (to support vegetable production), Divalá (which will serve a dual purpose: supporting rice production and diversification options), Circuito Garichè, southern area of Volcán (San Andres, Gomez, Aserrio), which is the only sub watershed with connectivity with the estuary and is threatened by 4 hidro concessions; Paso Ancho and Volcán.

As desirable criteria/conditions for the project, the participants mentioned:

- ✓ Type of producer: small / medium rice producers
- ✓ Equity in the service distribution: Similar coverage of hectares for all
- ✓ Limitation in the number of hectares: establishing a maximum limit and average
- ✓ Responsibility of the user with conservation of the water source
- ✓ List of prioritized uses; optimization through technology and measurement criteria. For example: micro sprinkler or drip irrigation
- ✓ Identification of type of soil, crop and irrigation system (irrigation or reservoirs, other)
- ✓ Conduct initial hydrogeology models/studies to learn about the situation of the water sources

To define specifics of the irrigation system, the AP reinforces the need to conduct an initial rapid assessment of the irrigation needs in the watershed using a concrete linkage with food security dimension and climate data. The results of the assessment will inform the TORs for the project. These TORs will be validated with MIDA before its publication. In the present, there are not existing specifications of MIDA or MiAmbiente regarding climate change in relation to irrigation systems.

The following tasks shall take place:

- Irrigation needs' assessment
- Systems design and installation of 2 low cost irrigation pilot systems (one in the upper watershed and other in the lower watershed)

- Technical assistance to farmers and companies for implementation of the irrigation system (at least 20 farms)
- Monitoring and evaluation.

Adaptation reasoning:

Table 18. Adaptation reasoning for output 1.2.b

Adaptation measure	**Establish climate resilient irrigation systems, with efficient and low cost technologies, to enhance agricultural production and increase crops yields**
Definition	Irrigation involves supply of water to the fields, by gravity or pumping. The water can be diverted from a river or canal, or drawn from a lake or a reservoir, or from the ground; or it can simply be retained at the place where the crop will be cultivated. Irrigation involves supply of water to the fields, by gravity or pumping. The water can be diverted from a river or canal, or drawn from a lake or a reservoir, or from the ground; or it can simply be retained at the place where the crop will be cultivated. A good irrigation scheme is characterized by the predictable availability of adequate water at the place and the time when the crops need it.
Scope/Scale:	Local, watershed level. Cerro Punta and Divalá (upper and lower watershed respectively)
Adaptation additionality:	The purpose is to promote, by the first time in Panama, a climate resilient irrigation system. Climate resilience of the proposed system will be supported by observing the following measures/guiding principles: • High over-all efficiencies of water-dependent production systems: High output and high value per m3 of water • Adequate hydraulic feasibility; good design; and good operation • Balance between water demand and raw water availability • To the extent possible, limited reliance on pumping • Adequate drainage • As much storage as possible • Good control of water allocation over time and within the scheme • Limited losses, for the sake of flow capacity and scour control • Predictable and reliable water allocation • Good collaboration between the farmers • Good access to information about the normal and actual weather • Good knowledge about management options, covering both cultivation and water management
Adaptation reasoning	The watershed management plan, approved in May 2014 identified aspects such as variability in rainfall (rainfall distribution in the year, intensity), soil fertilization needs, low availability of water for irrigation of crops and lack of labor as aspects that directly affect yields. The management plan is formed by 6 pillars, each divided into programmes and projects. One of those pillars is the Risks and Climate Change, which includes 2 programmes and 6 projects as follows: a) Disaster risk reduction: Projects: Flood control; drought mitigation; landslides control and fire prevention and management.

	b) Climate change adaptation: Projects: **Improving agricultural production through irrigation system;** Introduction of new plant species**;** Biological pest control**;** Protection of water sources**;** Protection of water recharge areas**;** Water harvesting. This project of the Climate Change Adaptation Programme of the Management Plan has not been implemented yet, due to lack of financial resources. By implementing this project with funding from the AF, it will be possible to positively influence agricultural productivity, while making visible the water-food-climate change nexus among the farm owners and other stakeholders.
Technical solution	The systems will consider the following climate related challenges to irrigation and logic of intervention: • Threat: rainfall irregularities • Effect: water shortage • Responsive measure: irrigation supply. Complemented by considerations regarding recommendations for shorter cultivation cycle and drought contingency planning. The scheme will be: • hydraulically feasible (for example in terms of raw water availability); • well designed (for example in terms of storage capacity, conveyance capacities and control structures); and • well operated (for example in terms of water allocation within the scheme). • financially feasible - meaning that the economic benefits exceed the operation and maintenance costs with a margin that makes it attractive to the farmers. A scheme with these characteristics is likely to have a good (or fair) climate resilience, because it is intended for 'normal', short- or medium-term weather irregularities. Climate change will mainly affect the hydraulic feasibility; the design (of new or upgraded schemes); and the operation (supported by data and knowledge). Hydraulic feasibility is the basic requirement for any investment in irrigation infrastructure. If a scheme is not hydraulically feasible, it is not likely to generate economic and social benefits. On the contrary, it can be a waste of money, and, at worst, positively harmful to resource management and cultivation. Hydraulic feasibility analysis will be a critical requirement of the initial diagnosis need assessment and for the system design.
Adaptation knowledge plus	a) In the context of this output, the Programme will generate discussion about the possibility of switching from use of freshwater to wastewater in order to increase availability of water for energy and agriculture. b) Innovative on the ground experience, mainstreaming climate change adaptation intro irrigation systems design and operation. c) Technical document resulting from the project, will serve as reference material for potential replication and further research. d) No specific technical standards regarding climate resilient irrigation systems have been identified during the proposal writing process. Nevertheless, recent experiences conducted particularly in Asia Pacific will be reviewed as referential material to inform the system design, installation and operation.

Table 19. Measures and expected results in comparison with BAU for output 1.2.b

Type of measure	CC risk or impact identified	Expected result on the ground	Difference with business as usual water management or agricultural best practices

Agriculture best practice. Clima**te change additionality linked to the use of climate** dimension **for system design and development in the context of a wider adaptation programme**	Altered seasonal patterns of precipitation and run-off;	Water management and water productivity increased	Current irrigation systems do not incorporate climate data into design and implementation phases. This will be ensured by observing technical standards that include climate change considerations taken from climate smart irrigation projects; conducting training workshops for sustainable water use accordingly to the crop needs, crop stage and production calendar. In the context of this output activities, the Programme will generate discussion about the possibility of switching from use of freshwater to wastewater in order to increase availability of water for energy and agriculture. Water footprint data of rice production

Important facts
Criteria for the selection of the intervention areas and beneficiaries

- Direct beneficiaries: Communities of Cerro Punta and Divala.
- Selection criteria/process: Cerro Punta and Divala communities. Based in the consultation process for the Management Plan and its inclusion in the management plan project portafolio.
- Divala community selection based also in light of the importance of rice production in this location, which has been severely affected drought associated with El Niño impacts.
- . Rice production in Divalá severely affected by drought associated with El Niño impacts.
- Both communities encompass a population of 13,116 inhabitants, (Population Census Data, 2000).

1.3 PILOT DIVERSIFIED FINANCING AND INCOME SOURCE MODELS IMPLEMENTED IN VULNERABLE POPULATION AREAS IN SMRW

This output focuses in the SMARW area, promoting improvements in the health of ecosystems and income generation to increase communities' resiliency and adaptive capacity, through supporting coffee production in the upper section of the watershed and piloting small scale promotion of non-traditional crops. Even though the need for diversification of the agriculture production as a response to climate change was discussed during the consultation workshops, a major request of the participants to support climate adaptation of the main traditional crops prevailed. Crops listed as severely affected were rice and coffee. This is coherent since it allows to establishing coffee as a transversely component, facilitating knowledge sharing, and monitoring.

As a result, the following changes were included in the activity design:

- ✓ Development of 200 hectares of agroforestry schemes in the upper section of the watershed, emphasizing coffee production. The elements of pest management and new climate tolerant varieties defined for the project in CHRVW will be replicated in SMRW.
- ✓ A small-scale pilot project to support women empowerment through strengthening orchid and naranjilla cultivation in the communities of Piura and Piedra de Moler.

1.3.a Implement agroforestry - soil conservation systems by establishing pilot farms

Climate change threat:
Fluctuation in the short and long-term of weather patterns (temperature, water) producing severe droughts worsened by El Niño events.

Technical specifications of the solution:
Development of 200 hectares of agroforestry schemes (mainly shaded coffee with beans) in the upper section of the watershed. These agroforestry modules of 200 hectares (emphasizing coffee production) were the result of downsizing the cattle ranching project (1.4.a) from 800 to 600 hectares. The elements of farm planning, plan implementation, maintenance, pest management and climate tolerant varieties defined for the project in CHRVW will be replicated in SMRW.

Clear link between the climate change threat and the solution:
These agroforestry plantations will make the coffee producers more resilient through improved pest management and adaptation to high temperatures.

Measures to mitigate environmental risks:
To prevent alteration of local ecosystem (by means of introducing exotic plant species), only species environmentally suitable for the site will be used for this type of climate change adaptation solution. The species to be used will be approved by MIDA and IDIAP technical specialists. Also, to minimize the loss of fertile soil by erosion, sedimentation, and to increase plants survival rate, special measures will be ensured in terms of spatial arrangement and combination of the reforested species/crops.

In addition, to prevent contamination of soil and water courses, organic fertilization of plants will be used instead of chemical fertilizers (which will be used only when other organic alternatives prove insufficient or ineffective).

1.3b Creating capacities for operating orchid and "naranjilla" crops, as well as establishing the correspondent commercialization scheme at the Rio Gallito Sub-Watershed.

It includes training on establishment and management of orchid and "naranjilla" crops; design of business plans; development/improvement of seedling nurseries; advice and technical assistance for commercialization

Production of Naranjilla:

Climate change threat:
Altered seasonal patterns of precipitation and run-off, worsening the erosion.
Fluctuation in the short and long-term of weather patterns (temperature, water, light) producing severe droughts worsened by El Niño events.

Technical specifications of the solution:
Establishing naranjilla plantations pilot plots. A production assessment indicating specifications on variety and cultivation techniques will be conducted as part of the final design of this solution. It will include technical assistance and commercialization analysis.

Clear link between the climate change threat and the solution:
Regarding Naranjilla, this fruit grows naturally in open vegetated areas of the upper SMRW. According to personal communications with local farmers, it is understood that naranjilla has adapted to changing climate in the area, since its natural growth and yield has been steady over the years (anecdotal information from community members). Currently, there is a high demand, high sale value for all the naranjilla that can be collected in situ (that is, buyers go periodically to the communities to buy available fruit). Comparing naranjilla with the traditional orange in the area, Price of naranjilla is 10 times higher (100 oranges cost 2.50 Dollars, while 100 naranjillas are 30.00 Dollas). Naranjilla could represent a climate proof income generating activity fostering local economy while producing governance and social co-benefits related to women participation and leadership.

Production of Orchids

Climate change threat:
Orchids are highly sensitive species to either changes of temperature and rainfall, and therefore, are among the most affected. They are considered as indicator species. Orchids growing naturally have mostly disappeared from the watershed areas, mainly due to fluctuation in the short and long-term of weather patterns (temperature, water, light) producing severe droughts worsened by El Niño events.

Technical specifications of the solution:
Provide technical assistance for establishing a pilot orchid green-house. Since there is a previous experience (an orchid production lab developed with Japanese cooperation at the community Piedra de Moler), this pilot will improve the existent facility and train local women; as well as assist in the establishment of a market scheme for the sustainability of this initiative.

Clear link between the climate change threat and the solution:
Regarding orchid, this Project will allow creating capacities (training, improvement of infrastructure, connecting producers with markets); this will:

- ✓ build a climate proof income generating activity fostering local economy while producing governance and social co-benefits related to women participation and leadership.

- ✓ increase the opportunity to foster conservation of orchid species being affected under natural conditions because of climate change.

Measures to mitigate environmental risks:
Orchid species to be grown will be native species of the area; non-agrochemical fertilization and pests/diseases control will be put in place.

Additional context information:
This small pilot will include technical assistance to increase current productivity, establish commercialization channels and promote association among the current women producers (approximately 14 producers of naranjilla and 4 orchid producers). In the case of orchid, a laboratory previously established in the area has been abandoned due to lack of specialized staff, being an asset that could be potentially revalued by the pilot project. Orchid production in domestic labs facilities could represent a climate proof income generating activity fostering local economy while producing governance and social co-benefits related to women participation and leadership.

This activity is pre-identified in the Rio Gallito Sub Watershed Conservation Area Plan as a sustainable income generating activity, based on natural resources management. The expected result is, by creating new options to generate income, local producers might diversify and reduce (or at least, not increase) existing cattle raising activity), thus contributing to the reduction in the expansion of intensive agriculture and the changeover to extensive livestock. It includes:

- ✓ A participatory community rapid assessment to identify and validate communities/farm owners with potential/interest to participate in the project.
- ✓ Training on orchids and "naranjilla" crops growing and management. Drafting of the corresponding business plans.
- ✓ Development/improvement of seedling nurseries
- ✓ Technical assistance for marketing and commercialization.

Table 20. Criteria for selection of sites for output 1.3.b

Adaptation measure	**Creating capacities for operating orchid and "naranjilla" crops, as well as establishing the correspondent commercialization scheme at the Rio Gallito Sub-Watershed.**
Criteria for selection:	The Gallito River Subwatershed is identified as a priority site within the SMRW accordingly to the Conservation Area Plan conducted in 2014, due to the provision of ecosystem services and its physical, environmental, and socio economic importance. The Rio Gallito Sub Watershed is part of Bulaba River sub-basin; it has approximately 5322.8 km2, is classified as a small basin and the length of its main river (Rio Gallito) from its source to the output is about 10.7km. Its importance lies in the maintenance of environmental services such as water quality for human consumption and for agricultural uses and connectivity between the forests of the upper sections of the basin with 2 important protected areas: the Santa Fe National Park and Forest Reserve La Yeguada.

	Climate change is one of the major threats for the four conservation objects defined in the Conservation Area Planning process conducted in 2014 along with forest coverage loss, land use conversion for extensive cattle ranching, unsustainable productive practices, solid waste pollution and loss of connectivity of water bodies. “Climate change puts pressure on the food security of residents through the fluctuation in the short and long-term of weather patterns (temperature, water and light) necessary for agricultural activities and impacting production and crop yields. Climate change threat was ranked as very high (high for primary forest, river ecosystem and pez titi (Sicydium salvini) and very high for secondary forests” (Rio Gallito Conservation Area Plan, FIDECO 2014) The Rio Gallito Sub Watershed is home to 1081 residents of which 55% were male and 45% female; 61% of the total inhabitants had more than 18 years, representing a productive population pressing natural resources, especially water and soil, to meet their basic needs. The watershed has 27 communities in 4 districts (El Alto, Rio Luis, Ruben Cantu and Santa Fe). Communities within the sub watershed are small settlements with less than 100 persons, lack of basic services and a livelihood associated to the extensive use of natural resources, especially soil. In addition to the vulnerability to climate change mentioned above, these communities present socio-economic vulnerability evidenced by the existence of poverty and extreme poverty in all the communities, where the unique productive alternative is the use of land (in 70% of the communities the average income is in the range of US$101-299/per month). Regarding socio economic activities, those are mostly related to extensive use of land and natural resources, typically for auto consumption (subsistence), based in family labor and low technology. There are 3 types of farms: small (0.1-9.99 ha-cattle and 10 animals) located in the middle and lower watershed; medium size (10-50 hectares and less than 50 animals, located in the middle and lower section of the watershed and large farms (50+ hectares and 50+ animals located in the lower watershed). In the upper section, there are “potreros” for pasture rent located in areas important for forest ecosystems and water sources.
Scope/Scale:	Local, sub watershed level.
Adaptation additionality:	Promoting these non-traditional production, can prevent these farmers to consider land use change for traditional extensive cattle ranching model, prevalent in the watershed, increasing their vulnerability to climate change associated to the drought that is severely affecting the watershed. Orchid production is an incipient non-extended activity at the watershed level, with positive revenues for current developers.
Adaptation reasoning	Project focus: The project will emphasize in effective transfer of technology to the target groups, using a participatory approach for effective transfer of technologies, including climate change considerations, to empower stakeholders, analyzing feedback for further refinement. To do this, the project will include a need based and focused training programme, demonstration sites and model training courses.

Table 21. Measures and expected results in comparison with BAU for output 1.3.b

Type of measure	CC risk or impact identified	Expected result on the ground	Difference with business as usual water management or agricultural best practices

Market based approach to sustainable development and sustainable consumption and production. Climate change additionality depends on targeting vulnerable producers to climate and non-climate risks.	Extensive cattle raising model depleting soil and water resources, exacerbated by water scarcity problems due to severe drought. In depth analysis is included in the CAP.	Increased income generation for programme participants; discouraging traditional "potrero" extensive cattle ranching production system, avoiding advance of agricultural frontier to new areas;	These products, orchids and naranjilla, are nontraditionally produced in the region. Innovation potential for local communities Use of climate data to define production system, calendar and commercialization strategy.

1.4 CONCRETE ADAPTATION MEASURES IMPLEMENTED FOR SUSTAINABLE CATTLE RANCHING. IMPLEMENT SUSTAINABLE CATTLE RANCHING PROJECT AT SMRW, COVERING COVER 600 HAS

Livestock is a key activity at the SMRW. Per the data obtained in the 2001 Census of Agriculture, the cattle raising activity is in the middle and lower section of the watershed. Of 202,367.82 hectares covering the middle and lower basin, the 42.78% of that area is occupied by grassland areas used in the breeding and fattening of cattle. The cattle raising activity is conducted in an extensive “potrero” model, characterized by low productivity and unsustainable practices causing soil degradation. In addition to this low productivity, farm owners in this area are suffering the impacts of climate change, in the form of severe droughts. In the area of the Arco Seco, some 70 percent of the wells have gone dry; efforts of MIDA to drill new, deeper wells found no water in nearly one-third of the holes it drills. Impacts on livestock production are severe.

On July, 21st, 2016 F. Natura staff met with technicians from the Livestock Department and Environment Department of the Ministry of Agricultural Development R-3 (MIDA-R3), as a result they confirmed that the Basin of River Santa Maria maintains most of their livestock in the middle and the lower part of the basin, especially in the areas of Ocú and Santa Maria, with approximately 1,831 hectares, divided among 42 producers. On average, according to MIDA database, producers have an average between 15 and 20 hectares; small producers in these areas do not develop best practices and management within their farms, the pastures are native and they burn the native grasses every year, not Silvopastoral System in farms are in place, not banks of cattle feed, neither a good system for storing water. In general terms, farm owners do not implement good or environmental friendly practices, and are not implementing either any climate change adaptation measures.

Following a chart with information about farms with cattle raising activity in the area.

To cope with the threats detected by farmers and MIDA staff in the lower basin of the Santa Maria River, such as lack of food by water shortages, increased pests (langosta Insect) caused by increased temperature, low rainfall and winds dry the moisture in the area, the Programme intends to work with silvopastoral systems to promote sustainable

management and adaptation to climate change, which have a potential to provide habitats and resources and increase the agricultural landscape connectivity. In addition, they may allow the animal movement through agricultural areas while helping to increase productivity.

Table 22. Number and area of agriculture exploitation with livestock, natural and planted grasslands, per Province, Indigenous Territories, District and County: 2010

Provincia, comarca indígena, distrito y corregimiento	Explotaciones con ganado vacuno	Tipo de pastos (hectáreas)				
		Total	Naturales o nativos	Sembrados		
				Tradicionales	Mejorados	De corte o bancos proteicos
TOTAL	**43.858**	**1.537.327,99**	**227.051,73**	**711.981,29**	**569.303,80**	**28.991,17**
Herrera						
Ocú						
Ocú (Cabecera)	215	7.506,22	1.168,76	3.983,96	2.208,80	144,70
Los Llanos	233	4.877,12	464,85	2.782,35	1.575,19	54,73
Llano Grande	141	4.103,59	1.133,50	1.920,85	956,79	92,45
Peñas Chatas	167	3.660,35	394,25	2.383,47	812,98	69,65
Subtotal…	**756**	**20.147,28**	**3.161,36**	**11.070,63**	**5.553,76**	**361,53**
Parita						
Parita (Cabecera)	165	6.168,90	922,78	1.336,91	3.718,55	190,66
Cabuya	70	1.866,75	304,25	806,50	649,50	106,50
París	53	3.077,13	204,00	255,71	2.552,34	65,08
Potuga	49	5.205,41	466,73	773,46	3.953,22	12,00
Subtotal…	**337**	**16.318,19**	**1.897,76**	**3.172,58**	**10.873,61**	**374,24**
Santa María						
Santa María (Cabecera)	25	3.727,73	93,74	3.317,59	216,40	100,00
Chupampa	73	1.215,93	145,28	722,39	296,31	51,95
El Rincón	54	567,63	68,75	310,63	179,25	9,00
El Limón	73	1.405,96	315,92	698,49	378,55	13,00
Los Canelos	19	744,89	201,78	287,28	195,25	60,58
Subtotal…	**244**	**7.662,14**	**825**	**5.336,38**	**1.266**	**234,53**
Veraguas						
Calobre						
Calobre (Cabecera)	106	2.732,74	699,56	1.515,91	487,07	30,20
Barnizal	47	1.386,40	139,75	850,85	210,80	185,00
Chitra	64	1.738,36	281,10	976,25	435,01	46,00
El Cocla	58	1.076,11	323,47	559,64	180,00	13,00
El Potrero	41	755,95	35,50	572,55	147,90	-
La Laguna	90	2.052,20	389,45	1.318,75	338,25	5,75
La Raya de Calobre	51	1.083,50	229,50	559,00	287,50	7,50
La Tetilla	46	1.502,50	151,50	938,50	400,50	12,00
La Yeguada	49	1.585,55	222,60	1.068,70	292,25	2,00
Las Guías	82	2.218,05	309,90	1.478,60	380,50	49,05
Monjarás	43	961,38	282,50	556,38	112,00	10,50
Subtotal…	**677**	**17.092,74**	**3.064,83**	**10.395,13**	**3.271,78**	**361,00**
Cañazas						
Los Valles	55	2.432,20	1.368,22	754,88	266,65	42,45
San Marcelo	64	1.669,97	438,45	627,02	589,50	15,00
El Aromillo	24	540,54	227,70	214,89	97,95	-
Subtotal…	**143**	**4.642,71**	**2.034,37**	**1.596,79**	**954,10**	**57,45**
San Francisco						
San Francisco (Cabecera)	83	4.045,54	374,75	917,91	2.617,63	135,25
Corral Falso	43	2.295,35	166,80	1.013,10	1.114,95	0,50
Los Hatillos	52	2.275,98	910,80	543,53	774,25	47,40
Remance	49	2.625,29	434,79	742,75	1.444,75	3,00
San Juan	44	734,86	135,93	379,78	216,15	3,00
San José	49	1.324,00	434,07	648,71	238,97	2,25
Subtotal…	**320**	**13.301,02**	**2.457,14**	**4.245,78**	**6.406,70**	**191,40**
Coclé						
Aguadulce						
Aguadulce (Cabecera)	25	1.861,92	74,25	495,14	1.254,53	38,00
El Cristo	197	4.855,29	1.207,43	1.932,00	1.480,20	235,66
El Roble	173	14.325,95	7.437,90	4.812,70	2.012,00	63,35
Pocrí	56	648,62	133,49	222,25	235,33	57,55
Barrios Unidos	35	797,97	354,99	276,94	161,54	4,50
Subtotal…	**486**	**22.489,75**	**9.208,06**	**7.739,03**	**5.143,60**	**399,06**
Total…	**2.963**	**101.654**	**22.649**	**43.556**	**33.469**	**1.979**
Promedio de has/finca	**34,31**					
Promedio de has de pastos mejorados/finca	**11,30**					

Climate change threat:
Increased temperature, highly variable precipitation, high speed and changing wind patterns stressing cattle livestock with heat. In addition, it causes loss of palatability and turgidity on the herbaceous component. Causing droughts, floods, pest and diseases increase and infertile soil.

Technical specifications of the solution:

The objective of this component is to increase productivity of cattle farms by implementing agrosilvopastoral systems (SSP). 120 pilot farms will be established, of up to 5 hectares per farm. Farm management plans will be developed and implemented for each farm, which will be complemented by an initial baseline diagnostic of the farms, then followed by the participatory design of the farm plan. A combination of viable technological options to be implemented at each farm, will be defined, in order to increase climate resilience, environmental quality and generation of income for the farmers. Preliminary identification of communities for installation of the ASP system are: Ocú, Santa María, San Francisco

The project will offer an aid package which includes: (i) technical assistance (TA) to promote cost-efficiency and environmental and economic sustainability of livestock production. TA will be provided to design and implement plans conversion to SSP through technical assistance providers, inviting ANAGAN (National association of cattle ranchers) and other smaller organizations as partners; support access financial resources for adoption of SSP. Specific climate change issues affecting cattle in the SMRW such as heat stress in dairy cattle and pest managements will be particularly addressed.

The program will target farms affected by climate change / climate variability, suffering severe Drought, to help them to implement adaptation strategies based on structural and nonstructural measures such as: improved pastures with trees, life fences, supplementation, banks feed, animal genetics, organic waste management, others. The Beneficiaries will be Small-medium landholders. For the selection of the 120 pilot farms, the following criteria will be considered ensuring fairness and transparency in access to opportunities for participation:

- ✓ Location of the farm (mid span or under the basin)
- ✓ socioeconomic vulnerability
- ✓ degree of degradation that the farm by climate variability (drought, floods, pests, infertile soils) and bad farming practices.
- ✓ Farm size /herd size
- ✓ Purpose of production (meat, milk, dual purpose)
- ✓ Closeness or influence in any water source technological level used by the farmer (rotational grazing, pasture divisions with hedgerows, water supply to the animals, grass cutting, etc.)
- ✓ Ground conditions (degree of erosion, slope, consistency, soil type, etc)
- ✓ type of vegetation in the area
- ✓ Co-financing commitment cash or in-kind (“jornales”) depending on financial capacity; Willingness to participate in replication activities; Long term legal commitment through farm management plan formalization.

Programme activities of this project will include:
(a) training on SSP to national and regional providers of technical assistance;
(b) selection of beneficiaries and baseline evaluation of the farms;
(c) technical assistance to farmers and implementation of SSP in the different communities of the middle watershed, including information exchange activities between farmers;
d) improving access of small and medium farmers to credit instruments to secure long term process;
(e) evaluation and adjustment of technologies applied in each of the areas project;
(f) Monitoring and evaluation SSP contributions to the generation of adaptation benefits (and potential mitigation benefits as well), including the effects of including trees in pastures;
g) dissemination of the results to stakeholders, including participation in technical dialogues with MIDA, private sector associations and financial institutions to promote dissemination and replication.

Clear link between the climate change threat and the solution:
Silvopastoral systems (SPS) are a type of agroforestry that allows the intensification of cattle production based on natural processes that are recognized as an integrated approach to sustainable land use. These systems can generate a microclimate, during summer, the shade from afforestation reduces the stress caused by heat on livestock, and reduces the loss of palatability and turgidity on the herbaceous component allowing its consumption by the livestock component and increasing cattle kilos and therefore production and meat quality. By implementing these systems, the programme aims to improving sustainability and efficiency in the cattle ranching sector in the watershed, increasing their resilience and capacity to cope with climate variability and discouraging advance of the activity to upper sections of the watershed where forest coverage remains.

For practices regarding vegetation, it is expected to accomplish (i) improved pastures to maintain good ground cover preventing erosion; (ii) tree fences and scattered trees in pastures will help improve the soil and air, provide shelter and food for wildlife, they serve as bridges between forest patches; (iii) will contribute to incorporate carbon in soil. Vegetative practices will include:

- ✓ Planting improved pasture
- ✓ Handling scattered trees in pastures, paddocks reforestation with fruit and timber species
- ✓ Forage protein banks using the following species: Leucaena, balo, mulberry, arachis, buttercup and / or cratilya.
- ✓ Energy sources for summer (cane)
- ✓ Silage
- ✓ Grass
- ✓ Handling and forest enrichment
- ✓ Establishment of hedgerows

For practices related to basic infrastructure, these will (i) keep water courses clean and free of animal waste; (ii) avoid wear banks of streams and rivers that produce sedimentation, which helps aquatic flora and fauna; (iii) reduce the pressure on the

expansion of the agricultural frontier by semi-stabling. Infrastructure measures will include:

- ✓ Water reservoirs (water harvesting)
- ✓ Driving and drinking water construction
- ✓ Animal Drinkers
- ✓ Animal Feeders
- ✓ Salt container
- ✓ Silos
- ✓ Division paddocks, working with short sleeves for better pasture management
- ✓ Galley for semi stabling
- ✓ Electric fencing
- ✓ Fencing riverbanks
- ✓ Correction Gully
- ✓ Fencing hillside areas

Regarding the management practices, these will contribute to (i) avoid erosion and water pollution, for proper herd management avoiding over stocking in the paddocks; and (ii) evidence that producer possible profitability with the application of BPSP. Management practices that will be implemented are:

- ✓ Records
- ✓ Land use planning
- ✓ Improved animal diet of mineral salts
- ✓ Controlled cross-breeding
- ✓ Pasture management
- ✓ Genetic improvement
- ✓ Health management
- ✓ Weed Management in paddocks
- ✓ Promote the use of free techniques that minimize the use of agrochemicals
- ✓ Manure Management
- ✓ Stop burning grasses and shrubs
- ✓ Calibration farm equipment and fumigation, if warranted
- ✓ Discarding animals
- ✓ Herd Management
- ✓ Herd sanitation

Measures to mitigate environmental risks:

Pests and diseases control techniques without or with non-intensive use of agrochemicals; as well as water pumps powered by solar energy (from solar panels).

Other technical facts of the solution:

Some of the menus of good practices such as the establishment of dispersed trees in pastures and hedgerows contribute to multi-layered grasses and herbaceous legumes have moisture and are less affected by sunlight and high temperatures. Trees on farms provide fodder, shade, in addition to storing carbon, improve soil, fix nutrients and preserve the quantity and quality of water available.

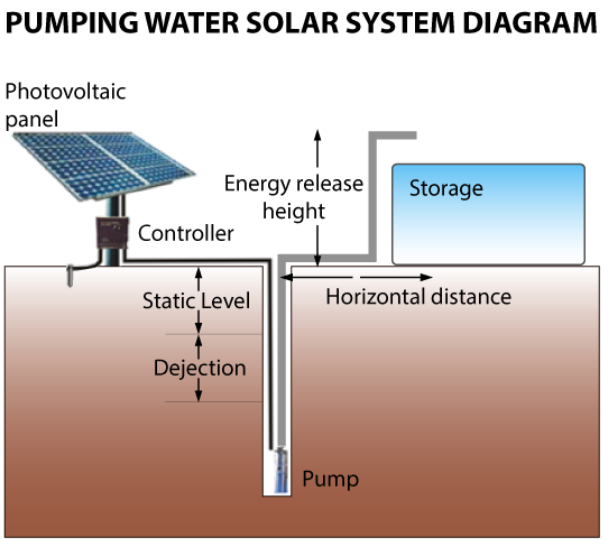
Project will include structures for water It is planned to construct works collection and conveyance of water (reservoirs, canals, collection tanks, water troughs) in the paddocks

and encircle, to give the animals a good water quality to improve production quality by developing a friendly livestock the environment.

It is proposed to use solar water pumps that feed on a photovoltaic system that generates electricity applied to hydraulic pumps, which bring the water to a storage tank to be carried by gravity to the various troughs used on farms as well as for irrigation pasture.

MIDA maintained solar panels in areas near the proposed program (as shown in the figure 3 below), which have been well received by farmers:

Figure 3 Pumping water solar system



The Programme includes a training and technical assistance module to strengthen producers and technical staff of MIDA and Mi Ambiente, including organizational strengthening, adaptation measures and better farming practices. The implementation of the program will promote measures to adapt to climate change, engaging farm owners and their families, as a strategy for a comprehensive approach that allows greater efficiency in the coordination of resources committed.

Programme will produce knowledge materials to support capacity strengthening modules and training events. This includes: Exchange of experiences among farmers on technical topics such as supplementation of livestock, breeding, effect of organic pasture management / tree planting in pastures, among others), to develop good farming practices in the region; training field trips on selected farms for all farmers in the area; Seminars- workshops on specific topics of farm management ; Lectures on general issues of livestock sustainability and climate change; Distribution of informational and educational materials on topics of interest; Delivery of awards to outstanding producers

in the project; Production of newsletters or data sheets (knowledge products) for dissemination and outreach.

Highlights of the consultation process:

Participants recognized the importance of agrosilvopastoral models, but expressed that it is not clear the reason why these systems have not been developed in the region, except for some small isolated pilot projects. As limitations for the establishment of these systems the participants mentioned: a) Lack of knowledge and technical assistance to promote demonstrative plots; b) Lack of incentives and high initial costs; c) Inappropriate use of land; no zoning. The inclusion of this component was highly praised because of the importance of livestock in the area and the serious problems producers are facing due to the extreme drought in some areas of the basin. A key message was to develop this project in the middle section of the watershed and not promoting cattle raising in the upper section.

Other Important facts:

- ✓ This projects entails the whole ASP system design, implementation and monitoring during the life of the programme. An international bidding process is envisioned to ensure quality, state of the art technical solutions and cost benefit figures.
- ✓ The project will benefit from existent successful experiences of sustainable cattle raising projects implemented in Costa Rica and Colombia, for example, with GEF funding. At the national level, experiences derived from the GEF Small Grants Programme, supporting small scale ASP schemes will also be considered as reference materials. The project will benefit also from on the ground experience gathered by F. Natura because of previous projects supported in the context of the FIDECO programmes, including previous projects implemented in the SMRW. Climate change dimension will be an innovation.
- ✓ Particular attention will be given to the pest management techniques associated to climate change, in order to facilitate learning exchange with cattle producers in CHVW who reported severe problems mainly because of ticks in cattle, aggravated by changes in temperature and precipitation. Another important aspect will be to include efforts to assess and make visible the mitigation co-benefits of this sustainable cattle-raising project based on the potential reduction of methane emissions.
- ✓ Due to the lack of local experience and limited technical expertise in establishing these systems in a landscape scale in Panama and the weight of this component in terms of technical complexity and resources, Fundación Natura will ensure collaboration with regional knowledge centers specialized in ASP: CIPAV in Colombia and IICA (Interamerican Institute for Collaboration in Agriculture) to train local providers and orient system installation.

Summary:

Table 23. Measures and expected results in comparison with BAU for output 1.4

Type of measure	CC risk or impact identified	Expected result on the ground	Difference with business as usual water management or agricultural best practices
ASP models recognized as good practice for climate change adaptation in rural LAC region. (Inventory of good practices for climate change adaptation in rural LAC region: options and lessons learned using the livelihood approach. EUROCLIMA Thematic studies ·4. EU, 2014). Also recognized as non-regret EBA measure by international key institutions such as IUCN, CATIE, FAO, CIAT.	Extensive cattle raising model depleting soil and water resources, exacerbated by water scarcity problems due to severe drought. In depth analysis is included in the CAP.	Increased income generation for programme participants; discouraging traditional "potrero" extensive cattle ranching production system, avoiding advance of agricultural frontier to new areas; increase productivity per hectare dedicated to cattle raising	ASP programme designed from a climate change perspective.

1.5 ENHANCED SECTORIAL SUPPORT THROUGH CLIMATE FINANCING INSTRUMENTS

Accordingly, to the UNFCCC climate finance refers to local, national or transnational financing, which may be drawn from public, private and alternative sources of financing. Climate finance is critical to addressing climate change because large-scale investments are required to significantly reduce emissions, notably in sectors that emit large quantities of greenhouse gases. Climate finance is equally important for adaptation, for which significant financial resources will be similarly required to allow countries to adapt to the adverse effects and reduce the impacts of climate change.

Although Panama´s financial sector is known for its world class services and robustness, it is a fact that the climate change dimension has not been mainstreamed yet into the sectors dynamics. Some initial steps have been taken by local banks regarding credit facilities for “green investments”. The National Bank and local development entities for the agriculture sector have dedicated special credit lines, without a strategic framework. In addition, the impact of these investments has not been quantified. The hypothesis is that these facilities have not reached the small farm owners, who are more vulnerable to climate change conditions.

To provide an entry point regarding this issue, the Adaptation Programme aims to involve the financial sector into the adaptation efforts, by reaching financial institutions that are traditionally devoted to the agriculture sector and provide a better understanding of climate-related risks and impacts on specific regions, agricultural activities and crops. In addition, the Program will promote research and analysis of the existing sources to support adaptation measures, and the extent that those sources are known and used by local stakeholders. To do this, the Adaptation Programme will focus in the microfinance sector. Regarding the energy sector, the Program will build upon the opportunities created and experiences derived from the Law 45 of 2004 for the promotion of small generation plants using new, renewable and clean sources (mini hydros) and other similar regulations. The hypothesis is that small farm owners could benefit of existent incentives to develop these projects, but the lack of information to access credit facilities inhibits project development. To accomplish this, the Programme includes the following activities:

1.5.a Conduct a review on current credit products offered to agriculture and energy sectors; including technical recommendations on climate financing instruments.

1.5.b Develop 4 business plans (2 for each watershed) to establish and operate mini-hydro energy projects, including the correspondent farm management plan, informative prospectus to access financing sources for climate change adaptation activities, and technical assistance offered to obtain such financing. Design a technical recommendations document to replicate this experience at national level.

1.5.c Socialize the concept of Microfinance, based on ecosystems and climate change adaptation. This activity will include as a criteria for selection of the microfinance institutions the willingness to design and develop a microfinance scheme implemented in women group. If possible, this will be linked also to activity 1.3 to support the orchid and naranjilla pilot.

Climate change threat:

Climate change dimension has not been mainstreamed yet into the energy and banking sectors dynamics. Some initial steps have been taken by local banks regarding credit facilities for “green investments”. The National Bank and local development entities for the agriculture sector have dedicated special credit lines, without a strategic framework. In addition, the impact of these investments has not been quantified. The hypothesis is that these facilities have not reached the small farm owners, who are more vulnerable to climate change conditions. Small producers and farm owners affected by climate change variations with limited access to financial resources to implement adaptation measures.

Technical specifications of the solution:

a) Promote a linkage between finance / microfinance options and implementation of adaptation measures by farm owners. Specific pilots to generate evidence about the feasibility of small scale renewable projects based on existing legal framework will be conducted.
b) Generate evidence about the feasibility (or lack of feasibility) of developing small scale renewable energy projects, taking advantage of current credit products, that are

supposedly available in the present, and the legal incentives in place for generation with non-traditional renewable sources with installed capacity up to 10MW. Following the discussion in the consultation workshop held in CHVRW, the activity is reframed to pursue the elaboration of the business plans for small scale renewable generation projects, not restricted to mini hydros, including, for example, installation of solar panels. The reasoning is mostly to avoid misunderstandings and potential conflicts with local groups opposed to hydro energy. Beneficiaries will preferably be participating in the ASP module to consolidate adaptation benefits. For this activity, specific requirements should be met in addition to the bio-physical conditions of the property, including land titles and access to credit. An open call for expressions of interest will be launched and beneficiaries' selection will be based in transparent criteria.

c) On the supply side, the programme will work with socializing the MEBA concept and develop a portfolio of EbA and disaster risk reduction financial products, for socializing these among local microfinance institutions (MFIs) and capable cooperatives or other organizations,), aiming to create an interest/demand for these products and services. Assessing the microfinances concept for adaptation based on ecosystems, whose purpose is to give support to the microfinance institutions (MFIs) in the development and implementation of new products and micro financial services focused in the climate change adaptation, including innovations in the risk management associated to these effects. To do this, the following activities will take place:

- ✓ Development of Microfinance Institutions mapping for both watersheds,
- ✓ Development of a portfolio of microfinance for Ecosystem-based Adaptation products and best practices based on similar successful projects in the region of Latin America & Caribbean, through desk study and exchange visits and/or videoconferences, each of them evaluated for suitability for one or both watersheds.
- ✓ Informative/instructional workshops on Microfinance for Ecosystem-based Adaptation (MEbA) with Microfinance Institutions, and identification of those interested/willing to participate in the training and technical assistance,
- ✓ Recruitment of 2 Microfinance Institutions (one at each watershed) or cooperatives which can manage microfinance e.g. revolving funds to develop the training and technical assistance to preliminary design and offer one finance product.
- ✓ Implement four microfinance programmes with MFIs and cooperatives, which each manage a portfolio or micro-financed micro-projects supporting local smallholders and families, with financed activities be evaluated on criteria linked their contribution to climate change adaptation, disaster risk reduction and ecosystem management and restauration. (For example: http://reliefweb.int/sites/reliefweb.int/files/resources/WI-Eco%20Criteria%20Brochure_web.pdf)
- ✓ To conduct this activity, the Adaptation Program will take into consideration the experiences and products developed in the context of the Microfinance for ecosystem based adaptation project (MEBA) project in Perú and Colombia, as

well as explore and evaluate other microfinance products and programmes as implemented successfully in the region.[27]

Clear link between the climate change threat and the solution:
Creating an offer of microfinance options available to small scale producers affected by droughts and floods events, to implement adaptation measures or develop small scale renewable energy projects, will increase the resilience to cope with changing climate conditions.

Measures to mitigate environmental risks
Solutions will not be provided in sites that would affect forested areas.

Component 2. Establish climate resilient water management instruments with integrated and community based approach

Expected outcome: Improved water governance and natural resources management in prioritized watersheds by mainstreaming climate change data

Table 24. Description of component 2

Project / Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
2. Establish climate resilient water management instruments with integrated and community based approach	2.1 Analysis for climate change vulnerability done in prioritized areas at the Chiriqui Viejo and Santa Maria River Watersheds 2.2 Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress 2.3 Increased hydrological security in prioritized areas at	Improved water governance and natural resources management in prioritized watersheds by mainstreaming climate change data	**US$515,000.00**

[27] The Microfinance for Ecosystem-based Adaptation (MEbA) project aims to provide vulnerable rural and peri-urban populations in the Andean region of Colombia and Peru with microfinance services and products that will allow them to invest in activities related to ecosystem sustainability, improving their income and resilience towards climate change effects. In its initial phase, MEbA is working with five microfinance institutions (MFIs) in Peru and Colombia. On the basis of the results achieved, the project could potentially be expanded to other countries or regions.

Project / Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
	the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security		

Reasoning:
This component is oriented to provide climate change technical studies that are currently inexistent. For example, 2.2 will generate climate information to inform the criteria to grant water concessions, which currently are granted without considering future climate scenarios.

2.1 Analysis for climate change vulnerability in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds. Specifically, this VIA activity refers to:

a) At SMRW. Updating the Santa María River Watershed (SMRW) Management Plan including the climate change's dimension. For this activity, the watershed's current Management Plan and the study on the water source's current vulnerability considering the climate variability in the Santa Maria River Watershed -prepared in 2004 will serve as inputs. The updating process shall include the conduction of a vulnerability analysis to climate change, following the methodology mentioned above.

b) At CHVRW. Participatory validation and socialization of the adaptation measures included in the Management Plan's Adaptation Program, adopted in 2014.

The technical process:
Climate change Vulnerability assessments are a mandatory methodological step in defining adaptation trajectories. The VIAs proposed are not meant to put the program on hold until adaptation measures are identified and validated, but in parallel implement the non-regret adaptation measures proposed in the programme components. The information derived from the VIAs will serve as basis/inputs for other programme components, for example, the location of the water harvesting, the small-scale irrigation systems and EWSs; the development of the district water security plans. A rapid crop sensitivity analysis for rice and coffee might be included. In addition, the VIAs will provide a comprehensive roadmap for adaptation measures that will help orient future investment decisions, in addition to the investments promoted by the adaptation programme.

The purpose of conducting a Vulnerability Impact Assessment (VIA) is to assess the impacts of climate change in the selected programme areas. It makes an integrated

analysis of ecosystem services demand and supply based on human pressures on natural resources, which is supported by primary information collected in the field through visits, ecosystem services mapping, group interviews and socioeconomic surveys. The conduction of a VIA is a complex process. The idea of this activity is to conduct a robust, but pragmatic process, to provide an entry point for discussing strengths and weaknesses to address climate change challenges including data on sensitivity, impact and vulnerability as well as recommendations for implementing adaptation measures. The VIAs will contain: a) Current tendencies; b) Future scenarios; c) Possible socio-economic impacts in the watershed; d) Set of adaptation measures, duly prioritized

VIAs will be conducted applying a standard/ pragmatic methodology divided into 3 common main phases: a) identification of threats and vulnerabilities; b) identification of environmental services that contribute to adaptation and c) adaptation strategy (identification and prioritization of adaptation measures). This process will be very important to provide an entry point to engage other institutions to participate/support the measures promoted by the Programme. In the case of the SMRW a full VIA process is envisioned and for the CHVRW the process is to validate/socialize the analysis conducted in the context of the management plan approved in 2014.

For purposes of this study the VIA will be conducted based on the IPCCs framework which evaluates 3 factors: i) The exposure, or degree in which a system is exposed to a weather variation; for example, the temperature increase; ii) The sensibility, or degree in which a system is positively or negatively affected by weather changes, for example, the increase or decrease in space available for crops; iii) The potential impact of climate change; that is, the expected consequences of this process in a system without considering any adaptation action; iv) the adaptive capacity, or the set of available resources of people and communities to face the losses and benefit from the possible opportunities that arise with the climate change.

In parallel to boost adaptation action, and based in existent CC knowledge and data, the Programme will implement a series of non-regret adaptation measures, so adaptation activity in the ground will take place while the VIAs are conducted. According to the World Bank no-regret options are "adaptation options (or measures) that would be justified under all plausible future scenarios, including the absence of manmade climate change. These are essentially activities that provide benefits even in the absence of climate change. The idea is that the VIA results also supports the no regrets measures designed by the Programme. Even though the no regret approach, it is important to emphasize the fact that the adaptation measures proposed have been identified in initiatives and planning documents of national entities mentioned in the previous sections.

Highlight of the consultation processes:
It is important to indicate that the Management Plans were not known by the participants, suggesting that technical information is not being used to orient decision making at the public of private level. This is a real-life fact that the AP will have to overcome.

2.2 Developed technical criteria for granting water use concessions and permits to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress

The climate change implicitly entails a change in all the hydrological cycle's components. In this change, in addition to the physical processes that are usually considered when describing the water cycle, the forest cover, the land use and the water extraction for human consumption have a great importance. Given the evapotranspiration's importance in the water balance, the forests play a relevant role as climate change will modify its structure and biological functions, which shall affect the biomasses' production and, therefore, the uptake of water resources. Currently there are techniques for modeling the new conditions that climate change will impose to ecosystems (for example, GOTILWA+ model), which allows to analyze the forests' response regarding the water balance. These works have not taken place in Panama.

To foster a linkage between the climate change dimension, the water cycle and the processes to grant permits for water users, the Programme includes developing the following actions:

a) Assessment of hydrological balance and environmental flows in prioritized areas of the SMRW, particularly the flows of Gallito's river micro watershed shall be assessed. The reason for this selection is that this sub-watershed provides key environmental maintenance services such water for human consumption and agricultural uses and its connectivity with adjacent forests. Producers in this area of the watershed has been severely affected by droughts, affecting coffee, rice and beans production. A Conservation area plan process was conducted in 2014, providing baseline data

b) Assessment of hydrological balance and environmental flows in prioritized areas of the CHVW. The flows of the R. Caisan's sub watershed shall be assessed. This sub watershed has both an agricultural and hydroelectric generation's use, having been identified as one of the main threats "the infrastructures' development such as possible hydropower projects and the transfer of water from the Caisan River to the hydropower project in the Caña Blanca River, as well as possible roads and real estate projects. Likewise, another threat is the "agrochemical contamination due to agricultural and livestock activities. Producers in this subwatershed are being severely affected, particularly the coffee production by unedited strong winds, change of temperature and new diseases

c) Development of a technical document for decision makers with criteria to consider during the process of granting water concessions for hydropower generation and agriculture production, based on the new climate information and knowledge generated by the Programme.

d) Revision of existing concessions in both watersheds, based on the technical document mentioned above and recommendations of necessary adjustments in the

process, to re-establish / improve the hydrological cycle, considering climate change scenarios and data.

2.3 Increased water security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security

2.3a. District water security plans.

To support the long-term feasibility of the infrastructure solutions installed and to ensure coordination with the national process conducted for the National Plan for Water Security, 2 hydrological security district plans, including weather information, will be drafted, 1 for each watershed. These plans shall be drafted with participative methodologies and based on the provisions of existing planning instruments, including, but not limited to, the watershed's Management Plan, local government plans, as well as what it is indicated in the instruments at the national level. The main criteria to select the districts shall be in function of its adaptive capacity, the vulnerability analysis' results (output 2.1) and serious interest expressed by the local municipal authorities.

For the development of these district water security plans, a gender analysis will be conducted as part of the activity considering gender roles, power relations, and differentiating between men and women´s specific needs and priorities. The purpose is to ensure that the plans consider gender equality issues and establish specific measures and targets to improve women engagement in water decision making processes.

2.3.b New national agriculture and livestock production map

Using the technical information produced in component 2, climate data generated by ETESA and MIDA (component 3), the Programme will elaborate a new national map for agriculture and livestock production in the country, based on climate and water data, including biodiversity, forest coverage, demography and other socio economic drivers. With this process, the Programme will influence the public policy process at the national level. This product will allow that for the first time, economic transformative processes such as switching to drought tolerant crops, relocation of production areas/efforts, will be suggested, based on climate analysis.

Highlights of the consultation process:
These activities although oriented to conduct technical studies rather than to implement on the ground adaptation actions, received very positive feedback from institutional and NGO participants, commenting that by using adaptation to climate change as an entry point, these types of technical products could potentially influence transformational change at the public policy level, providing reasoning to revise and revert current unsustainable pathways.

Component 3. Strengthened local national capacity for monitoring and decision making to reduce and respond to risks associated to climate change

Table 25. Description of component 3

Project / Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
3. Strengthened local national capacity for monitoring and decision making to reduce and respond to risks associated to climate change	3.1 Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds	Increased preparedness in target watersheds and reduced risk for disasters among vulnerable communities nationwide	**US$2,801,000**
	3.2 Established an early warning system to identify in advance, the necessary measures in case of hydro-climatic events that could affect food production and power generation	Improved access to data for informed, timely decision-making regarding climate variability risks	
	3.3 The NSCD interfaced and equipped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information		
	3.4 Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts*		

Per World Bank data in the climate change knowledge portal, in Panama at the local levels, early warning systems, weather forecast technology and more modern communication systems are needed, especially for long-term forecasting. In addition, skills in using software programs for modeling climate will need to be developed. Training

and awareness-raising on climate change threats and climate-resilient development will be necessary to better equip those whose livelihoods depend on climate-sensitive sectors.

ETESA is the national entity responsible for establishing and operating national-level meteorological and hydrological infrastructure to provide information, predict weather patterns, issue advisories, and provide climate related services in the country. The amount and distribution of meteorological stations managed by ETESA could be improved. Such stations currently provide uneven patches of density in the data, with an average coverage of 312 km^2 per station, in comparison with the recommend standards of the OMM of 20 km^2.

The need for this activity is also highlighted in the PNGIRH 2010-2030 as follows: “Strategy 5.1.2: develop systems for timely, reliable and accessible information that favor a stronger capacity for negotiation and consultation among the various stakeholders”.

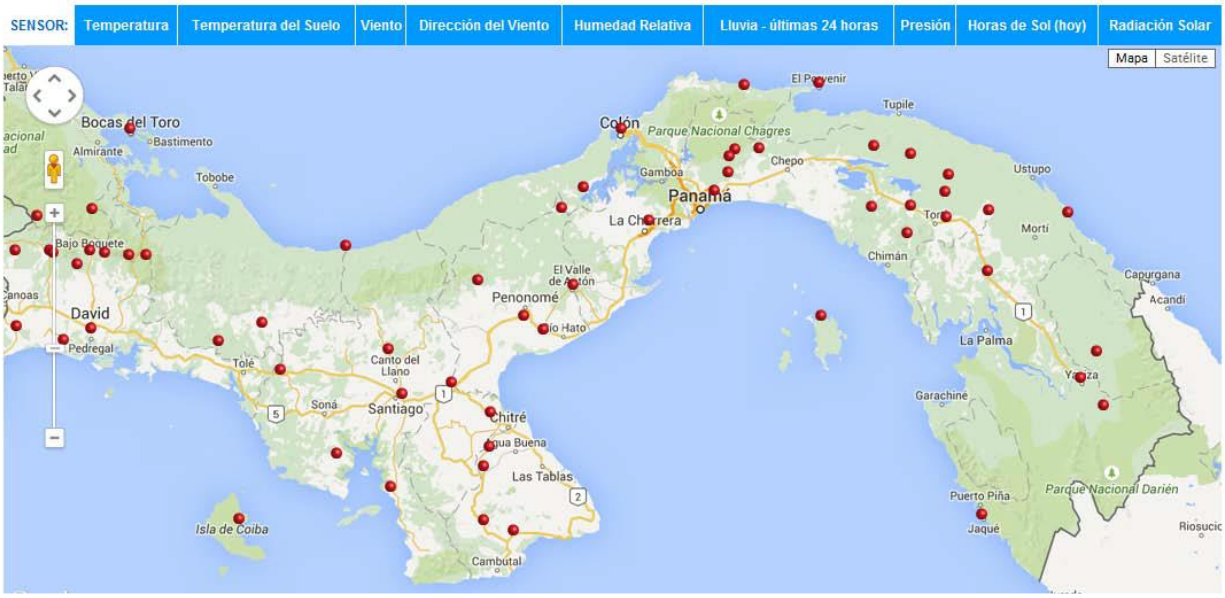
One of the main technical problems encountered is the lack of a culture of documentation, recording and provision of information, both meteorological and social, which could relate to climatic aspects. A system of indicators to evaluate economically relevant resources in Panama, such as coastal and marine resources, agriculture, biodiversity, water resources and energy, should be applied at the national scale with a databank that spans several decades as a vital part to orient decision-making on integrated resource management.

This component focuses on strengthening the existing hydro-meteorological network and enhancing key climatic information products to support planning and inform adaptive measures at local level and regional level, for mitigating the impacts of climate change and climate variability induced risks particularly in critical areas, such as of the Arco Seco portion of the SMRW. The overall objective of this component is to improve the gathering, monitoring and processing and dissemination of climatic data, improving the climate information baseline to support informed adaptive and risk reduction measures for climate risks affecting vulnerable communities.

Hydrometeorological Stations (Total = 215)			
Meteorological		**Hydrological**	
Type A	5	Limnigraphical	34
Type B	20	Limnigraphical	0
Type A Automatic	21	Automatic	22
Type A Satellite Automatic	13	Satellite Automatic	8
Rain Cans	3		
Rain Gauges	67		
Automatic Rain Gauges	22		
Total	**151**	**Total**	**64**
Conventionals	95 (63%)	Conventionals	34 (53%)
Automatic	56 (37%)	Automatic	30 (47%)

Source: ETESA web-page. Hydro-meteorological Network. Hydromet

Map 10. Meteorological Satellite stations



Source: ETESA web-page. Hydro-meteorological Network. Hydromet

One of the principal limitations on the application of adaptation measurements to Climate Change and the reduction of disaster risks is to know the degree of certain of the climate variables for medium and long terms. This component is designed to support on the process of modernization and strengthening the National Hydrometeorology Net.

To advance in these objectives the following activities will be developed.

3.1 Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds.

Highlights of the technical solution:

Technical meetings with the Department of Hydrometeorology of ETESA, Unit on Climate Change and Watersheds Ministry of Environment and the Ministry of Agricultural Development for the verification of needs and areas for installation, nationwide stations were made to meet the expansion and modernization of the National Hydro meteorological Agro-Net, maintaining appropriate procedures to be carried out at each facility, *by the standards of the World Meteorological Organization (WMO) and the Technical Regulations (WMO-No 49)*. It will be executed under 3 modalities:

1. Installation of new satellite meteorological stations with equipment to obtain agro-meteorological data.
2. Adding to complete meteorological instruments and meteorological stations.
3. Change of the traditional stations (manual) to automated stations.

The facilities and commissioning of automatic weather stations with satellite transmission, include a security perimeter fence, as indicated by ETESA sites and the Ministry of Agricultural Development.

Activities include:
Complete modernization of existent conventional stations with new automated equipment. Strengthening existent stations network and installation of new stations nearby, to complement/enhance observations of existing stations. Based on ETESA´s analysis and planning, the Programme will support the installation and implementation of TYPE A automatic weather stations; i.e, weather stations that meet the quality standards for robust observation and measure at least 7 parameters (rainfall, wind, relative humidity, air temperature, day length, barometric pressure and solar radiation). It is essential to have these observations in real time, meaning that the observations are transmitted in a very short time interval via satellite; allowing monitoring program activities to be remotely monitored in a timely basis. To date, the Department of Hydrometeorology of ETESA has successfully completed the acquisition of 30 Type A automatic weather stations for satellite transmission, based on competitive bidding process. The Adaptation programme will support the preparation and acquisition of a new suite of hydro meteorological stations to increase climate data collection and analysis at the national scale, including the

Program intervention areas. [28] The network will encompass automated stations; automated hydrological stations, automated climatological stations and automated precipitation stations with satellite transmission. The final sites for installation of the stations will be jointly defined among ETESA, Min. of Environment, MIDA and other relevant entities.

Table 26. Technical specifications of the stations provided by ETESA

Technical Specifications	
1.	The installation of structures in meteorological stations shall include perimeter fence with a metal door and locked access.
2.	The installation of the metal box hosting the electronic system and transmitter shall be on a still mast, next to the tower.
3.	The transmission antenna, solar panels and other equipment such as rain gauges will be installed in appropriate structures, in such way they can be supported and protected.
4.	Installation of metal and/or pvc pipelines which will protect the sensors wiring.
5.	The proponent shall be totally responsible for the transportation of such stations, using his own means (boat, engine, fuel, and crew) and shall also offer transportation for ETESA staff assigned for the supervision of this mission's works. In order to ensure ETESA worker's safety, the proponent shall submit to ETESA the proposed travel plan specifying the kind of transportation and operators.
6.	The proponent shall provide and transport all construction materials required for the installation of equipment to designated sites.
7.	The proponent shall submit a final report about the installation and commissioning of each station, and such report shall include data, pictures, maps and diagrams regarding the work done.
8.	Tower for sensors, metal box and other necessary accessories: a) All components, including the data recording unit, sensor interface, telemetric transmitter, battery and regulator, will be located inside a sealed weather resistant box protected against rainwater. b) All electric connections for this protection box shall be made of waterproof connectors, complying with an IP64 protection level as a minimum. c) The equipment box should have a grounding contact in its lower part, that serve as a common connection with a copper plated steel rod, 6 feet long and 5/8 inch in diameter. d) The joints of the sections of the tower must fit one inside the other and must be secured with bolts. e) The metal tower accessories (bolts, nuts, fasteners, etc.) must be stainless steel. f) The tower must have a protection system against electric discharges, the same that must comprise of a lightning rod, a drop cable isolated from the mast and ground rod 5/8 inches by 6 feet long, attached to the box. g) For the equipment metal box support, it must include a pole or galvanized steel pipe 4 inches in diameter and 2.0 meters long with a ½ inch platen welded at the upper end with 2 feet long forming a "T", at the lower end must be welded at least 3 iron bars 1.5 feet long arranged as anchorage. h) To support the rain gauge, it must include a pole or galvanized steel pipe 3 inches in diameter and 1.5 meters long and at the lower end it must be welded at least 2 iron rods 1.0 feet long arranged as anchorage. i) Cables used for system connections shall be UV rays resistant.

[28] Based on information provided by ETESA technical staff to the Ministry of Environment, in the context of the proposal development works. Institutional email communication. January 2016.

	j) All extra metal brackets and accessories required for the automatic station must be made of corrosion resistant materials, including but not limited to stainless steel, anodized aluminum or deep galvanized iron.
9.	Metallic perimeter fence: a. Must cover an area of approximately 25 square meters at least, keeping within this perimeter the wind anchor bases of the tower tensioners. b. Must use galvanized round pipes of 1 "diameter, schedule # 40. c. Must have cyclone type mesh, 11 gauge, 5 feet tall. d. The cyclone mesh must be anchored to the ground with concrete e. Must have security serpentine (trench wire) of 10 or 12 inches in diameter at the top, all around. f. Must have an access door made of pipes with wire cyclone mesh, chain and security padlock.

REPUBLIC OF PANAMA
MINISTRY OF AGRICULTURAL DEVELOPMENT
NATIONAL DIRECTION FOR AGRICULTURE

Table 27. Crops per region in areas of interest for the Ministry of Agriculture Development

Development and Transfer of Agrotecnology	Possible location	Region	Crops
1	Alanje	R1 CHIRIQUI	Rice, corn, root crops, oil palm, banana and plantain (banana and plantain), fruit (papaya, mango, pineapple)
2	San Andrés		
3	Pogreso		
4	David		
5	Bugaba		
6	San Juan		
7	Arena	R2 VERAGUAS	Rice, roots and tubers, cucurbits, sugar cane.
8	Mariato		
9	Soná		
10	Río de Jesús		
11	Atalaya		
12	Santiago		
13	Calobre		
14	Guarumal		
16	Las Minas	R3 HERRERA	Rice, cucurbits, corn, Solanaceae (pepper, tomato), legumes (beans)
17	Ocú		
18	Santa María		
19	El Roble	R4 COCLE	Onion, pepper, coffee, citrus fruits, beans, rice, sugarcane, corn, beans, squash, tomatoes, fruit.
20	Natá		
21	Penonomé		
22	Toabré		
23	Río Hato		
24	San Carlos	R5 CAPIRA	Coffee, citrus, vegetables, pineapple, cilantro, herbs, fruit, cucurbits, rice, coffee.
25	La Chorrera		

Development and Transfer of Agrotecnology	Possible location	Region	Crops
26	Nueva Arenosa		
27	Capira (pacífico)		
28	Buena Vista	R6 COLÓN	Banana, coffee, cocoa, roots and tubers, vegetables, coconut
29	Palenque		
30	La Mesa	R7 CHEPO	Rice, corn, hot pepper, sweet pepper, coriander, banana, roots and tubers, beans, okra.
31	Chepo		
32	Cañita		
33	Tortí		
34	Tonosí	R8 LOS SANTOS	Corn, rice, vegetables (peppers, tomatoes), cucurbits, fruit, plantain.
35	Macaracas		
36	Pedasí		
37	Pocrí		
38	Las Tablas		
39	Las Trancas		
40	Los Santos		
41	Guararé		
42	Bocas del Toro (Changuinola)	R9 BOCAS DEL TORO	Plantain, cocoa, rice, bananas.
43	Santa Fé	R10 DARIEN	Rice, roots and tubers, bananas, vegetables (peppers), corn, fruit (borojo), beans
44	Yaviza		
45	Meteti		
46	Soloy	R11 COMARCA NGOBE BUGLE	Beans, pigeon peas, roots and tubers, Musa (plantain and Chinese banana), corn
47	Hato Julí		
48	Alto Caballero		
49	Buenos Aires		

MIDA´s institutional interest and plans to advance towards the establishment of a network of agro meteorological stations was validated during the consultation process. Discussions about the siting of the stations, technical specifications of the sensors to meet specific agriculture information needs, took place at the workshop in SMRW. Thus, Fundacion Natura identified technical staff at the regional level in MIDA to form a specific working group that will be responsible for defining specifics of the network equipment and functioning that will be included in the bidding documents for this component. This working group will function as an ad hoc subcommittee of the National Climate Change Committee.

Important facts:

1. This component, which is intensive in terms of the amount of resource allocated within the programme (US$2 million dollars), will benefit from previous recent bidding and public purchasing processes conducted by ETESA, particularly the Contract No. GG-172-2015 for the acquisition of automatized meteorological stations with transmission by GOES", dated December 4, 2015, as stated in copy of the contract provided by ETESA.

2. In addition to the stations purchase and installation, this component implies the assessment of existent capacities in ETESA-Hidromet and MIDA, to manage the upgraded network to generate, analyse and disseminate climate data to the different users across the nation. The "creation" of a demand for this data and climatic services is part of the logic of this component. This knowledge process is in the core of this component.

3. Establishment of "climate nodes" in the Ministry of Agriculture (MIDA) to interact with ETESA network is a new application that will be enabled by the Programme and its capacity building activities.

The upgraded national network with the new satellite meteorological stations with agro meteorological sensors, that will be installed by the Adaptation Programme is shown in the image below.

Farms in all segments (high, medium, low and without technology) of the country will be affected to a greater or lesser degree by climatic variables according to the 2nd. National Communication to the UN Framework Convention on Climate Change (UNFCCC) and current analyzes are being made to be presented at the 3rd. National Communication. The proposed agrometeorology node for MIDA, will contribute to the development of agriculture with a better understanding of the effects that the climatic variables are exercising in the agricultural production systems in the country.

MIDA, as regent of agricultural activity in the country in conjunction with other institutions in the agricultural sector and accompanying ETESA (Law No. 6 of 3 February 1997 Hydro meteorological functions and responsible for the hydro meteorological network nationally) will lead the spreading of information of agrometeorological activity, in an understandable and easy language way for all concerned, free of charge, and available through the website of MIDA, different Links with public access to the entire agricultural sector.

For this product computer equipment, will be installed in the regional offices and sub-offices of the MIDA, in areas most vulnerable to climate change in the country which will be selected by the technical team specialized technical team of MIDA. Among the projections technicians and producers must be strengthen, so they can provide and understand information to manage activities such as irrigation or pest or disease monitoring, planting dates, etc. In addition, projects include early warning systems early to pests and diseases. In consultation with the Technological University of Panama, Las Tablas Regional verified that is starting a process for the creation of an early warning system for pests; once the of resources are allocated to the program, negotiations will start to implement it in the agrometeorological node with the adjustments required. It is very important to have the technology and measuring instruments of the agro-meteorological variables in different areas and main places of agricultural production in our country.

3.4 Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts*

Adaptation interventions have now become an integral part of plans and policies to deal with changing climate, but they are often also integrated into general development efforts. However, little evidence exists yet on the success of these measures in reaching their intended objectives, and/or contributing to development, and/or mitigation efforts. One important step in making adaptation count is to design appropriate monitoring and evaluating mechanisms for adaptation investments that can contribute to evidence-based decision-making in the future. Whether an adaptation measure has produced desirable results or not, or if, the measure is in progress, whether it is on a desirable path or not are issues that can be tackled by M&E processes. In contrast to mitigation investments, each adaptation investment is unique, not easily replicable, often bottom-up, very site-specific. While the secondary and tertiary benefits of adaptation may cut across various sectors, the design, implementation and immediate benefits are specific to a location.[29]

[29] Good practice in designing and implementing national monitoring systems for adaptation to climate change". CATIE-CTCN. 2015

Although several adaptation projects have been initiated in Panama, there is not a systematic and formal methodology or tool to assess the impact of such efforts. The purpose of this activity is to provide a M&E framework for the adaptation initiatives conducted in the country at a national/local scale, emphasizing, but not restricted, to the components and activities of the proposed Adaptation Programme.

The following aspects will orient the design and implementation of the system[30]:

- Indicators: To choose an appropriate set of indicators which focuses on the key issues and information needed for decision making. For this purpose, the indicators will reflect the local context, the processes that will be monitored and the progress of these processes. To define the set of indicators will be defined based on factors that define climate change vulnerability (exposure, impacts, sensitivity) as a guide, for this purpose it is necessary to demonstrate that the prioritization of adaptation actions is actually focusing on a useful priority.
- Integrating the indicator system into existing development structures and procedures, by adding adaptation issues. Interactions will be explored with existing health and hydro meteorological monitoring systems.
- Define how the monitoring and evaluation reports will be included systematically in decision making spaces defining mandates and reporting channels with established authorities.
- Considering that adaptation is a complex process over the long term, one about which we still know very little, the approach for setting up the indicator system will be flexible and pragmatic in terms of goals setting, defining processes, selecting indicators and finding adequate data.
- A participatory approach to involve a wide range of relevant stakeholders during the design and implementation stages of the indicator system.

The M&E protocol shall be particularly sensitive to measure and evidence impact/effects on mitigation and social co-benefits of the adaptation measures, including gender considerations and impacts in other sectors, such as health and poverty and potential mitigation co-benefits.

Note. Project strategy to ensure synergies between components 1 and 3 is described in Part III, section A. Describe the arrangements for project/programme implementation and A2. Institutuonal arrangements at the executing level.

[30] Based in the lessons learned identified in the document: “Good practice in designing and implementing national monitoring systems for adaptation to climate change”. CATIE-CTCN. 2015

Component 4. Rising awareness and establish an adaptation knowledge exchange platform to respond to and to mitigate impacts of climate change related events

Table 28. Description of component 4

Project / Program Components	Expected Concrete Outputs	Expected Outcomes	Amount (US$)
4. Rising awareness and establish a knowledge exchange platform to respond to, and to mitigate impacts of climate change related events	4.1 Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures	Improved institutional capacity, knowledge management, and awareness on climate change adaptation	**US$754,870**
	4.2 Strengthened professional capacities for the climate data analysis and processing, for different sectors involved		
	4.3 Strengthened professional capacities on water resources management by incorporating climate change adaptation approach		
	4.4 Systematized and disseminated experiences on climate changes adaptation, nationwide		
	4.5 Portal for Climate Change Adaptation in Panama, implemented		

National Knowledge Platform for Climate Change Adaptation. Capacity to make use of climatic information is limited in terms of both national coverage and in the use and translation of meteorological data into useful climatic information, making it less valuable for decision making. In all of the socioeconomic sectors, there is recognition that having competent agencies for the provision of climatic information (official data, information and forecasts) represents an advantage at the moment of formulating monitoring systems such as early alert.[31]

[31] Second National Communication to the United Nations Framework Convention on Climate Change Executive Summary

As stated in the Second National Communication to the UNFCCC, specifically, to strengthen institutional and individual capacities for better understanding of climate change and its effects, emphasis should be on:

- Knowledge and prediction of climate changes at the national, local and district levels
- Quantification of climate change impacts at the national, local and district levels
- Identify ways to eliminate obstacles that hamper the adoption of adaptation technologies and measures in the different national socioeconomic sectors
- Qualitative and quantitative estimation of the costs of adaptation and of not adapting
- Quantification of the costs of planned, unplanned and unforeseen mitigation measures

Efforts in this component will consider the guidelines and recommendations of the Nairobi Work Programme, particularly those derived from the Latin-American Knowledge Adaptation Initiative, particularly in terms of the methodology to define knowledge adaptation gaps and hands-on recommendations to fill those gaps.

The main guidelines are in the core of this knowledge component:

- All projects described in the components below will include the generation of "knowledge products" derived from the implementation. This means that TORs for every on the ground project, will explicitly include knowledge products as deliverables, such as working documents; policy briefs; technical guidelines/recommendations; info-graphics, audio visual aids, others, that will constantly feed the adaptation platform.
- A knowledge management process and responsible person will be dedicated to ensure this knowledge production, dissemination and exchange across the whole program. This task will also be highlighted in the Program Coordinator TORs.

This knowledge management function will be responsible of ensuring that the different participative events of the Programme, include the use of the materials generated by the Programme. This is particularly important regarding knowledge exchange with local stakeholders that don`t have access to online resources.

4.1 Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures

This output aims to create a shared understanding of the climate change adaptation dimension and the logic of intervention of the program based in the nexus approach. To do this, 3 specific activities will be conducted:

a) Technical working sessions with key implementing partners and project staff to define WorkPlan, coordination arrangements and kick off meetings/requirements. This activity also includes the development and facilitation of training sessions with key project staff and partners about the nexus approach to water–energy–food security as an option for adaptation to climate change.

b) Inception workshops with local and national stakeholders to present the approved programme; revisit programme rationale, scope, define shared visions and operational arrangements for programme implementation. At least 2 local workshops, one for each watershed with local stakeholders. One national workshop with government and civil society stakeholders to present the Programme, identify synergies with other ongoing adaptation efforts/initiatives and define operational and coordination aspects.

Workshops listed in 4.1a and 4.1b above, will include a gender sensitization training to secure project staff comprehension of gender specific issues.

c) Socialize the SMRW and the CHVW vulnerability analysis to facilitate the implementation of identified adaptation measures. If vulnerability analysis is not sufficiently disseminated within the communities and water users, they will not accomplish the purpose of serving as a tool to improve adaptive capacity. To this end, specific activities will be conducted to ensure devolution of information to the communities and stakeholders who participated in the process.

4.2 Strengthened professional capacities for the climate data analysis and processing, for different sectors involved

For this purpose, the following activities will take place:

a) Training on climate modeling course with special emphasis in future scenarios that impact the food and energy generation activities (at least 40 participants). The target audience for this training is technical staff from both government and non-government institutions, including but not restricted to regional technical staff at the CHVRW and SMRW. An important note is that the modelling tools that will be used for the training courses to the extent possible will be based in open sourced platforms, so that the participants will have no further impediments to apply the acquired knowledge and skills.
b) International training: Climate change adaptation: Role of the Eco-Systemic Services (40 participants nationwide, including key actors of the 2 priority watersheds CHVRW and SMRW). Together with CATIE. Arrangements will be made with course providers to include training on identification and valuation of eco-systemic services of water supply, focusing on hydrological modeling tools to determine hydrological profits. One of these tools is the one developed by the Natural Capital Project known as INVEST, which is “a suite of free, open-source software models used to map and value the goods and services from nature that sustain and fulfill human life. InVEST models are based on production functions that define how changes in an ecosystem’s structure and function are likely to affect the flows and values of ecosystem services across a land- or a seascape. The models account for both service supply (e.g., living habitats as buffers for storm waves) and the location and activities of people who benefit from services

(e.g., location of people and infrastructure potentially affected by coastal storms).[32]

4.3 Strengthened professional capacities on water resources management by incorporating climate change adaptation approach

This activity is linked to the hydrological balances and environmental flows analysis. The target audience for this training is technical staff from both government and non-government institutions, including but not restricted to regional technical staff at the CHVRW and SMRW. Training will include open source, spatially-explicit and modular tools and methodologies. The following formal training activities will be replicated in Panama:

a) International training on participative integrated watershed management. Ministry of Environment -Wetlands International (40 participants nationwide, including key actors of the 2 priority watersheds CHVRW and SMRW).
b) International training on adaptation based on ecosystems in marine coastal zones (20 participants).

These trainings will be carried out by Wetlands International in coordination with the Ministry of Environment, and the support of CATHALAC[33] and CREHO[34].

Full and partial scholarships to participate in the courses will be offered. For choosing course participants, a selection process will take place at the national level through an open platform. The selection process will consider professional background, the working sector, the potential for replicating gained knowledge, among others.

[32] Invest is an ecosystem services modelling tool developed by the Natural Capital Project, operated as a partnership between Stanford University and the University of Minnesota, The Nature Conservancy, and the World Wildlife Fund
[33] Water Center for the Humid Tropics of Latin America and The Caribbean (CATHALAC).
[34] Ramsar Regional Center for Training and Research on Wetlands (CREHO).

Important facts:

1. An interphase with the Technological University of Panama (UTP) will be designed and implemented to ensure that knowledge derived from this suite of specialized courses contributes / feed the curricula that the University is developing to mainstream climate change as a cross cutting topic in the graduate and post graduate curricula.
2. This interphase might include provision of funding to support specific research studies related to the different projects included in the Programme. This is particularly relevant regarding the agroforestry and agrosilvopastoral projects included in Outputs 1.2 and 1.4, for the development of methodological tools to enable mid and long term monitoring of the adaptation effects, as well as to advance towards preliminary research on carbon sequestration potential of the proposed activities.
3. Through this interphase, the Programme aims to guarantee long-term learning impact, which sometimes is a weakness of the specialized courses model, because of institutional staff rotation, lack of equipment (hardware and software) and other similar institutional gaps.

4.4 Systematized and disseminated experiences on climate changes adaptation, nationwide

a) Systematization process of current and planned adaptation action in Panama, including but not restricted to this Adaptation Programme. A mapping exercise and analysis of projects / initiatives undertaken will be made. A technical and practical document that will be available in print and digital format will be developed.
b) A suite of 10 workshops will be held at national level (1 per province) to present the document. These workshops will be organized jointly with universities.

4.5 Portal for Climate Change Adaptation in Panama, implemented - Adaptation knowledge management and communication strategy

The purpose is to enable adaptation knowledge popularization at all levels. To do this, the Programme includes the following activities:

4.5.a Communication strategy and systematization of experiences from the program. The design and implementation of this strategy is a key action to secure national and local appropriation of the programme activities and results; to enable effective and permanent public participation and transparency. This communication strategy will identify actions at different levels, including participatory activities, media and social media platforms; interaction with other ongoing adaptation efforts and continuous feedback from direct and indirect programme beneficiaries and stakeholders.

4.5.b Design and operation of the Portal for Climate Change Adaptation in Panama. This portal will serve as a gateway to the progress on adaptation to climate change in the country. It will also provide information and guidance on adaptive processes globally, so that existing online resources about adapting to climate change can be effectively used. The portal will keep a log with the proposed program progress on climate change adaptation, and it will serve as an interactive channel with direct project beneficiaries and the general public. Activities include: Design of portal structure and contents; Portal continuous update and maintenance.

4.5.c Compilation and synthesis of materials for different audiences -farmers, institutions, academia, etc.- on adaptation to climate change (as part of the "knowledge products" generation process). This activity will particularly include a specific material to address the vulnerability of women, measures adopted to overcome this and examples from the AP that could be replicated by other projects.

4.5.d Training on the use of the portal for different audiences, including the access and use of climate data by vulnerable communities with limited access to online resources

4.5.e Establishment of an advisory technical committee within the Climate Change National Committee to orient the program´s knowledge management process.

4.5.f Exchanges of experiences of activities at the local level, "pasantía" (guided study tours):

- ✓ For capacity building on agroforestry, sustainable cattle ranching, and irrigation systems in operation; (international); to be carried out at mid-term of proposed projects implementation.
- ✓ For capacity building on the EWS (international).
- ✓ For farmer-to-farmer exchanges at SMRW and ChVRW, emphasizing in the exchange of pest management techniques derived from the ASP in SMRW to the cattle producers in Caisan.
- ✓ One international study tour to visit a functional AgroSilvoPastoral system

The identification and selection of the "study guided tours "pasantías" will be done considering suggestions from the stakeholders (experts and beneficiaries) participating in the projects, as well as recommendations from F. Natura based on technical research, to ensure quality pertinence, relevance and cost benefit figures.

Two way interactions included in this activity 4.5f as guided visits, are conceived as STUDY TOURS (The visit or series of visits by groups of beneficiaries within sites with a specific adaptation-learning goal and to experience firsthand how the adaptation measure was or is being implemented). The study-guided tours will be designed considering the following aspects: the participants profile; group size; time; logistical constraints and resource availability.

Audience: The exchange will target farm owners from both watersheds. The groups will be of 5-10 persons, including at least 2 technical staff of the regional offices of MIDA and MiAmbiente.

The 3 study tours will be divided into 3 phases:

- Planning phase includes: a) Survey to help prioritize adaptation learning needs; b) Group brainstorming discussions to help the Fundacion Natura and the knowledge service provider target its delivery and develop appropriate learning materials; c) Series of video-conference-based dialogues involving all parties prior to the study tour to build trust and familiarity among participants and further prepare everyone for the visit.
- Delivery phase includes: a) the Field visits and meetings with project teams, local government officials, and beneficiary groups to understand first-hand the application of the adaptation measures; b) After action review: Action-planning and reflection session to document the experience and help participants think through how to act on what they have learned.
- Follow up phase includes: a) Focus group discussions to present lessons learned to other farmers and get input on the next phases of the implementation of the adaptation measures.

Affirmative actions will be undertaken across the activities of this component to promote participation of women implementing a gender perspective, as well as actions to incentive the participation of young people. For example: i) Include impact on women involvement and empowerment as a criteria for the selection of the project to be visited as part of the exchange of experiences; ii) Select and design one of the study tours or exchange activity where women involvement and empowerment is one of the main highlights of the project; iii) Define a 50/50 ratio of women and men participation in the study tour, establishing preference for eligible women participants.

A2. Program's contribution to the overall increase in resilience, in comparison to standalone individual projects

Four aspects have been identified as means of the proposed Adaptation Programme to promote increase in resilience in a more effective way in comparison with standalone individual projects:

a) The use of the nexus approach is the main programme strategy, rather than applying the traditional sectorial approach, which is usually the basis for standalone individual projects. The reasoning behind the project is that adaptation is a complex process which can`t be pursued successfully from a sectorial perspective. Using the Nexus approach will help us to better understand the complex and dynamic interrelationships between water, energy and food in Panama, exacerbated by unknown climate change conditions, so that we can use and manage our limited resources sustainably. The idea is that the programme will force us to think of the impacts a decision in one sector can have not only on that sector, but on others. By promoting synergies among the

different programme components, we can then design, appraise and prioritise response options that are viable across different sectors. For example, the EWS (output 3.2) is a response option viable for the 3 sectors involved in the project. It is expected to provide room for interactions and a stakeholder dialogue among farmers, the hydrological network managed by ETESA (energy sector), the institutions responsible for water issues analysis and the entity responsible for disaster risk management (SINAPROC). Currently in Panama, the advances in design and implementation of EWS has been carried as single projects, mainly conducted by SINAPROC, without further involvement of other users and stakeholders.

b) Another mean to promote increase in resilience derived from the nexus approach is that the programme has been conceived in a way that it pretends to include actions in 3 working areas: i) evidence (promoting the generation of reliable climate data-component 3) and implementation of on the ground adaptation measures (outputs 1.2-1.4); ii) scenario development (strengthening modelling skills through specialized training, output 4.1) and iii) response options (for ex. Development of EWS, output 3.2).

c) Another difference with traditional standalone projects is that the programme presents a combination of on the ground adaptation activities and actions to inform/influence decision making processes in the 3 sectors involved (i.e: elaboration of a new zoning map for agriculture and livestock production; technical documents with recommendations to improve the water concession process and to restore the hydrological cycle in highly intervened watersheds; technical document to promote microfinance sector engagement with adaptation efforts; a M&E protocol to track adaptation results at different scales). Standalone projects that do not apply an integrated approach often focuses either on implementation (evidence generation, for ex. through pilot projects) or policy processes fostering technical or policy dialogue without on the ground specific activities).

d) Finally, programme components have been designed in a way that components are independent, but connected, since results of one component serve as inputs for other component outputs. For ex., technical data resulting from 2.1 will serve as input for 1.1-1.5; 2.3 directly linked to 1.1

Table 29. Climate change specific orientation of the proposed programme, as opposed to BAU water management projects and agriculture best practices

A3. Climate change specific orientation of the proposed programme, as opposed to business as usual (BAU) water management projects and agriculture best practices

Output No.	Description	Budget Notes/Activities	Type of measure	CC risk or impact identified	Expected result on the ground	Difference with BAU water management or agricultural best practices
1. Increase climate change and variability adaptation capacity in agriculture, livestock, and energy production sectors						
Output 1.1	Concrete adaptation measures implemented for household water security	a) Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems.	Water harvesting systems widely accepted in climate change literature as adaptation measure	altered seasonal patterns of precipitation and run-of; unsustainable water consumption; severe water scarcity situation for human consumption and production	Improved water access for households (using quantity and quality indicators). Increased water supplies to meet demand	Linkage with participation in VIA analysis, water sources conservation projects and restoration of hydrological cycle in prioritized areas The project will promote reflection among participants regarding new storage and conveyance of water
Output 1.2	Pilot climate-smart farming projects implemented	a) Establish riparian reforestation and agroforestry projects with coffee and soil conservation systems at the Caisan river (CHVRW). This activity includes identification of farms according to results from the Vulnerability Analysis, Farm Management Plan (with identification of species, crops/area zoning, costs); and the design and establishment of gallery forest, as well as the agroforestry systems.	Riparian buffers listed as green infrastructure solution and ecosystem based adaptation measure for water management. (Green infrastructure guide for water management. UNEP-IUCN-The Nature conservancy. 2014)	altered seasonal patterns of precipitation and run-of	Erosion and flood control; water purification and biological control; biodiversity benefits; aesthetic and recreation values to communities engaged in the project; contribution to stabilization of stream flow and water temperature.	EBA approach is not explicitly included in agriculture best practices projects currently conducted in both watersheds
		b) Establish irrigation systems, with efficient and low cost technologies, to enhance agricultural production and increase crops yields. This includes: irrigation needs diagnostic; installation of pilot low cost irrigation system; technical assistance to farmers and companies for the implementation of the irrigation system; and monitoring and evaluation. It also includes -at Divalá-, a complement to the irrigation system consisting of an analysis of the water footprint for rice	Agriculture best practice. Climate change additionality linked to the use of climate data for system design and system development in the context of a wider adaptation programme	altered seasonal patterns of precipitation and run-of	Water management and water productivity increased, based in Water Footprint Methodology and indicators	Current irrigation systems do not incorporate climate data into design and implementation phases. This will be ensured by observing technical standards that include climate change considerations taken from climate smart irrigation projects in LAC; conducting training workshops for sustainable water use

Output No.	Description	Budget Notes/Activities	Type of measure	CC risk or impact identified	Expected result on the ground	Difference with BAU water management or agricultural best practices
		crops, which will allow identification of technological schemes for climate-smart rice production.				accordingly to the crop needs, crop stage and production calendar. In the context of this output activities, the Programme will generate discussion about the possibility of switching from use of freshwater to wastewater in order to increase availability of water for energy and agriculture.
Output 1.3	Pilot diversified financing and income source models implemented in vulnerable population areas	a) 200 has de agroforestry and 40 farm plans. b) Implement the strategic action of creating capacities for operating orchid and “naranjilla” crops, as well as establishing the correspondent commercialization scheme at CRSM. It includes training on establishment and management of orchid and “naranjilla” crops; design of business plans; development/improvement of seedling nurseries; advice and technical assistance for commercialization.	Market based approach to sustainable development and sustainable consumption and production. Climate change additionality depends on targeting vulnerable producers to climate and non-climate risks.	Extensive cattle raising model depleting soil and water resources, exacerbated by water scarcity problems due to severe drought. In depth analysis is included in the CAP.	Increased income generation for programme participants; discouraging traditional "potrero" extensive cattle ranching production system, avoiding advance of agricultural frontier to new areas;	Use of climate data to define production system, calendar and commercialization strategy.
Output 1.4	Concrete adaptation measures implemented for sustainable cattle ranching	a) Sustainable cattle ranching project implemented at SMRW, covering 600 hectares	ASP models recognized as good practice for climate change adaptation in rural LAC region. (Inventory of good practices for climate change adaptation in rural LAC region: options and lessons learned using the livelihood approach. EUROCLIMA Thematic studies ·4. EU, 2014). Also	Extensive cattle raising model depleting soil and water resources, exacerbated by water scarcity problems due to severe drought. In depth analysis is included in the CAP.	Increased income generation for programme participants; discouraging traditional "potrero" extensive cattle ranching production system, avoiding advance of agricultural frontier to new areas; increase productivity per hectare dedicated to cattle raising	ASP programme designed from a climate change perspective.

Output No.	Description	Budget Notes/Activities	Type of measure	CC risk or impact identified	Expected result on the ground	Difference with BAU water management or agricultural best practices
			recognized as non-regret EBA measure by international key institutions such as IUCN, CATIE, FAO, CIAT.			
Output 1.5	Enhanced sectorial support through climate financing instruments	a) Review current credit products offered to agriculture and energy sectors.	Enabling condition to promote adaptation, by facilitating access to climate finance options	Lack of access to climate finance options to implement adaptation initiatives	Understanding of barriers in the finance sector to effectively support adaptation efforts	
		b) Develop 4 business plans (2 for each watershed) to establish and operate mini-hydro energy projects, including the correspondent farm management plan, informative prospectus to access financing sources for climate change adaptation activities, and technical assistance offered to obtain such financing.	Enabling condition to promote adaptation, by facilitating access to climate finance options	Lack of access to climate finance options to implement adaptation initiatives	Generate evidence, "making the case" to support the hypothesis that financial risk to support adaptation initiatives could be appropriately quantified and managed.	Innovative approach. Climate finance options currently available at the corporative level, not oriented to support individual projects at the farm level.
		c) Socialize the concept of Microfinance, based on ecosystems and climate change adaptation. It includes: Development of Microfinance Institutions mapping for both watersheds; Informative/instructional meetings on Microfinance for Ecosystem-based Adaptation (MEbA) with Microfinance Institutions, and identification of those interested/willing to participate in the training and technical assistance, - Selection of 2 Microfinance Institutions (one at each watershed) to develop the training and technical assistance in order to design and offer one finance product. * To complete this activity, the program	Enabling condition to promote adaptation, by facilitating access to climate finance options	Lack of access to climate finance options to implement adaptation initiatives	Promote interest in local microfinance institutions for incorporating climate change adaptation into their portfolio of finance options	Innovative approach for the microfinance sector in the country

Output No.	Description	Budget Notes/Activities	Type of measure	CC risk or impact identified	Expected result on the ground	Difference with BAU water management or agricultural best practices
		will take into consideration the experiences and products developed in the context of the MEbA project at Perú and Colombia.				
2. Establish climate resilient water management instruments with integrated and community based approach						
Output 2.1	Analysis for climate change vulnerability done in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds.	a) Update SMRW Management Plan, incorporating the climate change dimension. It must include the analysis of current tendencies, future scenarios, potential socioeconomic impacts on the watershed, and duly prioritized adaptation measures.	VIAs considered a key step for science driven adaptation processes in the context of the UNFCCC	General	Management plan updated with climate change data and clear understanding of future scenarios of drought for the region.	Innovative approach. Few Climate Change VIAs conducted in Panama
		b) Analyze vulnerability of the CHVRW, and validate/adjust climate change adaptation measures identified by the Adaptation Program outlined in the watershed Management Plan.	VIAs considered a key step for science driven adaptation processes in the context of the UNFCCC	General	Validation of prioritized adaptation measures	Innovative approach. Few Climate Change VIAs conducted in Panama
Output 2.2	Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress	a) Identify the hydrological balance and environmental flow for the SMRW, specifically at the Gallito river micro watershed.	Generating on the ground evidence of the water-energy-food-climate change nexus	altered seasonal patterns of precipitation and run-of	Improved level of participation and stakeholders dialogue	Science-policy Interface. Technical information available to inform the dialogue, available for all participants in an equal access basis
		b) Identify the hydrological balance and environmental flow of the CHVRW, specifically at the Caisán river micro watershed.	Generating on the ground evidence of the water-energy-food-climate change nexus	altered seasonal patterns of precipitation and run-of	Improved level of participation and stakeholders dialogue	Science-policy Interface. Technical information available to inform the dialogue, available for all participants in an equal access basis
		c) Develop a technical document with criteria to consider during the process of granting water use permits for agriculture and power generation -based on information and findings from the environmental flows analysis.	Generating on the ground evidence of the water-energy-food-climate change nexus	altered seasonal patterns of precipitation and run-of	Ministry of Environment using climate data to justify approval or rejection of water concessions	Science-policy Interface. Technical information available to inform the dialogue, available for all participants in an equal access basis

Output No.	Description	Budget Notes/Activities	Type of measure	CC risk or impact identified	Expected result on the ground	Difference with BAU water management or agricultural best practices
		d) Review current concessions on both watersheds, based on the technical document, in order to determine recommendations for improving or restoring the water cycle.	Generating on the ground evidence of the water-energy-food-climate change nexus	altered seasonal patterns of precipitation and run-of	Ministry of Environment using climate data to justify approval or rejection of water concessions	Science-policy Interface. Technical information available to inform the dialogue, available for all participants in an equal access basis
Output 2.3	Increased hydrological security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security	a) Design 2 district plans for water security, incorporating climate information (1 at each watershed, SMRW and CHVRW).	Mainstreaming adaptation into sectorial and development planning	altered seasonal patterns of precipitation and run-of	Municipalities actively engaged in adaptation action	Adaptation action traditionally reserved for public and private environmental institutions
		b) Complement current technical analysis to elaborate a new national map for agriculture and livestock production in the country, based on climate and water management data generated by the program. For the first time, solutions oriented to switching to drought tolerant crops will be discussed based in climate analysis.	Mainstreaming adaptation into sectorial and development planning	altered seasonal patterns of precipitation and run-of	Ministry of Agriculture long term strategic planning informed by the new climate information. New map officially adopted as planning tool.	Innovative approach.
3. Strengthened local-national capacity for monitoring and decision making to reduce and respond to risks associated with climate change						
Output 3.1	Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds	a) Design and operation of the National System for Climate Data, by upgrading ETESA´s existing network for recording hydro-agro meteorological information from hydrographic watersheds.	Capacity building for climate change science and future analysis	Limited access to future scenario analysis due to lack of capacity to generate, systematize and deliver climate data in a timely basis	Consolidated network at the national scale; providing information and climate data to public and private stakeholders in an equal access basis	Currently access to climate data is limited; particularly for non-government stakeholders
Output 3.2	Established an early warning system to identify in advance, the necessary measures in case of hydro-climatic	a) Implement the sound warning system at the communities included in the CHVRW early warning system; and complete signposts along communities at risk areas. This EWS is focused on floods.	Capacity building for adaptation response	Losses due to extreme weather events	Response capacity improved for drought and flooding events. More communities and people trained	EWS are not widely distributed across the country currently. Programme will positively improve this trend.

Output No.	Description	Budget Notes/Activities	Type of measure	CC risk or impact identified	Expected result on the ground	Difference with BAU water management or agricultural best practices
	events that could affect food production and power generation	b) Implement an early warning system for floods and droughts at the SMRW.	Capacity building for adaptation response	idem	idem	idem
		c) Workshops and simulations to train technical staff and communities on the early warning system.	Capacity building for adaptation response	idem	idem	idem
Output 3.3	The NSCD interfaced and equipped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information	a) Interface and equip the NSCD with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information.	Capacity building for adaptation response	Limited access to future scenario analysis due to lack of capacity to generate, systematize and deliver climate data in a timely basis	Farm owners accessing climate data to adjust production cycles and calendars	Current approach is mainly stationery and reactive; programme will promote an integrated and systematic approach
Output 3.4	Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts*	a) Design a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program. This includes program inception workshops with public and nongovernmental relevant stakeholders (at least three workshops). *This program will serve MiAmbiente in starting to evaluate progress of other adaptation efforts being implemented in the country. Esta parte la vería Mayte	Capacity building for Adaptation M&E and to assess adaptation impact	General	Assessment of impacts of adaptation investments conducted	Innovative tool. In the present, there is lack of a protocol that could be used at different scales
4. Rising awareness and establish a knowledge exchange platform to respond to, and mitigate impacts of climate-related events from local and national scope						
Output 4.1	Improved awareness of watersheds vulnerability and participation of population groups	a) Socialize the SMRW and CHVRW vulnerability analyses to facilitate the implementation of identified adaptation measures.	Adaptation knowledge capacity building	Lack of understanding of the climate change dimension	Climate change dimension included in local organizations decision making processes	Limited access to adaptation information; communities participate in consultation process, but afterwards is not informed or directly engaged in implementation efforts

Output No.	Description	Budget Notes/Activities	Type of measure	CC risk or impact identified	Expected result on the ground	Difference with BAU water management or agricultural best practices
	in adaptation measures					
Output 4.2	Strengthened professional capacities for the climate data analysis and processing, for different sectors involved	a) Offer a Climate Modelling Course with special emphasis on future scenarios impacting food-energy generation activities (at least 40 participants).	Adaptation knowledge capacity building	Limited technical capacity for climate change analysis	Planning and future analysis conducted at different levels using climate data	Capacity building activities will include participants at the national and local level, government and non-government sectors
		b) Offer an international course on Adaptation to Climate Change: Role of Ecosystem Services (40 participants nationwide, including stakeholders in the two prioritized watersheds).				
Output 4.3	Strengthened professional capacities on water resources management by incorporating climate change adaptation approach	a) Offer an international course on participatory and integrated watershed management emphasizing conflict management skills (40 participants nationwide, including stakeholders in the two prioritized watersheds).	Adaptation knowledge capacity building	Sectorial approach for water management, not considering climate data	Water users and institutions with water related competencies use climate data in a regular basis for planning, budgeting and reporting purposes	Capacity building activities will include participants at the national and local level, government and non-government sectors
		b) Offer an international course on ecosystem-based adaptation at marine-coastal zones. (20 participants)	idem			
Output 4.4	Systematized and disseminated experiences on climate changes adaptation, nationwide	a) Mapping and analysis of projects / initiatives undertaken. A technical and practical document that will be available in print and digital format will be developed.	Adaptation knowledge capacity building	Limited access to information about adaptation project results.	Improved understanding of adaptation experiences, translated into improvements in adaptation projects planning and implementation skills, both at the local level in CHVRW/SMRW and at a national scale	The Programme will promote extensive lessons learned sharing, through national and local events. Systematization of lessons learned by the Programme will be conducted in parallel to project implementation, as opposed to do it at the end of the project implementation
		b) 10 workshops will be held at national level (1 per province) to present the document.	idem			

Output No.	Description	Budget Notes/Activities	Type of measure	CC risk or impact identified	Expected result on the ground	Difference with BAU water management or agricultural best practices
Output 4.5	Portal for Climate Change Adaptation in Panama, implemented	a) Design and operation of the Portal for Climate Change Adaptation in Panama.	Adaptation knowledge capacity building	Information on climate change adaptation available, but not organized accordingly to users' needs. Each institution generating their own adaptation library, without an integrated/coordinated approach. Technical information not always available in Spanish	Updated adaptation information available for public use	Portal nested into national government entities to ensure sustainability
		b) Compilation and synthesis of materials for different audiences on adaptation to climate change.	idem	idem	Increased public awareness about climate change causes, impacts and adaptation options	Currently not available
		c) Training on the use of the portal for different audiences (producers, institutions, academia, etc.).	idem	idem	idem	n/a
		d) Communication strategy and systematization of experiences from the program.	idem	idem	idem	Accepted best practice for project management.
		e) Establishment of an advisory technical committee within the Climate Change National Committee to orient the program´s knowledge management process.	idem	Limited participation in the Committee;	More institutional resources dedicated to participate in the Committee. Increased interest of institutional staff to participate in the committee.	Innovative approach regarding the climate change national committee current dynamics
		f) Experience exchanges activities at the local level, including at least one international technical guided visit.	idem	Limited access to information about adaptation project results, limitations and lessons learned.	Climate change dimension included in local organizations decision making processes	Activity not implemented in a regular basis, due to lack of financial resource; programme proposed will make a difference in this regard.

A4. Additional adaptation reasoning

1. The adaptation strategies proposed by the Programme can be classified mainly as managerial (requiring changes in the overall management of water and the roles played by individuals, communities and government institutions) and awareness raising – informing communities and households how to deal with climate risks through specific ecosystem based adaptation measures. Construction of infrastructures is limited to the irrigation and water harvest systems. Specific actions include:

    a. Climate proofing to strengthen the resilience of local populations, ecosystems and economies to the impacts of changes of temperature and rainfall patterns (ecosystem based adaptation measures such as best practices for soil and water conservation & diversification (1.2a, 1.3, 1.4);
    b. Water management, including water storage and water conservation to ensure the sustainable and efficient use of water in, thereby reducing demand. (1.1, 1.2b)
    c. d) Research, monitoring and risk management. The likelihood of natural disasters in both watersheds is expected to increase considerably due to changes in temperature and rainfall patterns (2.1, 2.2, 2.3, 3)

2. The rationale of the adaptation process could be summarized in 3 common steps: a) Identify current climate changes and their implications for local natural systems, rural livelihoods and local communities; b) Identify possible options to support local strategies for adaptation to climate change; c) Prioritize these possible response options as activities and initiatives that will form the basis of local action plans. An important note is that in absence of specific and sound climate data (which is one of the issues tackled by the Programme), the proposal design observed the following premise:

    a. The AP is based in previous planning processes that walked the steps mentioned above, particularly taking advantage of the existence of official approved Management Plans (2014 for the CHVRW and 2009 for the SMRW). In the case of CHVRW the Management Plan, it includes a Climate Change Adaptation Programme. The Conservation Area Plans developed in 2014 for the Caisan River subwatershed in CHVRW and Gallito Subwatershed in SMRW have been used also as basis for the proposed actions.

3. Lessons learned in adaptation and how they are reflected in the AP:

    a. The adaptation of the agricultural sector requires work at different scales, from the plot or farm to the national government. In this regard the AP aims to engaging public institutions and the private sector (through microfinance institutions) to support local plans and agendas for the development of adaptation strategies.

b. Diversification of production systems include different actions such as choosing cultivars and more resistant crops, to the use of agroforestry systems to improve soil quality, water retention and obtaining alternative products for consumption and the sale. These two adaptation measures are included in the AP: support to climate resilient rice production through new climate proof technology packages, particularly SICA (1.2b); agroforestry and restoration of riparian buffers (1.2a and 1.3b)

c. A better balance between subsistence farming and trade and agribusiness. Income diversification to decrease vulnerability of rural communities and agricultural livelihoods (1.2, 1.3, 1.4)

d. Consideration of information related to climate change and its effects makes the difference between adaptation and the more traditional rural development. Investment in human resources to implement adaptation actions, emphasizing local knowledge management for the rescue of local expertise to address climate change, including climate monitoring and forecasting; as well as investment in social resources to make viable adaptation, as the local organization for production and marketing, community agreements for water management and information dissemination networks. Components 3 and 4 are based in climate change data generation, its transformation into useful information for sectors and its dissemination to targeted audiences and general public.

e. Management of financial resources, including items of local government budgets, credits, incentives, insurance and better market insertion. Component 1.5 is specifically oriented to raise awareness and engage the microfinance sector in adaptation efforts.

f. Consideration of non-climate bottlenecks for adaptation, such as policies that can promote the conversion or degradation of ecosystems that function as recharge areas and water regulation. Also, the conversion of traditional farming systems (that generate products both for auto consumption and local markets) into mono-crops systems for export can have impacts on water resources and food security. Activities 2.2c, 2.2d and 2.3b aim to respond to this challenge.

A5. Relevance of the technical solutions to respond to climate change threats

The relation between the program activities defined for component 1 and the climate change threats identified for the 2 targeted watersheds, is clearly established in the following table.

Table 30. Main Impacts of Climate Change on the CHVRM and SMRW

Repercussions of Climate Change	Agriculture	Affectations		FA /Program
		CHVRM	SMRW	
Soil loss because of water concentration in a short period of time	General	√	√	Agroforestry Silvopastoril
New disease indicators of fungal involvement. Benevolent and symbiotic disappearance of species and ecosystems crops such as the disappearance of pollinating insects (bees), worms and other animal and plant species by moisture change, emergence of new disease indicators of these species	Coffee and crop plants	√	√	Agroforestry Silvopastoril Training plans
New species affecting crops (insects, scorpions, snakes and spiders) Birds do not eat crops for example “Paisanas” and olso opposums (Caisán)	General Corn	√		Agroforestry Training plans
Decreased production by proliferation of pests (Roya and Ojo de Gallo) and Broca on high ground. Coffee berry borer with greater intensity in the lowlands.	Coffee	√	√	Agroforestry (best coffee growing practices including new seed varieties) Agrometeorological node (MIDA)
Affectation of flowering by wind tunnels. New storms cycle patterns.	Coffee	√ (Río Sereno)		Property Management Plans
Calendar change and sowing cycle due to changes in rainfall patterns and floods. (CHVRW: Monte Lirio, Candela-Santa Clara and Rio Sereno; SMRW: Santa Fe)	Coffee	√	√	Agroforestry Acquisition and installation of the hydro-agrometeorological stations network Agrometeorological node (MIDA)
Changing Caisán calendar cycle. In Divalá, Alanje change in the cycle of sowing: 1st was in	Beans, corn, tomato and sweet pepper	√	√	Agroforestry Acquisition and installation of the hydro-

Repercussions of Climate Change	Agriculture	Affectations		FA /Program
		CHVRM	SMRW	
March, then in April and now in June.				agrometeorological stations network
Livestock sector affected by high temperature causing increased incidence of pests and diseases (ticks, etc). Before bathed every 21 days currently must bathe every 8 days	livestock	√	√	Exchange of experience (4.5.f) Agrometeorological node (MIDA)
Fire increase with frequency	grasslands and forest	√	√	SAT
Real change in temperature in the town of Rio Sereno used to have a "cold" climate and pass to a warm climate similar to the lowlands of the province (there is numerical data and is affecting the production of coffee and bananas)	General	√		Agroforestry
Affectations cattle for heat stress (death of livestock)	Livestock		√	Silvopastoril SAT Agrometeorological node (MIDA)
Decreased live weight of cattle by heat stress	Livestock		√	Silvopastoril SAT Agrometeorological node (MIDA)
Floods	General	√		SAT

Source: Fundación Natura. Based in Results of the Public Consultation and Technical Meetings. April 2016.

A6. Support and institutional engagement of key government partners

To successfully implement the nexus approach, securing political and technical commitment of the government institutions with sectorial competencies and mandates is critical. For purposes of the proposed programme, support from key stakeholders is guaranteed.

- Ministry of environment (MiAmbiente) as fund designated authority has fully endorsed the project and has already designated a climate change officer as institutional focal point and member of the proposal writing team.
- Ministry of Agriculture has also designated a focal point, who actively participated in the proposal writing process; in addition, an endorsement/support letter signed by the Ministry is attached.
- Support letter from ETESA was submitted.
- A support letter from SINAPROC, national entity responsible for emergency and disaster risk reduction, is submitted hereto.
- In addition to the abovementioned support letters, institutional arrangements for programme implementation include signing a collaborative agreement between F. Natura and the 3 entities to fully describe the extent and scope of the institutional involvement and support.
- The idea is that these agreements will promote preparation of an integrated work plan and also integration of programme outputs and activities within the institutional correspondent operative plans.

In parallel to government partners, local partner's engagement is also critical. For this purpose, consultation with key civil society organizations in the CGVRW (FUNDICEPP) and SMRW (AMIPARQUE) have been conducted and the organizations have expressed their interest in participating in programme design and implementation efforts, considering that climate change threat and conflict among water users is a permanent condition in both watersheds, not being addressed with a systematic approach yet. Both organizations are key local stakeholders, as stated in the correspondent Watershed Management Plans and Conservation Area Plans. Support letters from both organizations.

See attached document on the consultation process carried out for developing this proposal and results.

Other projects that are currently taking place not addressing particularly adaptation, but climate change issues, include:

- Rain Water harvesting project (SCALL for its initials in Spanish). Mainly leaded by Min of Environment is not focusing in climate change dimension, but in socializing the concept and installing systems at schools and health centers, based in demand driven basis, not as part of a climate change strategy. MiAmbiente technical focal point of this project participated in the consultation workshop conducted in SMRW. The officer clarified that the Adaptation Programme activity 1.1a complements current SCALL program scope, since it has not prioritized the CHVRW and the SMRW particularly, it is not oriented to promote RWH for human consumption and the programme is demand driven, specially oriented to schools and health centers.

- Strengthening risk management in the agriculture sector through Farm Management Plans that identify adaptation measures, conducted by the Ministry of Agriculture (MIDA). Although not officially listed, this project has been cited by the Environmental

Unit of the Ministry of Agriculture, through Ing. Graciela Martiz, MiDA`s representative to the Climate Change National Committee and to the Inter-Government Technical Committee of the Water Security National Plan 2015-2050. Ing. Martiz is also the person who participated as MIDA´s representative in the AP proposal writing process, along with MiAmbiente representative (René López, who is responsible for the Third National Communication Process)

- Drought Programme: Although it is not officially designated or gazzeted, this is a traditional action plan leaded by MiDA to respond to the extreme drought events, particularly associated to ENSO. This programme is not based or driven from an adaptation perspective. As mentioned previously, in the present MIDA does not has a specific staff or unit dedicated to climate change issues, although the institutional vision is to transform the existent Environmental Unit into a Climate Change and Environment Unit. The Adaptation Program proposed will enable a technical and institutional framework to collaborate with this transition within the Ministry, particularly through the implementation of outputs 1.2, 1.3, 1.4 and 3.3a.

- "Water Security and Climate Change in the region of Central America and The Caribbean". This project focused in pilot basins from Dominican Republic and Guatemala, implemented since October 2012, by the Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC in Spanish) with funds from the International Development Research Centre (IDRC, Canada). Among the results listed were: Applications for decision making were developed based on satellite images to monitor and forecast short-term climate for Central America, Mexico and Dominican Republic; Applications were also made to assess climate change impacts on biodiversity in the region. Representatives of the countries were trained in the use of tools and products developed. Regional policies were proposed to address adaptation to climate change, especially with regard to biodiversity. The Adaptation Programme interaction with CATHALAC will include communications regarding specifics of the national climate data portal in order to take advantage of the SERVIR platform managed by CATHALAC; as well as regarding the capacity building activities listed in 4.2a and 4.3a to establish synergy with current academic programmes offered by CATHALAC, particularly: the Diplomas in Climate Change Adaptation and Water Resources Management.

- Protection of carbon pools and sinks in mangroves of Panamá. Implemented by UNDP-Wetlands International-Conservation International. The mangroves of Panamá store and sequester enormous amounts of organic carbon not only in their vegetation, but also in roots and soil. The project is aimed to find out how much exactly and to make sure that these carbon pools and sinks are better managed and protected for their contribution to climate change mitigation, but also to maintain their broad range of ecosystem services in support of local adaptation. Even though this project is mainly oriented to mitigation issues, the Adaptation Programme will establish coordination

with this project in order to take advantage of the results obtained in the Chiriqui Province lowlands, that are nearby the Chiriqui Viejo lower watershed. http://lac.wetlands.org/Portals/4/Panama/IKI%20leaflet%20Wetlands%20International%20for%20COP20%20web.pdf

- Small grants programme. GEF-UNDP (PPD in Spanish). The Climate Change focal area promotes access to clean energy, sustainable transport, and good land use practices. The programme supports communities to improve their livelihoods to increase their resilience to weather events. Potential Eligible Activities are: a) Use projects and alternative energy resources that can be implemented locally or regionally; b) Best practices for handling such production lands decreased burning bush, forest clearance for expansion of crops; c) Activities or projects that reduce the production of harmful gases industries, motor vehicles and burning; d) Projects that fall firewood consumption. Coordination will be established with PPD to learn from the experience derived of the implementation of the project “establishment of agrosilvopastoral systems to develop sustainable cattle raising in Corregimiento Los Asientos in the Province of Los Santos, with the Association of agrosilvopastoral producers of Pedasi in 2014 (this is in the Rio La Villa watershed, neighbor to the SMRW). The SGP officer participated in the consultation meeting held with civil society organizations on May 5th, serving as an entry point for further communication and synergy.

B. Provision of economic, social and environmental benefits – Measures to avoid or mitigate negative impacts in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund

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

B1. Project's economic, social and environmental expected benefits

The combined effect of several programme activities will result in economic tangible direct and indirect economic benefits to the local communities within the CHVRW and the SMRW. Specific program results in this direction are:

- Income generation activities at SMRW through promoting small scale pilot project for orchid and "*naranjilla"* crops production and commercialization to empower women.
- Design and implementation of at least one microfinance credit product to support ecosystem based adaptation measures. This activity will enable economic positive results to both the microfinance institutions and the farm owners who access the facility
- Economic benefits derived from enabling, when feasible, the implementation of small scale renewable generation projects, not restricted toto mini hydro, including for example, installation of solar panels projects
- Improved economic results of productive campaigns, including rice production, associated to the low-cost irrigation systems
- Positive impacts in governance are expected because of the reduction of the number of conflicts among water users due to an improvement of the water concessions and permission processes,
- Enhanced public participation and engagement in environmental and sustainable dialogues and processes
- Water security improved resulting from the installation of water harvest systems at the farm level
- Improved awareness and professional and technical skills of local people regarding the causes, impacts and effects of climate change.
- The intervention areas of the programme are home of vulnerable communities to hydro meteorological events: floods in the case of the CHVRW and both

drought/floods events in the SMRW. In the case of the SMRW the districts that have been preliminary identified as areas to implement sustainable production activities and the EWS are included among the poorest districts at the national scale, for example, the Cañazas district.

- Co-benefits in poverty reduction as a result of income generating activities promoted by the Adaptation Programme.

At the national level, economic positive results will derive from: avoided losses and damages caused by droughts and floods, because of the implementation of the EWSs; improved economic results of the production campaigns due to the use of climate date to orient decision making and production calendars.

Environmental benefits of the proposed adaptation measures are evident, particularly considering that the 2 intervention areas -CHVRW and SMRVW- are listed among the 11 prioritized watersheds in the National Integrated Water Resources Management Plan 2010-2030. The environmental importance of these two sites is clearly outlined in the future water demand analysis of the abovementioned Plan, which determined that for the agriculture sector, the Santa María River is one of the main watersheds, given the importance of its irrigation system. In parallel, for the agro industrial sector, the highest volume of granted water corresponds to the Chiriquí Viejo river watershed, with 77.4 percent of the granted total at the national level for this sector. This watershed also presents the highest concession levels for hydroelectric (32.94 percent) and agriculture livestock (10.57 percent) sectors, compared to the other watersheds. Environmental benefits of the proposed interventions in both watersheds include contribution to the restoration of the hydrological cycle at the Gallito and the Caisan sub watersheds; habitat restoration in these two areas through increased forest coverage to protect water sources and reduction of the land use conversion to extensive cattle raising; avoided loss of connectivity of water bodies; protection of water provision ecosystem services. Another important environmental benefit is the expected reduced amount of methane emissions as a result of the sustainable cattle ranching project through the ASP model.

The expected benefits from program implementation, from social – economic-environmental points of view are as follows:

Table 31. Benefits per proposed component of the program

SOCIAL, ECONOMIC AND ENVIRONMENTAL BENEFITS

COMPONENT	*SOCIAL BENEFITS*	*ECONOMIC BENEFITS*	*ENVIRONMENTAL BENEFITS*
1. Increase climate change and variability adaptation capacity in agriculture, livestock, and energy production sectors	• Improved water access for households (using quantity and quality indicators). • Increased water supplies to meet demand • Improved food security (by improving access to water and agricultural practices, food supply will be enhanced) • Improved level of participation and stakeholders dialogue • Population with lower risk exposure due to climate-resilient sources of income and adapted livelihoods	• Increased income generation for program participants • discouraging traditional "*potrero*" extensive cattle ranching production system, avoiding advance of agricultural frontier to new areas; • increase productivity per hectare dedicated to cattle raising • Increased potential for agriculture diversification • Understanding of barriers in the finance sector to effectively support adaptation efforts • Generate evidence, "making the case" to support the hypothesis that financial risk to support adaptation initiatives could be appropriately quantified and managed. • Promote interest in local microfinance institutions for incorporating climate change adaptation into their portfolio of finance options	• Erosion and flood control • water purification and biological control • biodiversity benefits • aesthetic and recreation values to communities engaged in the project • contribution to stabilization of stream flow and water temperature. • Water management and water productivity increased, based in Water Footprint Methodology and indicator • reduction of the land use conversion to extensive cattle raising • protection of water provision ecosystem services • reduction of amount of methane emissions as a result of the sustainable cattle ranching project through the ASP model
2. Establish climate resilient water management instruments with	• Improved level of participation and stakeholders dialogue • Municipalities actively engaged in adaptation action	• Ministry of Agriculture long term strategic planning informed by the new climate information. New map officially adopted as planning tool.	• Management plan updated with climate change data and clear understanding of future scenarios of drought for the region.

COMPONENT	SOCIAL BENEFITS	ECONOMIC BENEFITS	ENVIRONMENTAL BENEFITS
integrated and community based approach	• Enhanced long-term access to water • Sustainable livelihoods	• Increased success possibility by selecting right crops and compatible areas for increasing crops yield and economic benefits from them.	• Ministry of Environment using climate data to justify approval or rejection of water concessions (environmental flows and ecosystem health sustained). • Validation of prioritized adaptation measures
3. Strengthened local-national capacity for monitoring and decision making to reduce and respond to risks associated with climate change	• Early warning systems save lives and help protect livelihoods. • Local authorities better enabled to evacuate or shelter people in advance; and to count on a faster response to problems of food and water insecurity • Informed decisions result in positive impacts on food security and social welfare • Response capacity improved for drought and flooding events: more communities and people trained • Consolidated network at the national scale; providing information and climate data to public and private stakeholders in an equal access basis • Improved level of participation and stakeholders dialogue	• Farm owners accessing climate data to adjust production cycles and calendars • Potential economic losses due to extreme events avoided through EWS. • Expansion of monitoring network may increase the number of potential beneficiaries of risk mechanisms. • More informed decisions result in positive impacts on crop production and farmer's incomes. • Assessment of impacts of adaptation investments conducted	• Access to better data to help make informed decisions on protecting conservation sites; restoring highly intervened areas; and adapt to climate change.

COMPONENT	*SOCIAL BENEFITS*	*ECONOMIC BENEFITS*	*ENVIRONMENTAL BENEFITS*
4. Raise awareness and establish a knowledge exchange platform to respond to, and mitigate impacts of climate-related events from local and national scope	• Climate change dimension included in local organizations decision making processes • Updated adaptation information available for public use (increased capacity for developing and implementing efficient adaptation approaches to climate change) • Water users and institutions with water related competencies use climate data in a regular basis for planning, budgeting and reporting purposes • Improved level of participation and stakeholders dialogue. • Incorporation of gender perspective by participation and dedication quotas in the program	• Increased capacity for developing and implementing efficient adaptation approaches to climate change that lead to protection of property and farmer's incomes • Planning and future analysis conducted at different levels using climate data • Updated adaptation information available for public use, to make informed economic-wise decisions	• Increased knowledge and awareness about climate change and its impacts will help create consciousness on environment protection • Climate change dimension included in local organizations decision making processes • Increased public awareness about climate change causes, impacts and adaptation options • Improved understanding of adaptation experiences, translated into improvements in adaptation projects planning and implementation skills, both at the local level in CHVRW/SMRW and at a national scale

B2. Project beneficiaries and the process for their selection

The expected direct beneficiaries of the Programme are local farmer communities located in the CHVRW and the SMRW, selected in previous planning processes. Nonetheless, policy, technical, financial, and knowledge instruments to be generated by the program will benefit the entire Panamanian population in adapting to climate change and variability.

The criteria selecting local and regional beneficiaries includes:

1. Watersheds selected as priority watersheds in Panama, highly vulnerable to climate change as stated in the Second National Communication to the UNFCCC and in the National Integrated Water Resources Management Plan 2010-2030
2. Conservation and management strategies included in the CHVRW Watershed Management Plan CHVRW 2014 and SMRW Management Plan 2010.
3. Priority areas located within both watersheds, Gallito River micro watershed (SMRW) and Caisan River sub watershed (CHVR) based in results of conservation area planning processes conducted for both watersheds considering critical ecosystems, including climate change dimension.
4. The importance of agriculture production for food security and vulnerability to climate change, based in severity of impacts of drought events, as determined by Min. of Agriculture.

Selection of final beneficiaries at both watersheds will be conducted observing the following criteria:

a) Inventory of producers per region and location maintained by MIDA. These databases are not integrated into one single national or regional database, so it will be analyzed jointly with MIDA regional offices. Coordination meetings conducted by F. Natura during proposal writing phase confirm willingness of MIDA regional offices to share the information and even build ad hoc data accordingly to program needs of information. This information is key to the programme, since the basis of the adaptation programme is to work with the most vulnerable producers (particularly those participating in agriculture and cattle raising activities) within the project intervention sites. Attention will be given to those families participating in productive activities that are being benefited by existing conditioned cash transfer programs (particularly Red de Oportunidades). An important note is that the purpose of this cross check is to mitigate potential omissions and not to create additional marginalization.

Based in this interaction, the Programme will actively look for opportunities to share information with the CCT programs to promote use of climate change vulnerability

data produced by the Programme (particularly within the VIA analysis) to feed their criteria for identification and focalization of beneficiaries (this is a potential co-benefit of the programme activities)

b) MIDAs institutional registry/statistic of loss and damages in production per region of the country. This baseline information is not available online, but it is maintained and updated separately by MIDA regional offices. An example of the type of information provided by MIDA is included here:

Table 32. Loss and damages report for crops and other agriculture activities – January 2015

MINISTERIO DE DESARROLLO AGROPECUARIO
REGIÓN 1, CHIRIQUÍ
INFORME DE PERDIDAS Y DAÑOS REPORTADOS EN CULTIVOS Y OTRAS ACTIVIDADES AGROPECUARIAS
ENERO 2015

Lugar	Fecha de reporte	Actividad	Rollos de Plástico de 7*100*180 (micras)			Daños en producción		Condición climática
		Productiva	Dañada	Perdida	total	Impacto en Produccion en Bl.	Infraestructura Económico en B/.	causante.
Totales			**614.5**	**614.5**	**614.5**	**284,700**	**407,634.61**	
Potrerillos	enero	Casas de cultivo de hortalizas	84	84	84		51,376.30	Fuertes Vientos
Boquete	enero	Casas de cultivo de hortalizas	351.5	351.5	351.5		217,723.31	Fuertes Vientos
Volcán	enero	Casas de cultivo de hortalizas	179	179	179	284,700.00	138,535.00	Fuertes Vientos
						TOTAL EN B/.	692,334.61	

Nota: En el Area de Potrerillos los productoes afectados fueron:17, Boquete 57 productores y Volcan 19 en diversos cultivos tales como: Tomate, Pimenton, Fresas y Flores

Table 33. Loss and damages report for crops and other agriculture activities – July 2014

MINISTERIO DE DESARROLLO AGROPECUARIO
REGIÓN 1, CHIRIQUÍ
INFORME DE PERDIDAS Y DAÑOS REPORTADOS EN CULTIVOS Y OTRAS ACTIVIDADES AGROPECUARIAS
JULIO 2014

Lugar	Fecha de reporte	Actividad	Superficie afectada (Has)			Perdidas en ganad		Daños en producción		Condición climática
		Productiva	Dañada	Perdida	total	Cabezas	Valor B/:	q perdidos	Impacto Económico en B/.	causante.
Totales			1443	443.65	443.65			249413.14	2,291,693.80	
La Esperanza, Qda. De Arena, Majagual, San Valentin, Santa Maria, Teca, San Pedro, Baco, Chiriquí Viejo, Corotú, Sta. Rosa de Lima.	Julio	Plátano	1075.25	408.00	408.00			231691.00	2,085,219.00	Vientos huracanados
Progreso	Julio	Papaya	31.90	6.75	6.75			16200.00	162,000.00	Vientos
Progreso	Julio	Maíz	1.00	0.90	0.90			122.14	2,442.80	Vientos
Divala	Julio	Plátano de Exportación	302.53	22.65	22.65			1250	40,386.00	Vientos/Lluvia
Bugaba	Julio	Plátano Nacional	32.5	5.35	5.35			150	1646	Vientos/Lluvia

Table 34. Producers benefitted with Coffee Plants 2014

MINISTERIO DE DESARROLLO AGROPECUARIO

Región 2, Veraguas

LISTADO DE PRODUCTORES BENEFICIADOS CON PLANTONES DE CAFÉ RODOLFO GUIRAUD_2014

N°	NOMBRE DEL PRODUCTOR	CEDULA	DISTRITO	CORREGIMIENTO	COMUNIDAD	HECTAREAS A REHABILITAR	CANTIDAD DE PLANTONES
1	JOSE ABREGO	9-72-453	SANTA FE	EL PANTANO	PAJONAL	0.2	500
2	FEDERICO MENDOZA	9-706-1466	SANTA FE	SANTA FE	LA PEÑITA	1	2,500
3	JAMES HILTON	9-139-631	SANTA FE	SANTA FE	LAS TRANCAS	0.8	2,000
4	FLORENCIO QUIROZ	9-56-558	SANTA FE	SANTA FE	EL TUTE	0.4	1,000
5	NODIER ABREGO	9-220-1084	SANTA FE	SANTA FE	DORMILONA	0.4	1,000
6	OSCAR GONZALEZ	9-707-603	SANTA FE	EL ALTO	EL ALTO	0.48	1,200
7	PAULINO GONZALEZ	9-102-654	SANTA FE	RUBEN CANTU	JUNCAL	0.4	1,000
8	SABINA HERNANDEZ	9-166-908	SANTA FE	EL ALTO	LA PUENTE	0.6	1,500
9	NESTOR PEÑA	9-143-841	SANTA FE	EL ALTO	LASIJAL	0.6	1,500
10	JOSE ANGEL MENDOZA	9-118-2607	SANTA FE	SANTA FE	LA OSSA	0.8	2,000
11	LEOPOLDO GONZALEZ	9-139-562	SANTA FE	EL PANTANO	PIRAGUAL	0.6	1,500
12	NICOMEDES CISNEROS	9-88-289	SANTA FE	EL ALTO	LA CULACA	0.2	500
13	AUGUSTO TORIBIO	9-99-729	SANTA FE	SANTA FE	MONTAÑUELA	1	2,400
14	AMINTA PINEDA	9-147-942	SANTA FE	SANTA FE	SANTA FE	1.6	4,000
15	FELIX ANTONIO GUIRAUD	9-217-51	SANTA FE	SANTA FE	SANTA FE	1.8	2,400
16	LUIS AGRAZAL	9-705-1267	SANTA FE	SANTA FE	DORMILONA	0.8	2,000
17	RAFAEL GUIRAUD	9-734-520	SANTA FE	SANTA FE	LA LAGUNA	0.9	2,250
18	AULIO PERALTA	9-147-529	SANTA FE	EL ALTO	LA CULACA	0.8	2,000
19	NELSON GUERRA	9-732-1452	SANTA FE	EL PANTANO	BERMEJO	0.2	500
20	ISMAEL CRUZ	9-57-606	SANTA FE	EL ALTO	LA PUENTE	0.12	300
21	LEOPOLDO GUIRAUD	9-135-149	SANTA FE	SANTA FE	SANTA FE	1	2,400
22	ORLANDO RODRÍGUEZ	9-133-31	SANTA FE	SANTA FE	SANTA FE	1	2,400
23	MACARIO AGUILAR	9-105-1396	SANTA FE	SANTA FE	MONTAÑUELA	0.12	300
24	RAFAEL STANZIOLA	2-66-639	SANTA FE	SANTA FE	BAJO SAN JUAN	1	2,500
25	ENEIDA ABREGO	9-57-200	SANTA FE	EL ALTO	EL GALLO	0.4	1,000
26	JESUS AISPRUA	9-212-263	SANTA FE	EL ALTO	EL CARMEN	2	5,000
27	GREGORIO PALMA	9-102-635	SANTA FE	SANTA FE	DORMILONA	0.1	250
28	AVIS E. PEÑA	9-121-1808	SANTA FE	EL CUAY	SAN ANTONIO	0.36	900
29	JUAN HERNANDEZ	9-169-414	SANTA FE	EL ALTO	EL ALTO	1	2,400
30	VICTOR MUÑOZ	9-121-1458	SANTA FE	SANTA FE	SANTA FE	0.12	300
31	FELIX RODRIGUEZ	9-113-1831	SANTA FE	SANTA FE	SANTA FE	0.12	300
32	ASUNCION PINTO	9-154-732	SANTA FE	EL QUAY	EL MACHO	0.4	1,000
33	LAZARO RODRIGUEZ	9-63-576	SANTA FE	EL ALTO	LA CULACA	0.8	2,000
34	ERICK CONCEPCION	9-99-2331	SANTA FE	SANTA FE	BAJO SAN JUAN	0.2	500
35	JUAN PALMA	9-99-1180	SANTA FE	SANTA FE	EL TUTE	0.4	1,000
36	NELSON RODRÍGUEZ	9-712-417	SANTA FE	EL ALTO	LA MULA	1	2,500
37	CHITRA	9-103-1878	CALOBRE	CHITRA	CHITRA	4.2	10,500
38	OBIDIO GONZALEZ	9-220-507	SANTA FE	EL ALTO	LA GOLONDRINA	0.48	1,200
39	ELISENIA RODRIGUEZ	9-702-2109	SANTA FE	SANTA FE	EL TUTE	0.6	1,500
40	FELIX A. GUIRAUD PEREZ.	9-146-844	SANTA FE	SANTA FE	LAS BRUJAS	0.8	2,000
	TOTAL					**29.8**	**72,000**

c) Registry of loss and damages associated to flooding events generated by SINAPROC. Some information is available through the Desinventar database, but it is not exhaustive.

This information will be also used to define with MIDA and SINAPROC the siting and design specifications of activity 3.2 (early warning system).

The beneficiaries' identification will be conducted by Natura jointly with MIDA and SINAPROC programme counterparts. The initial step will be a rapid socioeconomic assessment for both watersheds conducted during the first quarter of project implementation phase, based in primary and secondary sources of information. This process will identify not only socioeconomic variables, but enabling conditions and interest of families of participating in programme activities.

Once defined the master document of potential beneficiaries, the process of establishing the correspondent collaborative agreements will be conducted as part of the activities of each component.

In addition, the following special considerations will be considered when selecting beneficiaries, according to each of the proposed components:

Component 1:

1.1 Water harvest systems: Beneficiaries will be identified based on the preliminary results of the VIA.

1.2 Climate Smart farming projects:

- Irrigation system in the CHVRW. Direct beneficiaries: Communities of Cerro Punta and Divala. Selection criteria/process: Cerro Punta and Divala communities' selection based in the consultation process for the Management Plan. Divala community selection based also considering the importance of rice production in this location. Rice production severely affected by drought associated with El Niño impacts. Both communities encompass a population of 13,116 inhabitants, (Population Census Data, 2000).

- Protective plantations and agroforestry systems and soil conservation across at least 6,000 lineal meters located in the banks of creeks that contribute to the Caisan River's water system. Includes reforestation of riparian buffers in the Caisan River watershed. Direct beneficiaries: Farm owners located in the riparian area of the Caisan River. Selection process pre-conducted for the Conservation Area Plan process. Fideco 2015. This subwatershed encompasses 14 communities in 2 *corregimientos* (10 in Plaza Caisan with 2901 inhabitants and 4 in Dominical with 998 inhabitants, accordingly to data of the Statistics Institute, 2010). Communities directly related to the Caisan River subwatershed are: Caisan Primavera, Caisan Centro Plaza, Plaza Caisàn y Alto La Mina, Caña Blanca Arriba, Caña Blanca Centro y Caña Blanca Abajo.

1.3 (Diversified income source models implemented in vulnerable population areas, by creating capacities for operating orchid and *naranjilla* crops and establishing the correspondent commercialization scheme at the SMRW) and 1.4 (Concrete adaptation measures implemented for sustainable cattle ranching) will be focused in the Gallito River micro watershed, identified as a priority site within the SMRW accordingly to the Conservation Area Plan conducted in 2014,

due to the provision of ecosystem services and its physical, environmental, and socio economic importance.

Beneficiaries profile of the Rio Gallito Micro Watershed. Per the Statistics Institute (2010) there are 1081 resident inhabitants in the watershed, of which 55% were male and 45% female; 61% of the total inhabitants had more than 18 years, representing a productive population pressing natural resources, especially water and soil, to meet their basic needs. The watershed has 27 communities in 4 districts (El Alto, Rio Luis, Ruben Cantu and Santa Fe). Communities within the micro watershed are small settlements with less than 100 persons, lack of basic services and a livelihood associated to the extensive use of natural resources, especially soil. In addition to the vulnerability to climate change mentioned above, these communities present socio-economic vulnerability evidenced by the existence of poverty and extreme poverty in all the communities, where the unique productive alternative is the use of land (in 70% of the communities the average income is in the range of US$101-299/per month). Regarding socio economic activities, those are mostly related to extensive use of land and natural resources, typically for auto consumption (subsistence), based in family labor and low technology. There are 3 types of farms: small (0.1-9.99 ha-cattle and 10 animals) located in the middle and lower watershed; medium size (10-50 hectares and less than 50 animals, located in the middle and lower section of the watershed and large farms (50+ hectares and 50+ animals located in the lower watershed). In the upper section, there are “potreros” for pasture rent located in areas important for forest ecosystems and water sources.

1.5 Enhanced sectorial support through climate financing instruments. Direct beneficiaries will be identified during the project implementation, particularly during the inception workshops through preliminary identification of interested stakeholders, including farm owners and microfinance institutions. Microfinance institutions with presence in the Rio Gallito MicroMicro Watershed and that have been preliminary identified as key potential partner institutions are: Fundaciòn Hèctor Gallego, Santa Fe; Cooperative La Esperanza de los Campesinos, Santa Fe; Cooperativa de Turismo de Santa Fè, Santa Fè. (All 3, listed as key external actors in the Rìo Gallito MicroMicro Watershed CAP). (Conservation Area Plan for the RioRio Gallito Micro Watershed. Fideco 2014).

Component 2:

Outputs 2.1 (VIAs analysis); 2.2 (Hydrological balance and Environmental flows analysis) for both watersheds CHVR and SMR, will indirectly benefit programme local stakeholders since information gathered will be used to inform decision making processes, particularly through recommendations to improve water concession processes and technical guidelines to restoring water cycle.

Output 2.3: Design 2 district plans for water security. Criteria for the selection of Districts to design water security district plans will be defined in accordance with the implementation of the Water Security National Plan driven by the Min of Environment

Component 3:

Output 3.1 National System for Climate Data Direct beneficiaries: Farm owners participating in output 1 activities with access to climate data through Hidromet and interface with MIDA. Indirect beneficiaries: Stakeholders involved with water-energy-food sectors at the local and national level will benefit of access to climate data. Academic sector, government institutions, civil society with access to climate data to inform project implementation and decision making processes.

Output 3.2 EWS operating in CHVRW and SMRW. Direct beneficiaries: Local communities located in both watersheds. Specific siting of the EWSs will be defined jointly with SINAPROC as a program implementation activity.

Output 3.3: Joint mode ETESA-MIDA to provide access to producers to climate data. Direct beneficiaries: Farmers in CHVRW and SMRW. Beneficiaries at a national scale due to access to climate data.

Component 4:

4.1 Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures. Direct beneficiaries: local communities in CHRW and SMRW.

4.2, 4.3: Strengthened professional capacities and skills. Beneficiaries of specialized training and capacity building activities will be selected through an open (national) and competitive basis in coordination with implementing partners (Min of Environment, MIDA, ETESA) and the Climate Change National Committee and academic sector (Technology University of Panama-UTP; UNACHI (Autonomous University of Chiriqui) and the National University of Panama (public universities with presence in both watersheds). Participation will include participants form the 2 selected watersheds and other geographical areas of the country. Affirmative criteria will be used to encourage participation of women and indigenous/minority groups.

4.4 and 4.5: Systematization of adaptation experiences and climate change adaptation portal. Direct beneficiaries: Activities targeted to reach a wide audience-public a national level.

Beneficiaries selection at the household/farm level (for ex. for 1.1, 1.2, 1.3, 1.4) is part of the program implementation. Specific focalization methodology description and justification will be part of the TORs for each proposed activity. Nevertheless, general facts/conditions were discussed during the consultation workshops and meetings as follows:

Table 35. Criteria for the selection of beneficiaries per proposed activities

Proposed activity	Criteria for selection of beneficiaries	Potential sites identified during proposal writing/consultations, to be validated
1.1 Water harvesting	• Climate vulnerability: Municipalities/communities affected by recurring severe droughts and contaminated water sources. Source: SINAPROC, MIDA. • Social vulnerability: Cross information with MIDES (Ministry of Social Development) to identify beneficiaries of CCTs programs (Conditional cash transfer programs) particularly: 100 a los 70 and Red de Oportunidades. (Focalization for these programmers is based mainly in the social vulnerability census) • Equal participation of women • Comply with % of indigenous families	SMRW:District of Calobre, CHVRW: Cerro Punta, Paso Ancho (reservoirs) Monte Lirio (middle section) Divalá (lower section) Rio Sereno
1.2 Agroforestry and reforestation of riparian buffers in CHRW and SMRW	• Physical location of farms • Interest and commitment with farm management plan process • Connectivity • Potential hydrological earns* • Equal participation of women • Comply with % of indigenous families	Caisan subwatershed CHVRW Upper watershed, Sub Watershed Rio Bulaba SMRW
1.2b Irrigation system in CHVRW	As listed during the consultation workshop: • Type of producer: small / medium rice producers • Equity in the service distribution: Similar coverage of hectares for all • Limitation in the number of hectares: establishing a maximum limit and an average • Responsibility of the user with conservation of the water source • List of prioritized uses; optimization through technology and measurement criteria. For example: micro sprinkler or drip irrigation	Cerro Punta, Caisan, Río Gariché, Paso Ancho, Volcán Divalá

Proposed activity	Criteria for selection of beneficiaries	Potential sites identified during proposal writing/consultations, to be validated
	• Identification of type of soil, crop and irrigation system (irrigation or reservoirs, other)	
1.3 Climate resilient rice production Agroforestry in emphasizing coffee production	• Small medium farmers • Potential to improve productivity per hectare • Equal participation of women • Comply with % of indigenous families	Middle and lower section SMRW(rice) Upper section SMRW (agroforestry and coffee)
1.4 Agrosilvopastoral systems in SMRW	As listed in the consultation workshop: • Small-medium farmers • Commitment to transfer knowledge to other producers • Receptive to conservation and environmental practices and goals "conservationist"	SMRW. Middle section of the basin
1.5b Business plans for mini hydros and/or solar panel installation projects	• Existence of the hidro potential • Family participating in the agrosilvopastoral project • Limited access to traditional financial sources • Commitment to complete the technical and financial cycle of the project (farm management plan; business plan; presentation and submission)	SMRW and CHVRW

Criteria for the selection of beneficiaries/participants in training courses.

- Each training or capacity building activity will include balanced participation of:
- Participants from SMRW / CHVRW and other regions of the country
- Representatives from government institutions: central / regional offices.
- Participants from academic sector: public universities (UNACHI, University of Panama, UTP)
- Participants from civil society and community groups
- Participants from business associations
- Encourage equitable participation of men/women
- Comply with a % of indigenous participants

- Academic/experience requirements depending on the course/training technical specifications

B3. Programme focus regarding beneficiaries' profile

The targeted direct beneficiaries are vulnerable communities of local farmers located in the CHVW and the SMRW, including the prioritized sub-watersheds (Rìo Gallito and Rìo Caisan) engaged with agriculture and livestock production, other major users of water resources including hydro energy stakeholders and microfinance institutions. Government and non-government institutions will benefit of access to climate data and specialized training for climate change science and action.

This Programme is not targeting indigenous communities particularly. Indigenous communities are being directly targeted regarding climate change dimension through the REDD+ Programme (ONU REDD, UNDP).

Indigenous communities in the CHVRW (Ngäbe Buglé population): This community is present in the upper and middle basin, representing a social group with limited access to public services and sustainable development programs. Characteristics: Higher rate of illiteracy; High rates of poverty and extreme poverty; very limited livelihoods/living conditions. Accordingly, and as stated in the Management Plan, alternatives solutions require design of indigenous development projects, including cultural elements and ethnic Cosmo vision

Limitations of development and equality of indigenous population: This Indigenous group represents 20% of the population in the basin and is the most vulnerable social group. The causes of this include, among others, lack of comprehensive development plans and weak efforts to include indigenous worldview within development plans. Consequently, this population have higher illiteracy rate (up 17%), poverty and unemployment, and problems of reduction and/or loss of territory due to development projects and unsustainable production activities. This situation occurs in the upper area of the basin, and also in the communities Divalá and New Mexico. Alternative solutions are complex and include medium-long term development processes such as design of comprehensive development and social inclusion plans, emphasizing equitable distribution of benefits and social justice; Promoting and encouraging indigenous participation in development plans and, in general, Compliance existing legal framework for the region.

The solutions mentioned above require medium and long term processes, far beyond the limits of time and scale of this AP. Previous experience in Panama designing and implementing projects with indigenous communities indicate that a special rationale and strategy needs to be in place to enable project implementation. Mixed programs addressing indigenous and not indigenous communities are not a common figure and risks of not reaching projects results and deliverables are very high. In the case of the

AP, the programme has not been designed from the perspective of an indigenous development strategy.

Indigenous communities in the CHVRW: (Ngäbe Buglé population): In the province of Veraguas, the level of total poverty incidence is 53.0% and extreme poverty is 19.6%. In the indigenous area (inside and outside the indigenous reserve “comarca”), which are the highest levels of total poverty (98.4%) and extreme poverty (90.0%). All this shows a disadvantage for the communities of the Upper River Basin, considering that the population is mostly rural and a minority is indigenous of the ethnic Ngabe Bugle group (Communities of Paredón of Ñürum and part of the population of Santa Fe, although not within the boundaries of the comarca). Social and economic situation of this indigenous group is like the one described for the above in the CHVRW.

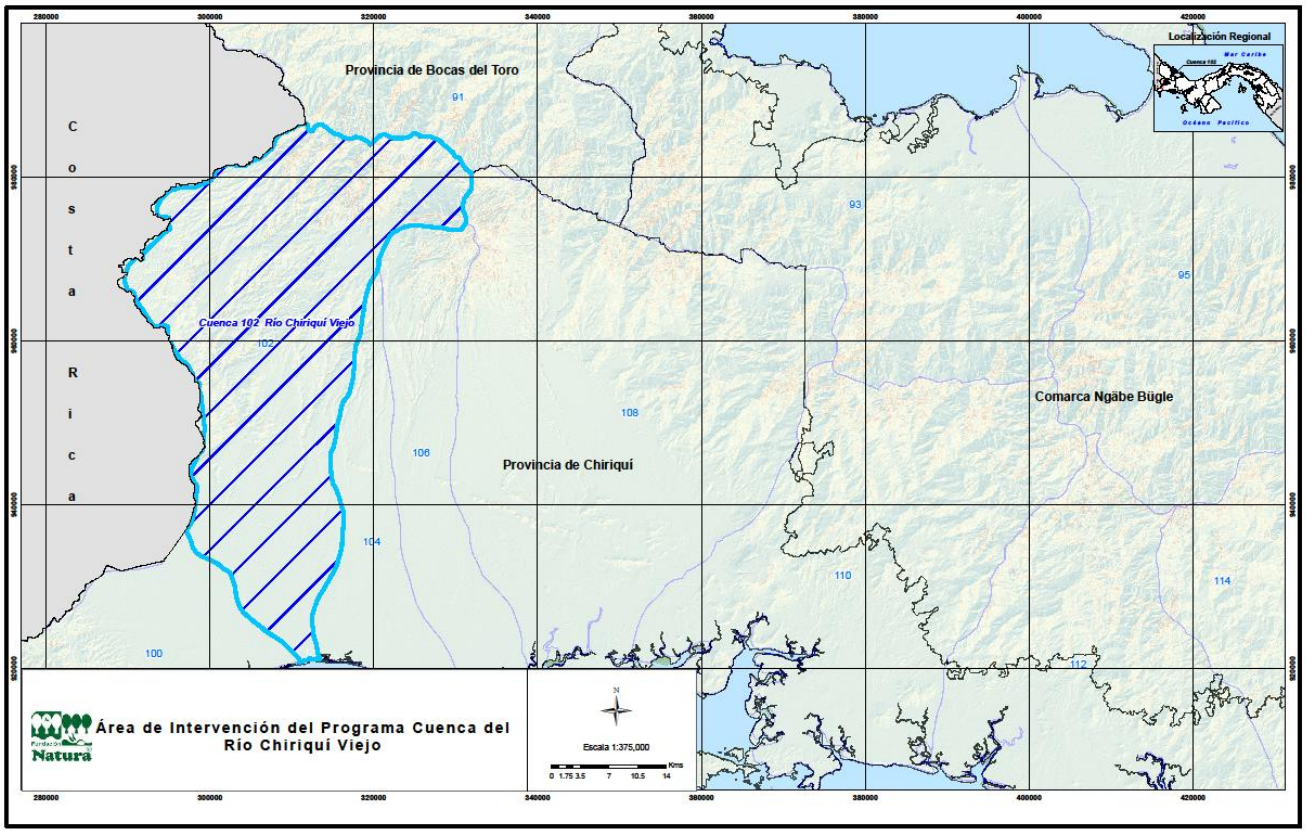
Programme strategy with respect to the Ngäbe Buglé population present in both watersheds.

Even though the AP components and activities have not been designed with a specific indigenous rationale, the AP will ensure that participation of indigenous families is promoted and encouraged, using the following criteria:

1. The presence of indigenous families will be specially considered when defining specific areas of intervention, particularly in activities of component 1 (1.1, 1.2 and 1.3)
2. Book a percentage for participation of indigenous Ngäbe Bugle people in the training opportunities offered by the program. The specific % will be defined during implementation depending on the participation of indigenous families in the various activities of the program.
3. In each basin, there will be at least one **bilingual** Community Promoter of the Ngäbe Bugle ethnic group, in order to facilitate communication and participation of the Ngabe bugle persons/families in the program.
4. A feedback and complaints mechanism with specific considerations to encourage indigenous peoples participation
5. Establish the practice of inviting the Indigenous community promoters to participate in the coordination meetings convened by the AP Manager related to outputs involving indigenous people’s participation.

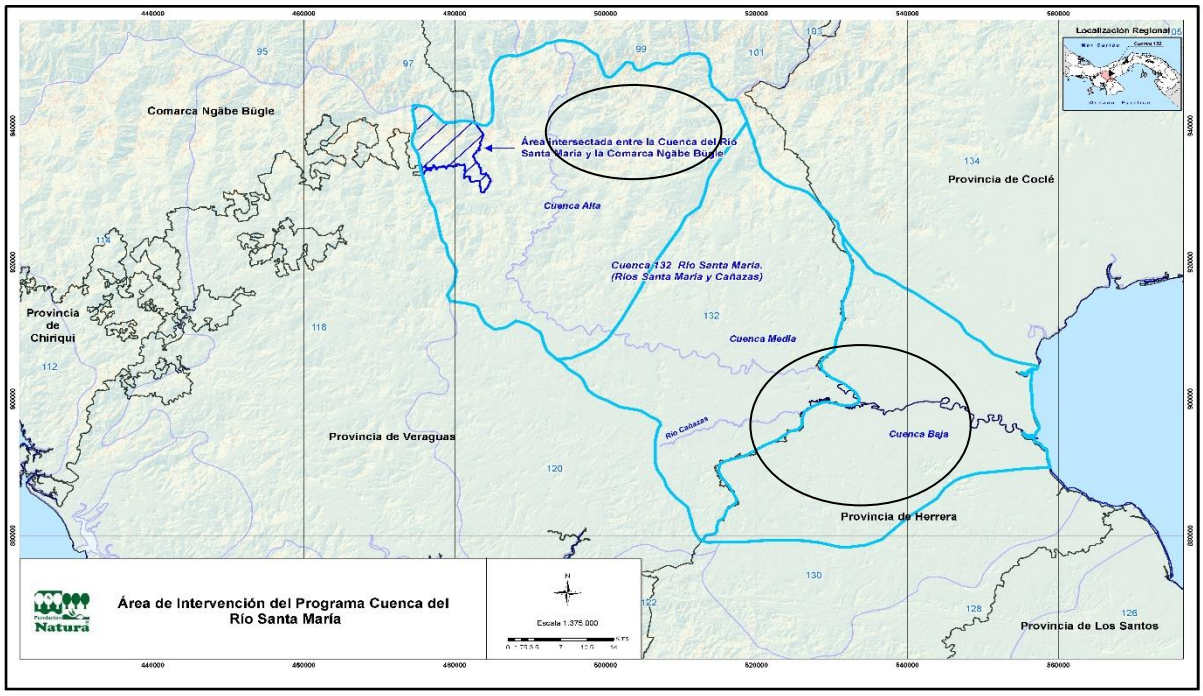
Chiriquí Viejo River Watershed: This map shows the Comarca Ngäbe Bugle, and clearly there is no overlap with the CHVRW

Map 11. Comarca Ngabe Bugle, which does not overlap with CHVRW

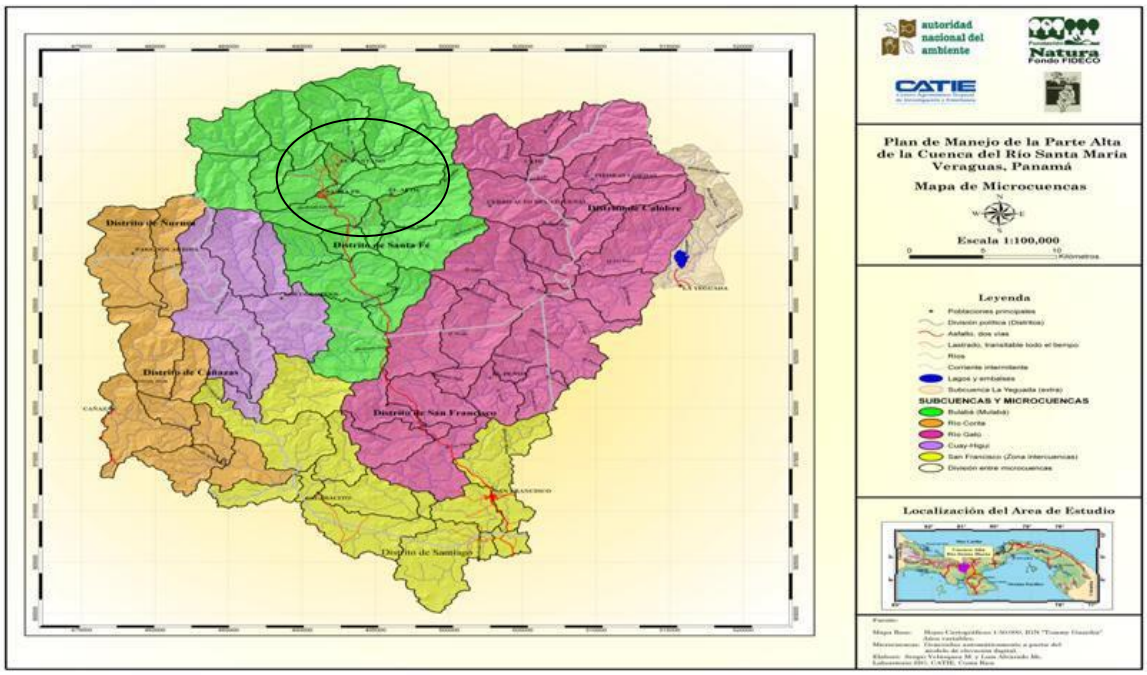


Santa María river watershed. There is an overlap of the watershed with the comarca; nonetheless, the implementation area has no overlap with the indigenous territory.

Map 12. Reduced area of upper SMRW (with blue stripes) in located in Comarca Ngabe Bugle, but outside the implementation area (circles)



Upper part. Map 13. It will be implemented at the Bulaba micro watershed; the implementation area as no overlap with indigenous territory (comarca).



B4. Program strategy with respect to indigenous groups

(see also special considerations regarding the approach and engagement of indigenous population in the project implementation included in section K of Part II)

Even though this AP is not targeting indigenous communities particularly and that it does not overlap with indigenous territories, the presence and involvement of indigenous people in the proposed AP has been addressed considering the requirements of the AP ESP. To this end, during the AP project identification and formulation phase, the NIE has taken the following measures, observing the principles of the AP ESP, elements of the FPIC process and the national context:

i) Inclusion of specific measures across project description to promote/facilitate indigenous peoples participation and involvement in AP activities, including a participatory communication plan through which project information will be disclosed in a transparent way and a feedback and complaints mechanism to ensure permanent communication among the indigenous persons and the AP management.

ii) Positive revision of AP outcomes, outputs and activities, confirming that no territorial or landscape rights, customary rights, spiritual practices or traditional ethical codes, and internal legal/traditional frameworks are affected by the AP negatively. On the contrary, actions promoted by the AP are envisioned to produce positive results to all vulnerable persons in the project areas, including indigenous peoples, in the way of improving their technical skills and knowledge; providing adaptive solutions for domestic and productive practices

iii) Development of indicators to track results/impacts in indigenous peoples

iv) Conduct a participatory consultation process oriented to present the AP proposal to indigenous persons in the project area and to identify the indigenous peoples' concerns and their representatives, document geographic information through and reaching consent about the programme and means of participation. Fundacion Natura conducted a specific consultation process with indigenous persons present in the project area. The meeting took place in Veraguas -at the Cooperative Esperanza de los Campesinos, 24 November 2016. Evidence of the meeting held, content and results of the meeting are included in a full report (including a list of the participants and evidence of the event) in annex 3. of the proposal.

The specific areas of intervention of the AP in the CHVRW and SMRW have not been involved in previous cases of conflict with indigenous communities. In consequence no documents related to legal processes, reports, specific cases, or complaints with respect to the rights of indigenous peoples by the Special Rapporteur of the UN System or similar instance are pertinent to the AP. Recent complaints involving indigenous communities in Panama are located outside the AP project areas (for example, the Barro Blanco

hydroelectric project located in the Tabasará River, District of Tole, disturbing a portion of the Ngabe Bugle Reserve)

During the programme proposal writing process, the communities mostly affected by climate change threats have been identified, in the middle and lower sections of the CHRW and SMRW. For both watersheds, it is a fact that these areas do not overlap with indigenous reserves, which are in the upper sections of the watershed.

According to the general orientation of the adaptation programme proposed, it is meant to work in those areas where the variables of production in agriculture, livestock and energy meet, worsened by climate change conditions particularly related with changes in precipitation patterns, causing either flood or drought events. And creating a pressure at the local level for the producers in their family economy, but also at a larger scale, impacting availability of basic commercial crops, particularly rice and coffee production. Therefore, the programme targets productive units for self-consumption and commercialization (families and communities) and among these, those productive units that are the most vulnerable based in official statistic information of loss & damages and also in light of their presence in areas with higher level of climate risk.

Indigenous communities typically are not farm owners, but their productive activity is for subsistence. In the case of the Districts of Baru and Renacimiento, indigenous families work as seasonal workforce during coffee collection.

In the AF project intervention areas where indigenous families are present, an affirmative approach will be implemented to ensure full participation in programme activities. This strategy is indicated above (see “Programme focus regarding beneficiaries’ profile” and “Equal access and distribution of the adaptation benefits among beneficiaries”).

In addition, and to ensure that the Programme maintains an open and permanent communication channel with beneficiaries and community stakeholders, Fundacion Natura will put in place a **Feedback and Complaints Handling Mechanism** as a critical tool for promoting Adaptation Programme transparency and accountability. Accordingly, to the World Bank proposed methodology to design and operate these mechanisms, it will ensure, at least, the following dimensions:

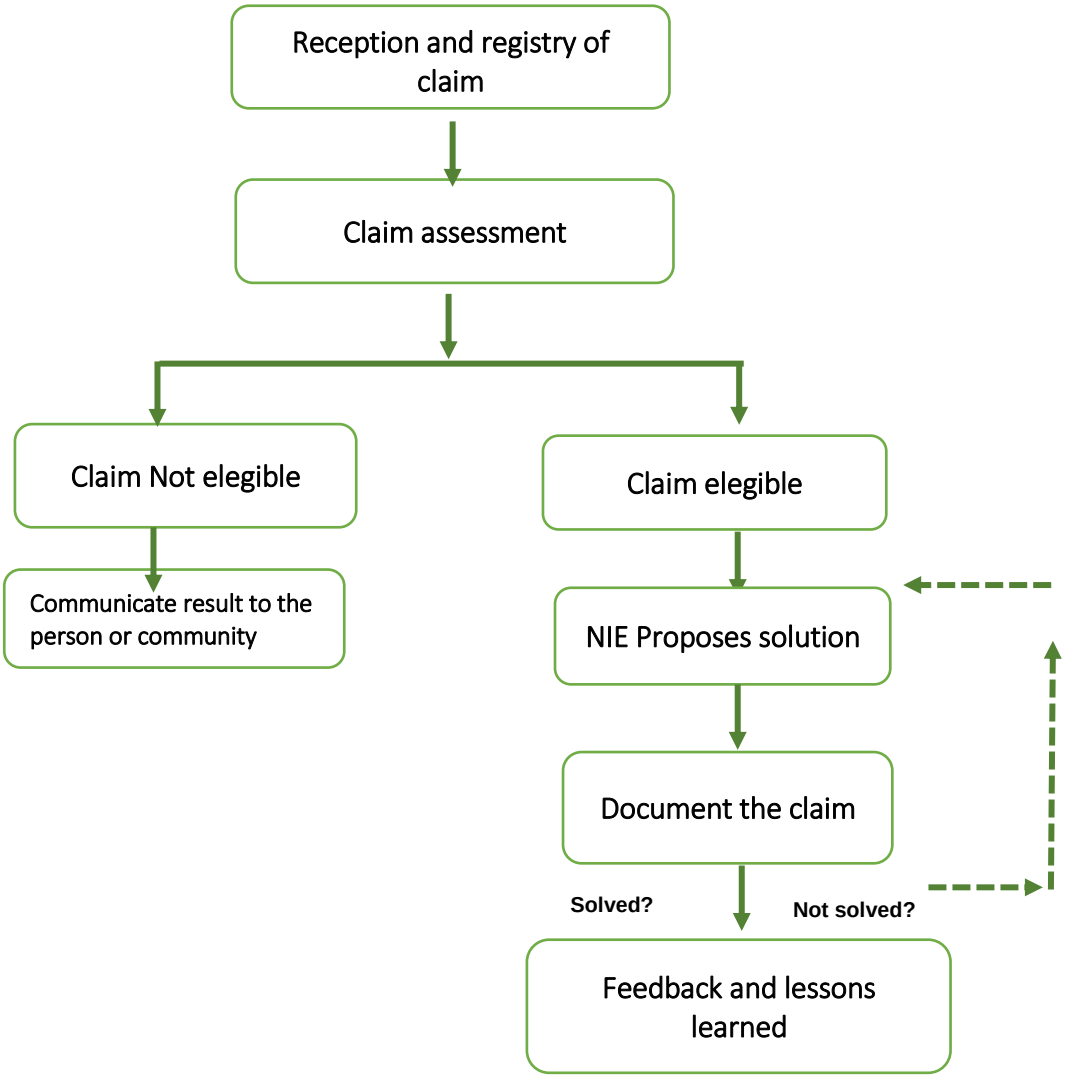
- ✓ complaint handling committee for each watershed
- ✓ The members of the committees will be given the authority to take or demand remedial action
- ✓ The members of the committee will not necessarily be obliged to act on all complaints. Indicative lists of situations and exceptions will be developed
- ✓ The mechanism will define measures to ensure that project-affected people feel that they can lodge complaints without fear of retaliation
- ✓ Inform project beneficiaries of their right to file a complaint and about the complaints handling process in general

- ✓ The mechanism will put in place an internal process to record, track and monitor the action taken on complaints
- ✓ The mechanism should provide timely feedback (written or otherwise) to the petitioner on actions taken

The proposed mechanism will serve as a tool for the NIE to evaluate and resolve complaints from the communities in relation to program activities design and implementation. In case complainants are not satisfied with the complaints management or solution, a special committee of Fundacion Natura Board will serve as appeals instance.

The NIE and implementers should provide information to communities on a regular basis, to clarify expectations about what the mechanism may or may not do; encourage people to use it; present results and gather information to improve the system claims.

Figure 4. Stage of the Program's Claim Mechanism



The following indicative criteria will be used to determine eligible claims to be included in the complaint mechanism.

Elegibles	**Non Elegibles**
• The claim is related to the Program • The issues raised in the complaint fall within the issues that the grievance mechanism is authorized to serve • The claimant is positioned to present it. •	• The claim is not clearly related to the program • The nature of the complaint is outside the mandate of the grievance mechanism • The claimant is not positioned to present • Other procedures are more appropriate to address the claim.

If the claim is rejected, the claimant is informed of the decision and the reasons for rejection.

In particular, regarding indigenous communities, the mechanism will include once a year the holding of a meeting with the indigenous peoples in the project areas, as a sequence of the meeting held during the project formulation phase, to present AP advance, receive feedback about positive/negative/neutral impacts and present adjustments to improve indigenous participation and benefits. Despite most of the indigenous persons do speak Spanish, the feedback and complaint mechanism will be available in the ngabe language to facilitate its use. Any particular indigenous issues raised will be also discussed during the quarterly meetings defined in the M&E Programme.

Examples of form used by NATURA Foundation for complaints of environmental and social safeguards:

Versión: 1	Fecha de revisión 11/03/15	Página 1 de 2	Políticas Contra la Corrupción

Formulario de Reporte por Inobservancia a las Salvaguardas Ambientales y Sociales de la Fundación Natura

Descripción textual del hecho reportado (lo más detallado posible):

_____

_____

_____

Identifique la salvaguarda específica que se ha inobservado:

_____

_____

¿La práctica reportada ha ocasionado algún tipo de consecuencia en razón a su comisión?

_____

_____

Datos de la persona que formula el reporte:

Primer Nombre_____ Segundo Nombre _____

Primer Apellido _____ Segundo Apellido _____

Número de identificación personal: _____

Organización _____

Puesto que ocupa: _____

Correo electrónico _____

Teléfono fijo _____ Teléfono celular _____

Dirección completa:

País _____ Provincia _____ Distrito _____

Corregimiento _____ Lugar poblado (o barriada) _____

Calle _____ Número de casa _____

Datos de las personas físicas y/o jurídicas involucradas (favor especificar nombres completos ya sean de personas como de organizaciones y aporte la mayor cantidad de información posible sobre estas y sobre el hecho en cuestión):

_____

_____

_____

Firma: Fecha y lugar:

Enviar formulario a: quejas@naturapanama.org ó entregarlo en sobre cerrado con el distintivo **SALVAGUARDAS**.

El reporte presentado tiene como única finalidad tomar las acciones efectivas que eviten recurrencias de situaciones similares que afecten el resultado de nuestras actividades. Agradecemos su aporte el cual nos permite actuar con transparencia y mejorar continuamente.

Nota:

1. Todos los campos son obligatorios y deben responderse en forma precisa y completa, con letra legible a fin de poderlo atender de manera oportuna.
2. Anexe tantas hojas sean necesarias para completar la información solicitada.

B5. Equal access and distribution of the adaptation benefits among beneficiaries

Programme will be sensitive to both gender equality (promoting equal opportunity) and equal benefits, by recognizing the different situations of women and men, and developing strategies to ensure that both sexes can benefit from the adaptation experience and results. For purposes of the Programme, Equality refers to ensuring project resources, activities and opportunities are equally available to women and men, and treating both sexes in the same way. Equity refers to the process of treating women and men fairly, so that the project generates similar benefits. To achieve this the key will be to find out the gender-based barriers to full participation for each specific group of women and men. The programme strategy to do this and overcome the barriers for each group includes:

a) conducting a social/gender overview to be very aware of the context and to determine the factors affecting women and men (this specific analysis will be key for activity 2.1 (VIAs) and 2.3a (district water security plans)

b) development of indicators that will help to measure how effectively the project is addressing the different needs, interests and resources of both women and men (as beneficiaries, workers and citizens). This provision will be a key element when designing the M&E protocol included in output 3.4

The following criteria and principles will be observed to ensure an equitable distribution of the adaptation benefits among beneficiaries:

1. Facilitating participation of individuals/families whose land rights are not clear, through collaborative agreements or similar contract figures
2. Working with both men and women is essential to the process. This involves supporting continued dialogue—at both household and community levels—about the roles of women in supporting agricultural innovation, while working to reduce structural deficits (access to resources) and encouraging more male support.
3. Free, prior and informed consent (FPIC) approach, particularly when inviting indigenous individuals/families to participate in AP activities
4. Co-design of the adaptation measures among the project implementers and the communities
5. Distributing AP activities across the different sections of the watershed, to the extent possible, depending on the technical requirements of each one.
6. Establish coordination with conditional cash transfers programs (CCTs) to identify specific cases of socio-economic and climate vulnerability
7. Encourage participation of community organizations (cooperatives, associations, other), without limiting participation of non-associated individuals or families.

Across the different AP components a suite of gender sensitive measures have been proposed, particularly in:

- ✓ 1.1 related to the installation of rainwater harvest systems, preference will be given to female headed households. This will require gender disaggregated information which will be obtained through local instances and confronted with statistical information available.
- ✓ 2.3a related to the development of district water security plans, a gender analysis will be conducted as part of the activity considering gender roles, power relations, and differentiating between men and women´s specific needs and priorities. The purpose is to ensure that the plans consider gender equality issues and establish specific measures and targets to improve women engagement in water decision making processes.
- ✓ 1.5c related to socializing the concept of Microfinance, based on ecosystems and climate change adaptation, will include as a criteria for selection of the microfinance institutions the willingness to design and develop a microfinance scheme implemented in women group. If possible, this will be linked to activity 1.3 to support the orchid and naranjilla pilot.
- ✓ 4.5.c Compilation and synthesis of materials for different audiences -farmers, institutions, academia, etc.- on adaptation to climate change (as part of the "knowledge products" generation process), will include a specific material to address the vulnerability of women, measures adopted to overcome this and examples from the AP that could be replicated by other projects
- ✓ Workshops listed in 4.1a and 4.1b will include a gender sensitization training to secure project staff comprehension of gender specific issues
- ✓ 4.5.f Experience exchanges activities at the local level, including at least one international pasantía (guided visit): Affirmative actions will be undertaken across the activities of this component to promote participation of women implementing a gender perspective, as well as actions to incentive the participation of young people. For example: i) Include impact on women involvement and empowerment as a criteria for the selection of the project to be visited as part of the exchange of experiences; ii) Select and design one of the study tours or exchange activity where women involvement and empowerment is one of the main highlights of the project; iii) Define a 50/50 ratio of women and men participation in the study tour, establishing preference for eligible women participants
- ✓ Valid for all components: TORs for grant executing partners will require the inclusion of gender and social experts as part of the project staff, when relevant.

C. Analysis of the cost-effectiveness of the proposed project / programme

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

- The proposed program directly addresses climate change adaptation measures in the water sector and its linkages with food security and energy production among others, in priority areas of Chiriquí Viejo and Santa Maria rivers watersheds.

- The activities proposed in the 4 components require investment for the creation of a water use model in line with the different demands of each of the two priority watersheds. These investments are mainly focused on specific activities to reduce conflicts over water use in both national priority watersheds, besides introducing the climate variability element in decisions-making about water management for the benefit of users.

- It is expected that the proposed program will generate long-term benefits in terms of resilience. This will be a result of the strong focus on capacity building at multiple levels, to help the process of resolving current conflicts between different water users, in view of the climate variability scenario the country is already facing. These capabilities include solutions in the field of technologies (such as water harvesting systems; irrigation systems; early warning systems, flood and drought; farms planning with climate-smart sustainable agricultural and livestock systems); financing (with the encouragement through climate financial instruments); country strategies (with the introduction of climate change adaptation elements into national, district and local plans for integrated watershed management); and knowledge management (with the establishment of a national knowledge platform on adaptation to climate change).

- The proposed program also has a strong focus on generating benefits with a multiplier effect, which results will have a positive impact on a larger number of people beyond the direct beneficiaries in each of the proposed areas. This through (i) the impact on food security that will generate nationwide in agricultural commodities for essential consumption among population (rice, vegetables and cattle); (Ii) the impact on the generation of energy for the national energy matrix (with appropriate monitoring and management of water flows at strategic sites in both rivers Chiriquí Viejo and Santa Maria); (Iii) the impact on the management of climate knowledge for water resource management and its linkages with the agricultural, energy and other sectors; and (iv) the impact on the response capacity of the country for timely decision-making in the

public and private sectors regarding water resources, based on their connection with agricultural production, hydropower and other sectors, supported by climate information.

- To select the proposed projects, the following criteria were taken into consideration:

  - emphasis on vulnerable population: Consider i) groups and sectors highly vulnerable to climate change (implementation of no regret measures[35]); ii) priority productive activities; and iii) highly vulnerable social groups (extreme poverty areas).
  - areas were previously identified as vulnerable to climate change and have previous planning processes in terms of watershed (watershed management plans and conservation plans for microwatersheds).
  - there are well-developed social capital and potential for results replication or transfer.
  - have a greater relationship with capacity building, development of learning experiences and adoption of technologies and practices, emphasizing the possibility of creating transfer processes.
  - can generate immediate benefits for participants, in the short term, and consider the environmental and climate change issues.
  - Consider the financial analysis of productive projects, mainly on aspects of profitability, social benefits and environment.

C1. Programme cost effectiveness facts

As originally conceived, the Programme presents a positive cost effectiveness scenario, based in the following aspects:

a) The Programme is targeting both implementation/on the ground results (for ex. piloting productive alternatives, consolidating a national network for climate data management) and in parallel influencing sensitive public policy processes and facilitating information for conflict resolution among water users, promoting policy coherence and inter-sectorial coordination

b) The nexus approach privileged by the Programme is by definition a cost-effective approach. Historically, most adaptation efforts and plans have been prepared to meet sectorial goals. They generally focus on sectorial and project-based activities, without adequate consideration or coordination of cross sectorial interactions among key climate-sensitive sectors such as water, energy, and food. As opposed to traditional

[35] No regret measures are those relevant enough from the climatic point of view, and that, at the same time, are relevant from the development point of view, even if specific climatic threaths may not occur in the future.

sectorial projects implemented in Panama, this Programme is pursuing multiple results at 3 sectors and at different levels and scales.

c) In absence of a climate change adaptation national baseline, the Programme will contribute with technical data to advance the baseline; outputs 4.5 and 3.4 b will be particularly important for this purpose (the M&E tool to assess effectiveness of climate change adaptation measures implemented by the programme is conceived to serve also as a tool for MiAmbiente to initiate monitoring of adaptation efforts and results at the national scale)

d) The Programme will benefit from data, results and consultation processes conducted by key programme partners in the context of national scale planning processes (National Plan for Water Security, an Energy Plan 2015-2050, and a National Pact for Agriculture); in other context, a similar adaptation programme will have to allocate resources to conduct parallel consultation and validation processes.

e) The Programme has been designed to serve as an implementing facility for planning processes conducted previously (National Integrated Water Resources Management Plan 2010-2030; Watershed management plans and Sub-watershed Conservation Area Plans). This is a highly cost effective figure of this programme.

f) The Programme is expected to accomplish complex adaptation expectations as evidenced in the following text (adapted from “The nexus approach to water-energy-food security. An option to climate change adaptation. Golam Rasul & Bikash Sharma (2015):

I. Mainstreaming climate change adaptation into development.

The proposal aims to influence the development agenda through providing specific inputs to improving water and soil management at a national scale. Project output 2.3a oriented to produce water security plans at the district level is a clear contribution towards achieving SDG #6 on water and sanitation. These plans are going to be developed by the first time and from a climate perspective. The idea is that these experiences will serve as pilots to orient further similar plans in the context of the process of the National Water plan for water security. In parallel, output 2.3b aiming to produce a brand new national agriculture and livestock production map, based in climate and data is a direct contribution to the national process to achieve SDG target 15.3 related to halt desertification and rehabilitate degraded land and soils, including land affected by desertification, drought and floods. This new map is expected to serve as a powerful planning tool for the government to orient mid and long term future public policy and investment plans, in order to incentivize the location or relocation of these productive activities based not only in market, demographic and labour conditions, but in future scenarios of water and temperature patterns, allowing to

design, for the first time, climate proof production plans and programmes for the country.

II. Transformative potential:

- Builds adaptive capacity. District water security plans (2.3a), operation of early warning systems (3.2) and rainwater harvest systems (1.1), are programme action lines that will improve adaptive capacity at the community level, since beneficiaries will have new tangible tools not only to face climate variability, but to prevent future losses and damages.
- Improve livelihoods: Through action items included in output 1, adaptive capacity will be strengthened through increased levels of productivity, resulting from the implementation of climate smart practices for agriculture and livestock production. These activities will evidence improvement in production rates and income generation, by preventing losses due to climate variables.
- Builds local institutions. The AP is intense in promoting institutional strengthening through specific capacity building processes for pubic officers and key stakeholders from other sectors. In addition, output 1.5 is specifically oriented to promote mainstreaming of climate change adaptation into the microfinance sector. This is a whole new process in Panama. Both ETESA and MIDA will directly benefit from implementation of component 3 “strengthened local national capacity for monitoring and decision making to reduce and respond to risks associated to climate change”. Fundacion Natura, in it´s role as implementing entity, will also benefit of completely new learning process on climate change adaptation issues that will definitively affect the other environmental projects leaded by the organization jointly with the Ministry of Environment, particularly the management of the environmental trust funds (FIDECO and Chagres and Darien debt for nature swaps).
- Builds response capacity: Access to timely and accurate climate data, will improve response capacity of the institutions and sectors regarding climate variability. Particularly the installation of the early warning systems is a building block in improving integrated response to disasters.

III. Addresses the drivers of vulnerability:

- Activities seek to reduce poverty and other non-climatic stresses that make people vulnerable. The AP has been designed from the perspective of an integrated approach. Particularly action lines of component 1 do expect to provide the “triple result” in terms of producing environmental, social and economic results. The AP programme also seeks to provide new climate based rationale to improve water granting processes, which is key for the hydropower sector, that is perceived as a source of conflict and increased vulnerability for producers settled in areas with hydropower potential.

- Promotion of minority rights. The proposed AP is not targeting minority groups. In light of the water-food-energy nexus, the main target audience are small-scale producers severely impacted by climate variability.
- Transformation of social relations to combat discrimination and underlying social and political vulnerability. By providing new data to orient investment decisions, at the public and household level, the programme will indirectly strengthen negotiation skills of small-scale producers to interact with government and other sector representatives to obtain better conditions to develop their productive activity. Traditional asymmetry between small scale producers and industrial large scale farm owners, energy sector and other extractive industries might be reduced as a result of the AP implementation.

C2. Cost effectiveness of the investments from a sustainability point of view

Since the AP privileges Managerial and Awareness strategies rather than hard infrastructure and maintenance strategies to foster adaptation benefits, the schemes envisioned by the AP to address long term sustainability of project results, include:

- Promoting a behavioral change of individuals (to sustainably apply ecosystem based adaptation and natural resources practices installed by the project); government institutions (to qualitatively improve decision making process regarding water concessions and land zoning regulations to conduct it based in technical and climate information) + (define operative protocols to transform current generation of hydro meteorological data into affordable and useful information for other sectors, particularly the agriculture sector), among other profound changes.
- Support the behavioral change with capacity building efforts through training opportunities, a brand new adaptation knowledge process in the country, evidence generation about climate change and adaptation needs.
- To the extent possible, include legal obligations to force ownership and long term commitments of the beneficiaries in relation with gray and green infrastructure investments.
- Promote institutional ownership of project results, particularly ETESA and MIDA regarding the climate data infrastructure, through participating and/or influencing strategic processes such as the Climate Change National Committee, the Water Security Plan and the National Energy Programme.
- Based in the experience of rapid obsolescence of online portals after the umbrella projects finishes; and aiming to sustain the adaptation knowledge exchange dynamic, Fundacion Natura is willing to continue the portal operation, delivering early efforts to collaborate with potential partner institutions.

In terms of cost effectiveness of the proposed programme, the AF is requesting additional quantitative reasoning. To conduct such in depth analysis, Fundación Natura has decided to request official cost/benefit information of other programmes with similar components to present numerical comparison. Information will include programmes implemented by Panama Canal Authority, REDD + Programme and comparison with other environmental funds managed by Natura (Debt for nature swaps and FIDECO) and will be submitted shortly. The purpose is to present a quantitative scenario that could fulfill the AF request

C3. Benefits from implementation of proposed activities aiming at generating revenues

According to the estimates made, from the economically, socially and environmentally points of view, the three modes evaluated for adaptation to climate change are feasible. The climate adaption methods with good production and conservation practices generate greater benefits socially and environmentally, but also demand a higher level of initial investment which will be provided by the project.
the other hand, NATURA Foundation has implemented projects incorporating silvopastoral and agroforestry systems in other areas of the country generating short-term impact and showing the probability of generating impacts at medium and long term featuring lessons learned.

IRRIGATED RICE
The following table shows the economic results reached by the Ministry of Agricultural Development (MIDA) in the area to intervene when comparing the dry rice production system and the irrigated rice production system which show that in the form rain-fed generated an estimated total of 94 quintals/ha; while for the irrigated rice system expected, returns are estimated at 120 quintals/ha, in both cases using high-yield seeds. Based on the above, it is concluded that the proposed system is more profitable than the traditionally used by producers.

Table 36. Economic results when comparing the dry rice production system and the irrigated rice production system

Economic Analysis	Measure Units	Values	
		Dry Rice	Irrigated rice
Expected Yield	tm	5.00	6.00
Expected Price	B/./tm	462.00	462.00
Production Values	B/.	2,310.00	2,772.00
Net income per hectare	B/.	388.72	542.17
Cost / tm	B/.	384.26	371.63

Economic Analysis	Measure Units	Values	
		Dry Rice	Irrigated rice
Income /tm	B/.	77.74	90.36
Benefit/ Cost ratio	B/.	1.20	1.24
Profitability	%	20.23	24.31

Source: Dirección Nacional de Agricultura, MIDA-2015

SILVOPASTORIL SYSTEM

Cost-benefit trials were performed to assess the financial viability by investing in incorporating SSP in small cattle farms in the lower and middle areas of the Santa Maria River basin. the net present value (NPV) was estimated considering the situation of the farm with traditional livestock (“without" the project) dealing with the situation of the farm with SSP ("with" the project without taking into account all the environmental benefits) in order to obtain the incremental net benefits due to the adoption of new technologies for adaptation to climate change. The results of the financial year indicate that the adoption of the SSP in the farm management is financially profitable.

Table 37. Economic analysis of when comparing financial results from traditionally produced cattle vs enhanced silvopastoral schemes

Economic Analysis	Traditional	Enhanced
NPV(10%)	1,464.52	1,796.35
NPV BENEFITS (10%)	7,202.15	7,672.88
NPV COSTS (10%)	5,737.63	5,876.53
Benefit / Cost ratio	1.26	1.31

Source: Fundación NATURA

Direct benefits for small scale stockbreeders (bovine meat) incorporating good practices with technology products, would derive from an increase in productivity and stability in production versus climate variability (high temperatures causing increased incidence of pests and diseases, drought, live weight decrease by 30% and deaths of animals).

It is estimated that the results of the intervention generate substantial changes in the culture of benefited local farmers and technicians because the project has a high potential to generate knowledge, lessons learned and establish the conditions for competitiveness. It is an opportunity for the stockbreeder sector and the MIDA looking for climate resilience in the pastoral areas of incidence and adjacent to the project; In addition, it has benefits of inclusion and social cohesion at the level of rural communities.

Consequently, the project provides tangible support to vulnerable groups in the areas identified in the lower and middle sectors of the Santa Maria River´s basin as sensitive to water stress caused by drought, water scarcity and high temperatures making a significant contribution to the resilience in order to benefit small producers who lack the resources and capacity to modify their production systems, those who require immediate action to increase their productivity and resilience to climate change to be sustainable and remain in production

AGROFORESTRY SYSTEM

- **Santa Maria**
  Currently small producers in the area have a production of 3-4 quintals per hectare due to climate variability and lack of proper handling in their plantations. According to the technician of the Cooperative “La Esperanza de los Campos de Santa Fe”, counting with better practices adapted to climate variability for coffee production can increase production up to 50 quintals per hectare as it has been shown with large producers in the area which count with the resources to make improvements and adaptations required. The current sale of robusta coffee is in the order of US $210 per hulled qq.

- **Chiriquí Viejo**
  Most farms today in the Renaissance area are able maintain production levels of 21qq per hectare in plantations of catuai and caturra coffee, some with more than 20 years of establishment. This proposal aims to increase yields per hectare from 40qq to 60qq by the third year seeking for greater profitability in coffee production.

NATURA Foundation has implemented agroforestry projects in the Panama Canal watershed sectors with profitable projections adapting the following show below.

Table 38. Economic analysis of when comparing financial results from traditionally produced crops vs enhanced production schemes

Economic Analysis	Traditional	Enhanced
NPV BENEFITS (10%)	4,300.83	6,489.28
NPV COSTS (10%)	2,833.47	2,833.47
BenefiT / Cost Ratio	1.52	2.29

Source: CATIE/Fundación NATURA, Fondo FIDECO

Budget figures of other programmes under implementation in the country, suggest that the magnitud of the investment requested for the AP are coherent and based in evidence and experience of implementing programmes at the country level:

a) Mitigation oriented project “Protection of carbon pools in mangroves and protected areas of Panama”. Budget: US$3.2 million. The area of intervention of this programme

is a mangrove area located across 65 kms of coastline of 3 coastal districts. This project is mainly oriented to generate evidence through technical studies; in terms of community engagement, the programme aims to deliver a portfolio of 6 microprojects. (@ US$8,000 each aprox.) This programme is not intensive in installation of in the ground solutions; different from the AP proposed, which aims to promote transformative changes at different levels.

b) Contingency plan for drought operated by Ministry of Agriculture (three months' urgency programme launched after de declaration of urgency by MIDA in August 2015). This is an urgency programme to respond to the crisis caused by El Niño in Los Santos province. It focuses in 3 components: food supplementation, animal health (medicines) and infrastructure (drilling wells). US$5.1 million. Since the plan is designed as an emergency plan, it is oriented to provide crisis response, but not to create mid-long term adaptive capacity, improvement of productive patterns/schemes; climate data analysis or similar adaptation measures. These are the characteristics of the adaptation programme proposed, which are a clear differentiating element compared to business as usual response to climate issues.

Urgency for solutions

- One of the problems with greater urgency to be solved, at both watersheds -Chiriquí Viejo and Santa Maria rivers- is related to the use of water; which is in great demand and has potential for hydroelectric generation, domestic use, livestock and agriculture.

- The Chiriquí Viejo river watershed is a very important territory for the Republic of Panama, for its suitability for agricultural production and its natural conditions that allows great water resource availability, which is being exploited for hydropower generation; both qualities are based on the hydro climatic conditions of the watershed, its landscape, life zones, and the quality of soils, especially at the upper watershed.

    - Currently, 77% of available water at the Chiriquí Viejo river watershed is under concession for hydropower generation. According to the ANAM (2008)[36], as of 2008, there were 19 concessions along the river course for hydropower generation; however, total number of concession was 191. In most cases, concessions for hydroelectric power generation were granted without conducting appropriate studies that would ensure the availability of water in line with generation capacity design; because of this, such activity is likely to harm the river ecosystem.

[36] Development of Hydrological Monthly Balances Elaboración de Balances Hídricos Mensuales, Offer – Demand by hydrographic watersheds; Proposal for Modernization of Hydrometeorological Network, Republic of Panama. Technical document, Cuenca 102. 2008.

- The Chiriquí Viejo river watershed area produces 81% of onions, 97% of potatoes, 97% of carrots, cauliflower 99%, 73% of beans, 43% of coffee consumed nationally, and is source for 31% of the milk also consumed nationwide[37]. In addition, half of the rice production of the Chiriquí province is produced at the lower part of the watershed (over 11,000 hectares planted).

- According to the National Plan for Integrated Water Resources Management (ANAM, 2011) 77.4% of the total national water concessions for the agribusiness sector is located in the Chiriquí Viejo River watershed. It also indicates that this watershed sustains the highest water volume granted in concession for hydroelectric generation (32.94%) and agriculture (10.57%), compared to other areas.

- The watershed management is necessary because of the hydropower potential, the potential of small-scale irrigation systems, ecotourism potential, domestic water uses, and agricultural development in the middle and lower parts. By choosing not to act with this vision, not only development opportunities will be lost, but existing problems of poverty, environmental degradation, environmental conflicts and the impact of climate change will increase.

- Meanwhile, the Santa Maria River watershed is also one of the priority watersheds in the country[38]. The potential of water resources is important for local/regional activities, at the upper, middle and lower parts of the watershed; and at the river mouth (the Parita Bay). This watershed meets the needs of much of the population living in the provinces of Coclé, Herrera, Veraguas and part of the Ngäbe Bugle Indigenous territory.

  - Its hydropower potential has been considered as strategic alternative for the future of both, the inhabitants of the watershed, and the provision of services to local and neighboring areas (Integral Management Plan Upper, Middle and Lower parts- of Santa María River Watershed, 2009).

  - This watershed is in a promising economic development zone. The region, and particularly the lower part of the watershed, integrates important productive activities in the national agricultural sector. According to the data of cultivated area, the region of the middle and lower watershed is considered a sugarcane area, and home for production of rice and corn; the rest of other crops do not cover large areas. In addition, 42% of the middle and lower watershed area is devoted to livestock, perhaps the activity that generates more income to the region. Also, this

[37] Management Plan for Chiriquí Viejo River Watershed.
[38] According to the Land Management General Plan (LMGP) of Panama, ANAM, 2006.

section experiences water-related conflicts between the shrimp industry and the sugar industry.

- In contrast, the upper part of the watershed is dedicated to traditional agriculture (slash and burn); planting subsistence crops such as grains, roots and tubers, vegetables, for one or two years and subsequent abandonment or conversion to pasture. Along with perennial crops (such as coffee and orange), this agricultural system is the basis of food security of the population in this area. Livestock activities, especially ranching are also observed.

- It is estimated that from the investment proposed to implement this program, important benefits that justify the whole operation will be achieved. These benefits include economic, social and environmental aspects. At the local level, the population living at the Chiriquí Viejo River watershed is 99,000 people, and at Santa Maria River watershed is 75,500 people. However, the scope of benefits extends to the national level, considering the impact on economy and food security both offer, to supply a significant proportion of agricultural commodities and energy generation.

- The risk of doing nothing in a scenario of climate change threatens the integrity of both areas, with the consequent environmental, social and economic impact locally and nationally.

- Past experiences show that, for example, extreme events related to El Nino and La Nina in Panama between 1982 and 2008, amounted up to 32 disasters. These claimed some B / 86 million in economic damages and nearly 250 lives lost nationwide. Starting 2015, forecasts indicate that the threat of climate variability is becoming a driving force of greater risks for ever more extreme weather events; a reason to prioritize attention to potential impacts of climate change on the most vulnerable populations; and address the risks from an integrated planning on disaster risks regarding food security, access to energy and sustainable development.

- The cost benefit of the proposed program is based on recognition of the importance of these regions and their vulnerability to climate change; and to acknowledge that the problem posed forces a scenario of continued deterioration and progressive vulnerability to life-support systems.

- The proposed program will focus on the effectiveness of the anticipated outcomes and impacts for each component, and the profitability of all the detailed activities.

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D. Consistency of the project / programme with national or sub-national sustainable development strategies

Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national adaptation plan (NAP), 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 proposed program is consistent with national policies and programs to address adaptation to climate change, building climate resilience, disaster risks reduction, and associated programs and policies to strengthen IWRM incorporating elements that increase resilience and adaptation climate change; to harmonize water use for human consumption, food production and energy development; to achieve a climate-resilient water management sector (water-food-energy- climate change adaptation nexus); to establish a national monitoring system for adaptation to climate change; and to establish a national knowledge platform for adaptation to climate change.

This proposal is consistent with:

- The Integrated Management Plan (Upper, Medium and Downstream) of the Santa Maria River Watershed (2009); and Integrated Management Plan for Chiriquí Viejo River Watershed (2014).

Both management plans indicate the need to incorporate elements that enhance resilience and adaptation to climate change, as well as harmonize the different water uses in a scenario of conflicts and deterioration, aggravated by drastic climate changes.

- Second National Communication to the UN Framework Convention on Climate Change, Panama, Panama (2011).

This Second National Communication raises the need to build capacity to provide strategies, policies and appropriate measures in the priority sectors: water resources and their relationship to agriculture in the Santa Maria River Watershed. Specifically, it suggests the need for investment in improving water resources monitoring networks, and developing an early warning system, for populations most vulnerable to drought and flooding, among other measures.

- The National Plan for Integrated Water Resources Management of the Republic of Panama • 2010-2030 (2011).

This plan recommends promoting the development of programs to support the poorest vulnerable communities, to facilitate their adaptation to climate change effects. It also establishes the need to strengthen climate observation networks, to monitor the parameters and indicators of climate change; and develop mechanisms for coordination

between public sector and civil society, in order to contribute to fulfill international agreements made by the Panamanian government in relation to climate change.

- Act No. 41 of 1998 "General Law for the Environment".

It establishes that the National Authority for the Environment (ANAM) will establish special programs for watershed management, which, due to the level of deterioration or need for strategic conservation, are suitable for a decentralized management of water resources by local authorities and users.

- National Climate Change Policy.

This policy shapes the actions that Panama, according to its national circumstances, can structure to have an impact on achieving the ultimate objective of the UN Framework Convention on Climate Change (UNFCCC), and improve the country´s adaptive capacity by reducing vulnerability and identifying priority adaptation measures. Specifically, it highlights the need for interventions to strengthen water security, food security and energy security.

- The "National Strategy for the Environment: Environmental Management for Sustainable Development 2008-2012".

The Objective 10 stresses the need for conservation and restoration of watersheds, with an ecosystem and participatory approach.

- Law 44 of August 5, 2002. Official Gazette 24,613.

This law sets a special administrative system for the management, protection, and conservation of watersheds in the Republic of Panama.

- Executive Decree 70 of July 27, 1973.

It regulates the granting water use permits and concessions; and it determines the integration and operation of the Consultative Council of Water Resources.

- National Policy for Integrated Disaster Risks Management (PNGIRD), and the National Plan for Disaster Risk Management 2011-15.

It establishes the need to improve preparedness for extreme natural phenomena; and more frequent and intense floods and droughts.

- Law 24 of June 4, 2001, by which measures are adopted to support the farmers affected by adverse weather conditions and other eventualities.

Its aim is to provide financial assistance to farmers affected by adverse weather conditions; sharp falls in market prices; or for exotic pests and diseases that significantly affect agricultural production.

- Law No. 25 of June 4, 2001, that dictates provisions on the agricultural transformation national policy and on its implementation.

This law was established as a national response to support the agricultural sector for investments farmers made with own funds or loans, in order to improve their crops/livestock and adapt to the new environment of competitiveness and production efficiency. The producer is suitable to receive a reimbursement for investments made in production activities detailed by the program. An average of 50% of the investments -referred to in the regulations- could be reimbursed depending on the produce subject to support.

- The Government Strategic Plan 2015-2019.

In addition to the above instruments, the proposed program is consistent with:

- Executive Decree No. 84 of April 9, 2007, by which the National Policy for Water Resources is approved.
- Decree Law No. 35 of September 22, 1966, by which the exploitation of state waters is regulated, in order to ensure their exploitation according to the social interest.
- Decree Law 35 of September 22, 1996, that establishes regulations for water uses.
- Executive Decree 16 of March 5, 2002. Official Gazette 24,506 of March 7, 2002. By which the Executive Decree 104 of December 23, 1994 is modified.
- National Biodiversity Policy; National Policy on Climate Change; National Decentralization Policy of Environmental Management; National Policy on Comprehensive Management of Hazardous and Non-Hazardous Waste; National Environmental Policy Information; National Cleaner Production Policy; and National Policy for Environmental Monitoring, Control and Supervision.
- Law No. 11 of April 12, 1995, by which the Regional Convention on Climate Change, signed in Guatemala on October 29, 1993 is approved.
- Law No. 10 of April 12, 1995, which approves the United Nations Framework Convention on Climate Change signed at New York on May 9, 1992.
- Law No. 88 of November 30, 1998, whereby the Kyoto Protocol of the United Nations Framework Convention on Climate Change (signed in Kyoto, the December 11, 1997) is approved.

Last but not least, currently the state is taking steps towards the establishment and implementation of three important instruments related to the proposed program:

National Plan for Water Security, National Energy Plan 2015-2050 and the National Pact for Agriculture Sector.

These 3 processes are planning efforts conducted currently by the central government at a national scale. The proposed Programme is conceived as an implementation opportunity to generate on the ground evidence that will demonstrate how climate change is a cross cutting dimension and that by delivering adaptation results, other positive results are produced in the 3 sectors. In operational terms, once approved, the Programme will invite the responsible offices of these plans to participate in the Programme work plan validation, so that synergies are identified from the very beginning.

Special consideration regarding programme coordination with ministry of agriculture (MIDA) current initiatives

As part of the actions taken towards building the Plan for Adaptation to Climate Change, through workshops and seminars run by the Environmental Unit of MIDA, they have identified strategies and lines of work, which are compatible with the Adaptation Project which focuses on the watersheds of the rivers Chiriqui Viejo and Santa Maria. Some strategies and lines of work are:

1. Identify the measures of adaptation to climate change for each production system.
2. Establish public-private partnerships for knowledge management on Climate Change.
3. Identification of key actors and their responsibilities in the Plan for Adaptation to Climate Change.
4. Establishment of agro-forestry and pasture systems according to territorial characteristics.
5. Use of clean technologies appropriate
6. Adoption of organic farming practices that reduce GHG emissions
7. Use of the Integrated Watershed Approach for agricultural extension service.
8. Incorporating GIS System agricultural extension
9. Establishment of pilot projects on adaptation and mitigation to climate change.
10. Integrated Risk Management in agriculture
11. Systems for and Use of Rainwater collection and use
12. Using climate forecasts locally
13. Networking Information on Climate Change.
14. Consideration of gender and traditional knowledge of indigenous peoples

Three public policy processes have been listed as particularly relevant for this Adaptation Programme, the National Plan for Water Security; the National Energy Plan and the Pact for the Agriculture Sector. The nexus and coordination scheme with these processes and particularly with Ministry of Agriculture is listed below:

Table 39. The nexus and coordination scheme with public policy processes

Pogramme	Description	Synergy scheme with the AP
National Plan for Water Security 2015-2050. "Water for all" http://www.miambiente.gob.pa/index.php/2013-02-20-08-59-23/avisos-y-eventos/otros-avisos/430-plan-nacional-de-seguridad-hidrica-2015-2050-agua-para-todos Responsible: High Level Inter Government Commission	The National Plan for Water Security 2015-2050 Water for All was officially approved through a resolution of the Council of Ministers (Consejo de Gabinete) on August 26, 2016. The Plan is conceived as the national planning instrument to define public policies aimed at improving the supply of water in acceptable quantity and quality. The Resolution included the creation of the National Water Council (CONAGUA for its initials in Spanish) and the Technical Secretariat for Water Safety leaded by the MiAmbiente. This document will be the instrument for the inter institutional articulation and coordination among the institutions involved with the use of water, through the planning of actions at the national level, including strategic structural interventions, to securing water supply for human consumption and meet the demand of the productive sector, as well as reducing the risks associated with extreme weather events such as droughts and floods. Although the Plan is divided into 5 targets, the initial investment of the Plan in the amount of US$5.5 million dollars will focus in the basic sanitation 100/0. The 5 targets are related to: water universal access and WASH; water for inclusive growth; water related risk management; water sustainability and maintenance of 52 prioritized	The role of MiAmbiente as Technical Secretariat of the NWSP provides the solid basis for the synergy with the AP, since MiAmbiente is one of the programme key partners, along with MIDA. Both entities MiAmbiente and MIDA are part of the CONAGUA structure. The AP, through MiAmbiente, will formally request to participate along with MiAmbiente in the technical meetings convened by the Technical Secretariat to establish, from the very initial phases, coordination among the AP actions and the NWSP actions, particularly regarding AP outputs/activities 1.1, 2.2, 2.3, 3. Actually, the experience derived from the AP in these items will serve as a knowledge basis for the NWSP implementation. AP Coordinator will be responsible for periodically handling project results to the Conagua Technical Secretariat and establish operative synergies during implementation phase. This can be operative through securing the inclusion of AP correspondent activities in the NWSP Work plan. Communication with the NWSP also will be canalized through the Climate Change National Committee. According to the presentation of the NWSP 2016-2018, particularly strong synergies are envisioned with the target Availability of water for inclusive socio-economic

Pogramme	Description	Synergy scheme with the AP
	watersheds (including both Chiriqui Viejo and Sta. Maria river watersheds). An important aspect of the Plan is the creation of the National Water Council (CONAGUA for its initials in Spanish) as the entity responsible for promoting, guiding, coordinating and ensuring the development and implementation of the NWSP 2015-2050. CONAGUA is a high level political instance, formed by the Environment Minister, who will preside over it; and a representative of the Ministers of Economy and Finance; Minister of Health; Minister of Agricultural Development; the administrator of the Panama Canal Authority; the general administrator of the National Authority of Public Services; and the director of the Institute of Aqueducts and Sewers (IDAAN). The functions of CONAGUA include: advising, guiding and proposing to the Cabinet Council guidelines, policies, regulations, strategies. MiAmbiente will serve as the Technical Secretariat of CONAGUA, which will be responsible for monitoring and operating the actions within the Plan. The 2016-2018 Work Plan of the NWSP was presented by the Minister of Environment on October 26, 2016.	development target, since it includes the construction of new multipurpose reservoirs in critical areas such as the (Bayano Lake, Rio Indio, Rio La Villa, and including the Santa Maria River. Another clear linkage will be established with the actions of the target related to the Preventive management of water-related risks which aims to strengthen and integrate a network of hydrological and meteorological stations at the national level, as well as the design and implementation of the National Hydrological Extremes Management Program (dry and rainy season) in priority basins; these actions are in clear alignment with component 3 of the AP.
Energy National Plan 2015-2050 (PEN for its initials in Spanish). http://www.energia.gob.pa/Plan-Energetico-Nacional.	The process started with a national participatory dialogue, which resulted in 17 national forums, with 800 participants and 36 working tables. The result of the process is an extensive	Synergy with this process will be established directly with the Secretariat, accompanied by the MiAmbiente representative. Another level of interaction will be secured through the

Pogramme	Description	Synergy scheme with the AP
Responsible: National Secretariat of Energy	document recently published in the digital official gazette in April 5, 2016 called “National Energy Plan 2015-2050. Conceptual Guidelines” wich includes a section of Energy Scenarios, a Short Term Operative Plan 2015-2019 and the proposal for a long term energy policy http://www.energia.gob.pa/tmp/file/440/Plan%20Energetico%20Nacional%202015-2050.pdf	National Climate Change Committee, since the Secretariat participates in the Committee. Maintaining a permanent AP Coordinator will be responsible for periodically handling project results to the Secretariat and find synergies during implementation phase.
Pact for the Agriculture Sector http://www.mida.gob.pa/noticias_id_3083.html	This Pact is part of the President Juan Carlos Varela government plan. There is not an official document, but the Pact is conceived as a Programme leaded by the Ministry of Agriculture consisting in the implementation of measures to stimulate production through products such as loans at 0%, debt payments, purchase of domestic production, irrigation system, among other actions. According to institutional information online, more than US$95 million dollars have been invested in the sector in the context of the Pact. In January 2016, the Institute of Agriculture Insurance and the Bank for the Development of Agriculture signed a collaborative agreement as part of the actions derived from the Pact. Other actions included the improvement of the National Institute of Agriculture; millionaire payments of compensations and incentives to producers, including payments for losses due to climate change; reorganization of the Bank for	Synergy with this process is secured through the National Climate Change Committee. MIDA`s representative at the Committee is the Environmental liaison of the Ministry, also designated as representative at the PNSH. (Please note that this technical officer was also designated by MIDA to participate in the AP proposal writing process). The implementation arrangement will be a collaborative agreement type Memorandum of Understanding between Fundación Natura and the Ministry to facilitate the AP implementation. This MoU will reinforce the communication through the representative of the Ministry at the National Climate Change National Committee. A subcommittee to accompany the AP program will be proposed, formed by MIDA, MiAmbiente and Technological University of Panama.

Pogramme	Description	Synergy scheme with the AP
	Agriculture Development (BDA), among other actions.	This sub-committee will participate in quarterly review meetings with the AP project staff of F. Natura to review implementation and promote

The following projects are identified as relevant for coordination purposes with the Adapation Programme proposed:

- Currently MinAmbiente efforts regarding Climate Change are particularly oriented to the preparation of the Third National Communication. Although initial steps have been taken and dialogue with cooperation agencies have taken place leaded by MiAmbiente (for example with IICA, CTCN), the process for a National Adaptation Plan has not initiated yet. The NDC was officially presented in April 2016 (available: (http://www4.unfccc.int/Submissions/INDC/Published%20Documents/Panama/1/Panama_NDC.pdf) and it is focused in the mitigation component, through the energy sector (promotion of renewable energies, targeting 30% of the matrix from renewable sources by 2050), reforestation efforts to increase absorption capacity, climate finance through contributing to the GCF and promotion of the REDD schemes. Even though the NDC is not presenting specific commitments in adaptation, synergies with the AP will be pursued through MiAmbiente with regards to the design and implementation of AP activities 1.2 and 1.5.

  As per the Ministry of Environment´s official web page (www.miambiente.gob.pa), the national climate change listed projects are: REDD + and Project AEA Alliance for Energy and Environment Partnership. Both projects focus on Climate Change Mitigation. a) REDD+ aims to contribute to the reduction of emissions by deforestation and forest degradation and it is part of the mitigation activities of the Climate Change Unit of the Ministry. It has 2 objectives: Promote national capacity for sustainable forest management and conserve and restore natural forest to benefit rural communities. The implementation of the strategy includes three stages: the first is the preparatory stage focused on the development of the National Strategy REDD +; the second is the implementation of the National strategy aimed at capacity building and implementation of policies, measures and payments for emissions reductions. The third will continue with the implementation of the National REDD + Strategy in the context of low carbon development and payments for verified emissions reductions. b) The Alliance for Energy and Environment Partnership with Central America (AEA) is an initiative originated within the framework of the World Summit on Sustainable Development of the United Nations in Johannesburg 2002, with the aim of promoting renewable energy in Central American countries, to contribute to sustainable development and mitigation of global climate change. This effort started with the

support of the Ministry for Foreign Affairs of Finland in coordination with the Central American Integration System (SICA) and the Central American Commission on Environment and Development (CCAD) and since February 2007, the incorporation of the Austrian Development Cooperation (OCAD) has strengthened this effort. Support is offered primarily to solar generation projects, wind, small hydro, bioenergy and geothermal energy; working with government institutions, NGOs and private sector.

Other projects that are currently taking place not addressing particularly adaptation, but climate change issues, include:

- Rain Water harvesting project (SCALL for its initials in Spanish). Mainly leaded by Min of Environment is not focusing in climate change dimension, but in socializing the concept and installing systems at schools and health centers, based in demand driven basis, not as part of a climate change strategy. MiAmbiente technical focal point of this project participated in the consultation workshop conducted in SMRW. The officer clarified that the Adaptation Programme activity 1.1a complements current SCALL program scope, since it has not prioritized the CHVRW and the SMRW particularly, it is not oriented to promote RWH for human consumption and the programme is demand driven, specially oriented to schools and health centers.

- Strengthening risk management in the agriculture sector through Farm Management Plans that identify adaptation measures, conducted by the Ministry of Agriculture (MIDA). Although not officially listed, this project has been cited by the Environmental Unit of the Ministry of Agriculture, through Ing. Graciela Martiz, MiDA`s representative to the Climate Change National Committee and to the Inter-Government Technical Committee of the Water Security National Plan 2015-2050. Ing. Martiz is also the person who participated as MIDA´s representative in the AP proposal writing process, along with MiAmbiente representative (René López, who is responsible for the Third National Communication Process)

- Drought Programme: Although it is not officially designated or gazzeted, this is a traditional action plan leaded by MiDA to respond to the extreme drought events, particularly associated to ENSO. This programme is not based or driven from an adaptation perspective. As mentioned previously, in the present MIDA does not has a specific staff or unit dedicated to climate change issues, although the institutional vision is to transform the existent Environmental Unit into a Climate Change and Environment Unit. The Adaptation Program proposed will enable a technical and institutional framework to collaborate with this transition within the Ministry, particularly through the implementation of outputs 1.2, 1.3, 1.4 and 3.3a.

- “Water Security and Climate Change in the region of Central America and The Caribbean”. This project focused in pilot basins from Dominican Republic and Guatemala, implemented since October 2012, by the Water Center for the Humid

Tropics of Latin America and the Caribbean (CATHALAC in Spanish) with funds from the International Development Research Centre (IDRC, Canada). Among the results listed were: Applications for decision making were developed based on satellite images to monitor and forecast short-term climate for Central America, Mexico and Dominican Republic; Applications were also made to assess climate change impacts on biodiversity in the region. Representatives of the countries were trained in the use of tools and products developed. Regional policies were proposed to address adaptation to climate change, especially about biodiversity. The Adaptation Programme interaction with CATHALAC will include communications regarding specifics of the national climate data portal in order to take advantage of the SERVIR platform managed by CATHALAC; as well as regarding the capacity building activities listed in 4.2a and 4.3a to establish synergy with current academic programmes offered by CATHALAC, particularly: the Diplomas in Climate Change Adaptation and Water Resources Management.

- Protection of carbon pools and sinks in mangroves of Panamá. Implemented by UNDP-Wetlands International-Conservation International. The mangroves of Panamá store and sequester enormous amounts of organic carbon not only in their vegetation, but also in roots and soil. The project is aimed to find out how much exactly and to make sure that these carbon pools and sinks are better managed and protected for their contribution to climate change mitigation, but also to maintain their broad range of ecosystem services in support of local adaptation. Even though this project is mainly oriented to mitigation issues, the Adaptation Programme will establish coordination with this project in order to take advantage of the results obtained in the Chiriqui Province lowlands, that are nearby the Chiriqui Viejo lower watershed.
  http://lac.wetlands.org/Portals/4/Panama/IKI%20leaflet%20Wetlands%20International%20for%20COP20%20web.pdf

- Small grants programme. GEF-UNDP (PPD in Spanish). The Climate Change focal area promotes access to clean energy, sustainable transport, and good land use practices. The programme supports communities to improve their livelihoods to increase their resilience to weather events. Potential Eligible Activities are: a) Use projects and alternative energy resources that can be implemented locally or regionally; b) Best practices for handling such production lands decreased burning bush, forest clearance for expansion of crops; c) Activities or projects that reduce the production of harmful gases industries, motor vehicles and burning; d) Projects that fall firewood consumption. Coordination will be established with PPD to learn from the experience derived of the implementation of the project “establishment of agrosilvopastoral systems to develop sustainable cattle raising in Corregimiento Los Asientos in the Province of Los Santos, with the Association of agrosilvopastoral producers of Pedasi in 2014 (this is in the Rio La Villa watershed, neighbor to the SMRW). The SGP officer participated in the consultation meeting held with civil

society organizations on May 5th, serving as an entry point for further communication and synergy.

- Million Hectares Alliance project which seeks to reforest one million hectares in 20 years, aiming to curb the drought affecting the main rivers and tributaries of the country. In 2016 MiAmbiente has committed 15 nurseries to produce 1.5 million seedlings to restore watersheds and degraded areas. Funding for the project comes from a loan from the Latin America Development Bank. According to the Alliance, reforesting one million hectares within 20 years would represent planting some 50,000 hectares each year. This Alliance is also leaded by the MiAmbiente, so coordination between the AP and the Alliance will be established through the Alliance Coordinator, particularly regarding implementation of AP activity 1.2.

- Leverage of non-refundable financing for climate change (portfolio of NAMAs for urban mobility, energy efficiency and ICREDD. These efforts are also driven by the Climate Change Unit of MiAmbiente, whose representatives have been closely engaged with the AP proposal writing and adjustment process.

- Third National Communication process. This process is in progress leaded by the Climate Change Unit of MiAmbiente. The Coordinator of the Third communication (Ing. René López) has been the person appointed by MiAmbiente as member of the AP proposal team, so coordination has been secured since the very beginning.

Finally, it is important to mention the fact that according to verbal communications during meetings held with MiAmbiente, the Ministry is looking forward to symbolically declare 2017 as the year of Adaptation to Climate Change, so the AP is envisioned as a key opportunity in this context to widely promote adaptation efforts and knowledge.

E. How the project / programme meets relevant national technical standards and complies with the Environmental and Social Policy of the Adaptation Fund

Describe how the project / 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.

Overall, the project meets all environmental requirements established in the 1998 General Law for the Environment. In particular, the project was designed taking into consideration compliance to environmental requirements, studies, and regulatory standards for better agricultural practices, water quality, and climate risks control.

- The NIE (Fundación Natura) will ensure observance of environmental and social policy of the Adaptation Fund during design, implementation, monitoring and evaluation of the proposed program, in order to identify, prevent and minimize any damage that the intervention could cause to people and the environment.
- A preliminary Environmental and social risks analysis was performed as part of the proposal design to ensure that environmental and social concerns, and communities were taken into account and represented in the design and implementation of projects.
- Among the requirements to be met are:
    - Compliance with the laws pertinent to the activities included in the 4 proposed components.
    - Projects provide fair and equitable access to benefits in a manner that is inclusive, without impeding access to basic supply of clean water and sanitation, energy, education and safe and decent work conditions, and the right to the land. The program, through the proposed projects, will not exacerbate existing inequities, especially related to marginalized and vulnerable groups.
    - In analyzing the proposed projects, the NIE reviewed and considered the particular impacts on marginalized and vulnerable groups.
    - During the entire program international human rights will be respected and promoted.
    - The NIE will encourage equal participation of men and women; both will receive comparable social and economic benefits, and they will not be subject to disproportionate adverse effects during the development process that the proposed program promotes.
    - The national labor standards will be met, as well as those identified by the International Labor Organization.
    - Every project implemented will be consistent with the rights and responsibilities set forth in the UN Declaration on the Rights of Indigenous Peoples and other applicable international instruments related to indigenous peoples.
    - Projects financed will not involve unnecessary conversion or degradation of critical natural habitats.
    - Projects designed will be implemented in a manner that avoids any unnecessary or significant reduction or loss of biological diversity, as well as the introduction of known invasive species.

- The program will not generate significant and / or unjustified increase in greenhouse gases emissions or any other cause of climate change.
- The program was designed in such a manner that will meet applicable international standards for maximizing energy efficiency and minimizing material resource use, waste generation, and release of pollutants.
- Proposed projects were designed and will be implemented in a way that avoid significant and negative impacts on health.
- Proposed projects were designed and will be implemented in such a way that promote soil conservation and prevent degradation or conversion of productive lands, or lands that provide valuable ecosystem services.

Legal and technical standards relevant to the programme components

Considering the nature of the proposed activities, the Programme will comply at least will the following technical standards:

a) Output 3.1. Internationally approved standards for Type A automatic weather stations for satellite transmission. ETESA as the institution responsible for the operation of the national network will be responsible for providing evidence of the applicable standards and evidence of compliance. These standards are included in previous bidding documents used by ETESA to complete the acquisition of 30 Type A automatic weather stations for satellite transmission, based on competitive bidding process conducted in 2013-2015
b) Output 3.3. The M&E tool will be developed accordingly to technical guidelines and provisions developed by the Climate Technology Centre and Network (CTCN) described in the document “Good practice in designing and implementing national monitoring systems for adaptation to climate change”
c) Output 1.2 Water Footprint Analysis for rice production in Divalá, (CHVRW), will be conducted following the methodology described in “The water footprint assessment manual: Setting the global standard. Earthscan, London, UK.
d) Programme implementation leaded by F. Natura will observe the RBM (results based management) model for planning, implementation and reporting purposes.
e) Technical national standards for agriculture and livestock sector defined by MIDA and other national applicable regulations will be observed in coordination with MIDA and the Climate Change National Committee. For the agrosilvopastoral systems, technical standards from CIPAV (Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria, from Colombia) will be observed. For agroforestry, standards from CATIE will be observed regarding coffee production
f) Shall the final design of each intervention demand an environmental impact assessment, this will be performed for development of water harvesting systems, irrigation systems, and construction of infrastructures related to the early warning systems and the National System for Climatic Data.

In addition, for development of improved farming practices, all regulations regarding fertilization or waste management will be met.

Preliminarily no need for category 3 EIAs are envisioned.

Example of detailed analysis for complying with legal and technical standards relevant to activities in the program

Due to the complexity of the multi-sector and multi-scale of the proposed program, and given that many of the activities that deliver concrete results on the ground –mainly in terms of infrastructure- need a diagnostic (prior to the full design of the solution tailored to specific conditions in each site and for each beneficiary) it is not feasible at this time to provide a final version of:

a) a complete environmental and social assessment that consider (i) all potential direct, indirect, transboundary, and cumulative impacts and risks that could result from the proposed project/programme; (ii) assess alternatives to the project/programme; and (iii) assess possible measures to avoid, minimize, or mitigate environmental and social risks of the proposed project/programme. Even so, an exercise to identify potential risks and impacts for the overall program proposed was included in section K, as our approximation to complying with the Environmental and Social Policy of the Fund.

b) the specific detailed legal and technical standards relevant to each activity included in all 4 components. Nonetheless, an approximation of the analysis for designing solutions in accordance to relevant technical and legal standards is presented hereby, specifically for output 1.1.a.

Table 40. Example of detailed description of legal and technical standards relevant to output 1.1.a

Output No.	Description	Activities	Compliance with relevant legal or technical standards
			1. Increase climate change and variability adaptation capacity in agriculture, livestock, and energy production sectors
Output 1.1	Concrete adaptation measures implemented for household	a) Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and	To install this solution, recommendations and specifications of the manual: “Captación y almacenamiento de agua lluvia, opciones técnicas para la agricultura familiar en América Latina y el Caribe” (FAO, 2013) will be followed, as described in CR 1.

Output No.	Description	Activities	Compliance with relevant legal or technical standards
	water security	CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems.	http://www.fao.org/fileadmin/user_upload/AGRO_Noticias/docs/captacion_agua_de_lluvia.pdf It is estimated that diagnostic and positive final consideration for the RWH systems from MiAmbiente, MINSA, and MIDA shall take 1 month at the latest. Since no larger constructions will take place, clearance from respective minor construction (such as PVC pipes, channels and cisterns installation) will be obtained from local municipality over a period of 1 week at the latest.
		• Diagnostic • Installation of water harvesting systems • Maintenance of water harvesting systems	For RWH systems that will supply water for human consumption, the project will coordinate with Ministry of Health (MINSA) to apply the water safety plans methodology described in the 3d edition of the WHO Guidelines for Drinking Water Quality. This will be followed during diagnostic, installation, maintenance and training of beneficiaries. Reference to this, can be found on: Guías de la OMS para la calidad del agua de consumo, segunda edición, volumen 3; documento complementario Water Safety Plans (Planes de seguridad del agua) (apartado 1.3); Simpson-Hébert et al. (1996); Sawyer et al. (1998); y Brikké (2000). http://www.who.int/water_sanitation_health/dwq/gdwq3rev/es/ In addition, to ensure water quality for household uses / human consumption, the proposed activities will ensure compliance with Reglamento Técnico DGNTI-COPANIT 23-395-99 (the national standard for water quality observed by MINSA and other competent institutions in this sector). http://www.asep.gob.pa/agua/Anexos/395%20Gaceta%20Oficial.pdf Also, materials to be used to build the household system will be previously approved by the MINSA as part of the design of each particular pilot, to ensure they are safe and innocuous for human

Output No.	Description	Activities	Compliance with relevant legal or technical standards
			health. During the construction of the each system, participation of a representative from MINSA and/or MIDA will be ensured, accordingly. At every case, a representative from MiAmbiente will oversee the environmental aspects are met according to the Ley General de Ambiente de la República de Panamá (Ley Nº 41 de 1 de julio de 1998), and particularly the Manual de Procedimientos para la Supervisión, Control y Fiscalización Ambiental (ANAM, 2013). At the cases where the technician from MiAmbiente determines (during preliminary evaluation) that an Environmental Impact Assessment is needed, such study will be included in the work plan for each pilot, in order to comply with regulations on this matter prior to undertaking any construction. http://www.miambiente.gob.pa/images/stories/BibliotecaVirtualImg/CalidadAmbiental/manual_control_y_fiscalizacion.pdf Special reference to the chlorination system used by the SCALL method will be used –where feasible- when installed under this proposed adaptation solution. http://www.miambiente.gob.pa/images/stories/BibliotecaVirtualImg/CambioClimatico/manual_scall.pdf
		• Systematization of experience and technical guidance for implementing water harvesting as a means of adaptation to CC	Among training methods to be considered (to be decided upon completion of the diagnostic) are: 1. Instructor presentation. The trainer orally presents new information to the trainees, usually through lecture. Instructor presentation may include classroom lecture, seminar, workshop, and the like. 2. Group discussion. The trainer leads the group of trainees in discussing a topic. 3. Demonstration. The trainer shows the correct steps for completing a task, or shows an example of a correctly completed task.

Output No.	Description	Activities	Compliance with relevant legal or technical standards
		• Training on issues of hydrological water cycle + Integrated Water Resources Management (basins), methodology for installing the RWH system and basic concepts of climate change.	4. Exercise. The trainer assigns problems to be solved either on paper or in real situations related to the topic of the training activity. 6. Case study. The trainer gives the trainees information about a situation and directs them to come to a decision or solve a problem concerning the situation. 7. Role play. Trainees act out a real-life situation in an instructional setting. 8. Field visit and study tour. Trainees are given the opportunity to observe and interact with the problem being solved or skill being learned. All of these are based on the Manual *Improving agricultural extension: a reference manual* (FAO, 1998).http://www.fao.org/docrep/W5830E/w5830e00.htm#Contents Finally, systematization of experiences will follow guidelines from GUÍA PRÁCTICA PARA LA SISTEMATIZACIÓN DE PROYECTOS Y PROGRAMAS DE COOPERACION TÉCNICA, FAO 2005. http://www.fao.org/3/a-ah474s.pdf

A list of general standards / regulations / guidelines / instruments which are foreseen to be reference for compliance with overall program components is included as follows:

- The Integrated Management Plan (Upper, Medium and Downstream) of the Santa Maria River Watershed (2009); and Integrated Management Plan for Chiriquí Viejo River Watershed (2014).
- Second National Communication to the UN Framework Convention on Climate Change, Panama, Panama (2011).
- The National Plan for Integrated Water Resources Management of the Republic of Panama • 2010-2030 (2011).
- Act No. 41 of 1998 "General Law for the Environment".
- National Climate Change Policy.

- The "National Strategy for the Environment: Environmental Management for Sustainable Development 2008-2012".
- Law 44 of August 5, 2002. Official Gazette 24,613.
- Executive Decree 70 of July 27, 1973.
- National Policy for Integrated Disaster Risks Management (PNGIRD), and the National Plan for Disaster Risk Management 2011-15.
- Law 24 of June 4, 2001, by which measures are adopted to support the farmers affected by adverse weather conditions and other eventualities.
- Law No. 25 of June 4, 2001, that dictates provisions on the agricultural transformation national policy and on its implementation.
- The Government Strategic Plan 2015-2019.
- Executive Decree No. 84 of April 9, 2007, by which the National Policy for Water Resources is approved.
- Decree Law No. 35 of September 22, 1966, by which the exploitation of state waters is regulated, in order to ensure their exploitation according to the social interest.
- Decree Law 35 of September 22, 1996, that establishes regulations for water uses.
- Executive Decree 16 of March 5, 2002. Official Gazette 24,506 of March 7, 2002. By which the Executive Decree 104 of December 23, 1994 is modified.
- National Biodiversity Policy; National Policy on Climate Change; National Decentralization Policy of Environmental Management; National Policy on Comprehensive Management of Hazardous and Non-Hazardous Waste; National Environmental Policy Information; National Cleaner Production Policy; and National Policy for Environmental Monitoring, Control and Supervision.
- Law No. 11 of April 12, 1995, by which the Regional Convention on Climate Change, signed in Guatemala on October 29, 1993 is approved.
- Law No. 10 of April 12, 1995, which approves the United Nations Framework Convention on Climate Change signed at New York on May 9, 1992.
- Law No. 88 of November 30, 1998, whereby the Kyoto Protocol of the United Nations Framework Convention on Climate Change (signed in Kyoto, the December 11, 1997) is approved.
- National Plan for Water Security, National Energy Plan 2015-2050 and the National Pact for Agriculture Sector.

F. Duplication of project / programme with other funding sources

Describe if there is duplication of project / programme with other funding sources, if any.

The proposed program does not duplicate the country´s efforts aimed at adapting to climate change, agricultural production, power generation, risk management, water management - watershed management, and sustainable development.

By contrast, the proposed program presents specific and scalable interventions that provide relevant results and experiences to prepare the country in terms of water management -a key element for economic, environmental and social sustainability of Panama-, considering the factor of climate change and risk management.

There are not experiences in Panama of a programmatic interventions to address conflicts in water resource management as the core of climate change adaptation, building resilience, and reducing climate vulnerability; to propose improvements in food and energy security based on integrated water management, in a way that the water-energy-food-climate change adaptation nexus becomes visible.

In addition, there is momentum right now to implement the proposed program, which coincides with the country's intention to implement a National Plan for Water Security, an Energy Plan 2015-2050 and a National Pact for Agriculture. The proposed program offers a unique scenario to create synergies between the agendas of mitigation and adaptation to climate change, to conserve and restore important ecosystem services for the population and agriculture.

Additional considerations regarding complementarity with climate change initiatives

In Panamá adaptation action is relatively recent. An important milestone to define a starting point is the Climate National Policy gazetted in 2007. Equally remarkable are the processes for the 2 national communications to the UNFCCC already presented (2001 and 2011).

Currently adaptation efforts are taking place both in the policy arena and in the implementation side. To clarify coordination lines with ongoing processes and avoidance of overlapping or duplication of efforts, we identified 3 categories of relevant processes: public planning long term processes; climate change projects or programs and climate change capacity building processes.

a) Long term planning processes. As mentioned previously 3 specific processes are considered particularly relevant for the proposed Adaptation Programme: the National Plan for Water Security, the National Energy Plan and the National Pact for Agriculture Sector. As mentioned above, the three of them are planning processes, which will require complementary actions from different sectors to achieve the desired goals. In this sense, the Adaptation Programme is envisioned as an implementation effort which will provide on the ground evidence to support the strategic guidelines established by the Plans regarding climate change dimension. These plans are also in an initial phase, so there is a good timing to establish coordination lines between the Adaptation Programme and the responsible entities and ensure complementarity of actions. For example, the Ministry of Environment, implementing partner of this programme, is the leading institution in the process of the Water Security Plan; this situation facilitates the required dialogues and arrangements to maintain permanent coordination through mutually aligned work plans. With regards to these planning processes the idea is to establish a dynamic where the Adaptation Programme provides evidence from the ground to feed the plan implementation process.

b) Regarding specific adaptation programmes or projects under implementation, 2 key efforts shall be highlighted: a) the process for the 3rd national communication implemented with funding from the GEF to update the GEI 2005-2010 and define an adaptation and low carbon development strategy. Again, this process is leaded by MiAmbiente, so coordination with the Adaptation Programme is secured, through: i) the designation of the focal point for this effort (as part of the institutional arrangements). Important to emphasize the fact that the responsible person in charge from MiAmbiente of presenting the 3rd communication process is the same officer designated as institutional focal point to accompany the Adaptation Program proposal writing process; ii) through the close coordination with the Climate Change National Committee headed by MiAmbiente. B) The FCPF Project or REDD+ Phase 2 with funding from the WB, jointly implemented with UNDP. This project is particularly oriented to complete the national forest inventory, so no duplication with the proposed adaptation programme is foreseen.

c) Climate change capacity building processes: i) the technological needs assessment (TNA) with technical assistance from UNEP-DTU and the CTCN is also in the works. It will be important to establish opportune communication with this initiative in order to share information regarding the technical solutions promoted by the Adaptation Programme to ensure the experience is adequately considered in the assessment. ii) Technical process to transform the environmental unit of the MIDA (Min. of Agriculture) into a climate change and

environment division within the Ministry. This Ministry is actively participating in the proposal writing process; coordination between the AP and the Ministry has been emphasized and became operational very early in the process, starting with the proposal writing process. Also, coordination with national efforts driven by MIDA, particularly the “Plan Sequía” to address effects of ENSO (El Niño Southern Oscillation) is secured through MIDA`s focal point who has accompanied the proposal writing process.

Other climate change projects under implementation include: a) the USAID Adaptation Regional Programme which focuses in the region of the Darien, so no overlapping or duplication in terms of activities in the prioritized watersheds by the Adaptation Programme is expected; b) climate change project under implementation jointly by MiAmbiente, Authority of Aquatic Resources in partnership with Wetlands Int. and UNDP, focusing in the role of mangroves as carbon sinks, working directly in the province of Darien and the coastal area of Chiriqui Province; the project is mainly oriented to address mitigation issues, so no overlapping, but complementarity is foreseen for the works in the Chiriqui Province.

Actually, other adaptation efforts are taking place in the country implemented at local levels by Universities, NGOs and/or local groups. The adaptation knowledge platform included in Component 4 will contribute to make visible adaptation efforts all across the country and promote knowledge sharing and synergies among the different participants and stakeholders. This type of synergy and coordination is not taking place currently systematically.

Finally, and as indicated in previous sections, the Adaptation Programme will directly support implementation of prioritized actions of the Management Plans and the Conservation Area Plans of the CHVRW and SMRW. An explicit coordination mechanism will be defined during the inception workshops with MiAmbiente regional offices to align the correspondent work plans and participate jointly in the monitoring and evaluation sessions, including those in the context of the PMEMAP (monitoring programme for the management effectiveness) which includes both watersheds. With regards to the implementation of the CAPs for the Gallito River Watershed and the Caisan River Watershed, coordination is secured, since implementing action for both CAPs is being promoted by F. Natura.

The following projects are identified as relevant for coordination purposes with the Adapation Programme proposed:

Currently MiAmbiente efforts regarding Climate Change are particularly oriented to the preparation of the Third National Communication and the INDC document, considering that Panama is one of the few countries pending for its presentation at the UNFCCC. According to the Ministry of Environment´s official web page (www.miambiente.gob.pa), the national climate change listed projects are: REDD + and Project AEA Alliance for Energy and Environment Partnership. Both projects focus on Climate Change Mitigation.

- REDD+ aims to contribute to the reduction of emissions by deforestation and forest degradation and it is part of the mitigation activities of the Climate Change Unit of the Ministry. It has 2 objectives: Promote national capacity for sustainable forest management and conserve and restore natural forest to benefit rural communities. The implementation of the strategy includes three stages: the first is the preparatory stage focused on the development of the National Strategy REDD +; the second is the implementation of the National strategy aimed at capacity building and implementation of policies, measures and payments for emissions reductions. The third will continue with the implementation of the National REDD + Strategy in the context of low carbon development and payments for verified emissions reductions.

- The Alliance for Energy and Environment Partnership with Central America (AEA) is an initiative originated within the framework of the World Summit on Sustainable Development of the United Nations in Johannesburg 2002, with the aim of promoting renewable energy in Central American countries, to contribute to sustainable development and mitigation of global climate change. This effort started with the support of the Ministry for Foreign Affairs of Finland in coordination with the Central American Integration System (SICA) and the Central American Commission on Environment and Development (CCAD) and since February 2007, the incorporation of the Austrian Development Cooperation (OCAD) has strengthened this effort. Support is offered primarily to solar generation projects, wind, small hydro, bioenergy and geothermal energy; working with government institutions, NGOs and private sector.

Other projects that are currently taking place not addressing particularly adaptation, but climate change issues, include:

- Rain Water harvesting project (SCALL for its initials in Spanish). Mainly leaded by Min of Environment is not focusing in climate change dimension, but in socializing the concept and installing systems at schools and health centers, based in demand driven basis, not as part of a climate change strategy. MiAmbiente technical focal point of this project participated in the consultation workshop conducted in SMRW. The officer clarified that the Adaptation Programme activity 1.1a complements current SCALL program scope, since it has not prioritized the CHVRW and the SMRW particularly, it is not oriented to promote RWH for human consumption and the programme is demand driven, specially oriented to schools and health centers.

- Strengthening risk management in the agriculture sector through Farm Management Plans that identify adaptation measures, conducted by the Ministry of Agriculture (MIDA). Although not officially listed, this project has been cited by the Environmental Unit of the Ministry of Agriculture, through Ing. Graciela Martiz, MiDA`s representative to the Climate Change National Committee and to the Inter-Government Technical

Committee of the Water Security National Plan 2015-2050. Ing. Martiz is also the person who participated as MIDA´s representative in the AP proposal writing process, along with MiAmbiente representative (René López, who is responsible for the Third National Communication Process)

- Drought Programme: Although it is not officially designated or gazzeted, this is a traditional action plan leaded by MiDA to respond to the extreme drought events, particularly associated to ENSO. This programme is not based or driven from an adaptation perspective. As mentioned previously, in the present MIDA does not has a specific staff or unit dedicated to climate change issues, although the institutional vision is to transform the existent Environmental Unit into a Climate Change and Environment Unit. The Adaptation Program proposed will enable a technical and institutional framework to collaborate with this transition within the Ministry, particularly through the implementation of outputs 1.2, 1.3, 1.4 and 3.3a.

- "Water Security and Climate Change in the region of Central America and The Caribbean". This project focused in pilot basins from Dominican Republic and Guatemala, implemented since October 2012, by the Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC in Spanish) with funds from the International Development Research Centre (IDRC, Canada). Among the results listed were: Applications for decision making were developed based on satellite images to monitor and forecast short-term climate for Central America, Mexico and Dominican Republic; Applications were also made to assess climate change impacts on biodiversity in the region. Representatives of the countries were trained in the use of tools and products developed. Regional policies were proposed to address adaptation to climate change, especially with regard to biodiversity. The Adaptation Programme interaction with CATHALAC will include communications regarding specifics of the national climate data portal in order to take advantage of the SERVIR platform managed by CATHALAC; as well as regarding the capacity building activities listed in 4.2a and 4.3a to establish synergy with current academic programmes offered by CATHALAC, particularly: The Diplomas in Climate Change Adaptation and Water Resources Management.

- Protection of carbon pools and sinks in mangroves of Panamá. Implemented by UNDP-Wetlands International-Conservation International. The mangroves of Panamá store and sequester enormous amounts of organic carbon not only in their vegetation, but also in roots and soil. The project is aimed to find out how much exactly and to make sure that these carbon pools and sinks are better managed and protected for their contribution to climate change mitigation, but also to maintain their broad range of ecosystem services in support of local adaptation. Even though this project is mainly oriented to mitigation issues, the Adaptation Programme will establish coordination with this project in order to take advantage of the results obtained in the Chiriqui Province lowlands, that are nearby the Chiriqui Viejo lower watershed.

http://lac.wetlands.org/Portals/4/Panama/IKI%20leaflet%20Wetlands%20International%20for%20COP20%20web.pdf

- Small grants programme. GEF-UNDP (PPD in Spanish). The Climate Change focal area promotes access to clean energy, sustainable transport, and good land use practices. The programme supports communities to improve their livelihoods to increase their resilience to weather events. Potential Eligible Activities are: a) Use projects and alternative energy resources that can be implemented locally or regionally; b) Best practices for handling such production lands decreased burning bush, forest clearance for expansion of crops; c) Activities or projects that reduce the production of harmful gases industries, motor vehicles and burning; d) Projects that fall firewood consumption. Coordination will be established with PPD to learn from the experience derived of the implementation of the project “establishment of agrosilvopastoral systems to develop sustainable cattle raising in Corregimiento Los Asientos in the Province of Los Santos, with the Association of agrosilvopastoral producers of Pedasi in 2014 (this is in the Rio La Villa watershed, neighbor to the SMRW). The SGP officer participated in the consultation meeting held with civil society organizations on May 5th, serving as an entry point for further communication and synergy.

IMPORTANT FACT

Regarding the Early Warning Systems, no duplication of funding or efforts has been identified.

The only additional effort acknowledged on this topic at national level to date is the Technological University, which is working in the development and installation of an EWS especially designed for pests. This does not represent any overlapping, rather complementarity with the proposed EWS.

In designing the concrete adaptation measure of installing the EWS at CHVRW and SMRW, lessons learned from the previous efforts of SINAPROC and CEPREDENAC were considered (http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/San-Jose/pdf/Informe%20SAT%20Panama.pdf).

Also, during the consultation process, the communities reinforced the need to establish these systems since there are not such systems currently operating at both target areas.

This activity was formulated in consultation with SINAPROC as evidenced in Annex 1 (letter from SINAPROC).

G. Learning and knowledge management component to capture and disseminate lessons learned

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

The proposed Adaptation Programme includes a specific component devoted to promote adaptation learning and knowledge management at the national and local levels: To do this, the Programme will undertake the following strategies:

G1. Strategy to capture the experiences and lessons learned on the ground

Programme strategy to promote knowledge sharing across the different components includes a combination of the following methods:

a) Positioning the climate change national committee as a technical advisory instance for the programme. The Programme will promote the creation of a knowledge subcommittee within the Climate Change National Committee, whose purpose will be to permanently look for information and knowledge pieces that could be derived from the different programme activities).
b) Project implementation architecture defined by F. Natura will emphasize the role of the Programme Coordinator regarding the need to include explicit and periodic milestones in the WP to share advances/limitations among programme partners and project staff
c) Observing RBM recommendations, the M&E process will be launched in a very initial stage of programme implementation, aiming to capture lessons learned from the very beginning and introduce adjustments in the plan as needed.
d) Systematization of adaptation experiences described in 4.4 will feed the knowledge sharing process.
e) Specific knowledge and experience sharing activities between key stakeholders of the 2 watersheds, including at least one international technical guided visit to enable output 1 results. Development of a suite of web based tools such as webinars and communities of practice to promote knowledge sharing
f) Establishing operative/functional communication channels with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions.
g) Reporting documents at all levels (program partners, project staff, consultants) will include the requirement of documenting interactions with stakeholders, coordination meetings with government and nongovernment partners during the implementation of the contract/agreement and outline knowledge products envisioned or limitations to reach those.

The AP aims to using Multiple Strategies to increase knowledge sharing success by:

- Providing very specific, tailored messages for diverse audiences based on their specific adaptation and knowledge-sharing needs.
- Highlighting different components within the body of adaptation knowledge being shared and increasing opportunities for collaborative thinking rather than just presenting adaptation information.
- Encouraging water users and community members to connect in diverse ways
- Increasing the likelihood that a message is heard and considered during decision-making by making the knowledge accessible at multiple times and in multiple ways. For ex. generating policy brief type documents; fostering stakeholders' meetings to discuss working papers; presenting the paper in a radio program.

The AP will use three knowledge-sharing strategies based on delivery method: writing, speaking, and information technologies (online).

- Writing creates permanent knowledge-sharing products. Categories of written materials that will be promoted during the AP implementation include: research publications, working documents for discussions, technical reports, newsletters, media advisories and releases. As mentioned in previous sections, Fundación Natura will be responsible of including the need to generate knowledge products in the TORs for the implementation of specific project activities (particularly 1.1, 1.2, 1.3, 1.4, 1.5a, 1.5c, 2.2, 2.3b, 3.4)
- Speaking. Spoken knowledge-sharing strategies that will be implemented include conferences, lectures and presentations, workshops, conversation sessions, and meetings. Two important elements of the speaking category (identified during the consultation workshops) are:
    a. the "promotores comunitarios" (community promoters or agents) that will serve as the permanent liaison between Fundación Natura and the program beneficiaries.
    b. The use of radio programme as a communication tool to ensure connectivity with remote areas with limited access to internet and other communications means.
- Online. The online knowledge-sharing strategy, mainly through the Adaptation Portal, will be used to support existing knowledge-sharing communities, rather than be considered as stand-alone knowledge-sharing activity. This strategy includes the creation of the websites/adaptation portal; other online tools such as discussions forums, email lists and social networks will be considered.

G2. Programme strategy to ensure outreach of knowledge produced, particularly to stakeholders with limited access to information technology tools

The Programme will promote:

a) Periodic public events to present/discuss programme activities and receive feedback from local stakeholders.
b) Information/Dissemination materials to be used during the different stages of the program (fact sheets, media dossiers, other) as part of a larger communications strategy for the programme, taking advantage of working sessions conducted in the different components
c) F. Natura will promote collaborative agreements with academic institutions with presence in CHVRW and SMRW, specifically public universities to keep them informed and engaged with programme activities
d) Functional coordination with MIDA, IDIAP (Institute of Agriculture Research) and other related public services, to include programme information and activities as part of their Extension Programmes in CHVRW and SMRW

e) Technology responses: Applications via cell phones, radio, others to facilitate access to climate data generated by the programme components, particularly output 3
f) Coordination and information channel with local water management instances ("juntas locales de agua", irrigation committees; watershed and sub-watershed committees and sub-committees, health committees, other)

To ensure access and benefits from the knowledge management strategy of persons living in remote areas with limited access to communication channels the AP has identified two main means:

a) Community promoters that will serve as the permanent liaison between Fundación Natura and the program beneficiaries. These promoters will be part of the Communications Strategy of the programme, having a key role in ensuring permanent communication among programme stakeholders, facilitating that stakeholders' views are heard during project implementation. They will support and participate in the different participatory events (workshops, meetings, trainings), encouraging equitable participation of the beneficiaries; they will also implement communication and knowledge sharing specific activities and will also promote dialogue with local technical staff of the institutions and with local authorities. TORs for the community promoters will include technical and communications skills, emphasizing in the use of participatory methodologies and approaches. The number of community promoters will be defined as part of the communications strategy, but at least 2 permanent community promoters for each watershed (SMRW and CHVRW) will be considered.

b) Radio program. Radio is the more extended communication channel in Panama. Previous experience of Fundacion Natura implementing on the ground projects in remote areas in Panama, for example the Darien and Chagres regions, confirms this. The successful experience of working with "Radio Sin Fronteras" in Darien will be replicated in the AP in both watersheds. Selection of the radio station and technical requirements will be defined during implementation.

Additionally, the physical/geographical location of beneficiaries should not be a limitation to participate in AP activities. For this end, Fundación Natura will ensure that logistics and necessary support is in place to encourage equitable participation.

G3. Programme knowledge management strategy for long term project outcomes sustainability

After the AP completion, Fundación Natura and the Ministry of Environment (MiAmbiente) jointly will sustain the adaptation portal with a view to consolidate it and secure long term functioning. Natura will actively look for partnership arrangements with institutions with knowledge and technological resources willing to share or participate in the portal maintenance, for example Technological University of Panama (UTP), CATHALAC, others. It is important to mention that Fundación Natura has previous experience leading knowledge/technical processes to guarantee permanence, for example, the program to monitor the management effectiveness in protected areas, will serve as an entry point. In this case, after several years supporting the PMEMAP and working jointly with ANAM, the programme has been institutionalized and nested in the Ministry of Environment (MiAmbiente).

H. Description of the consultative process undertaken during project preparation

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 and Gender Policy of the Adaptation Fund.

The NIE (Natura Foundation) has worked in close coordination with the Ministry of Environment (DNA) for development of this concept of the proposed program. Moreover, in view of the multiple sectors involving the proposed program, both the NIE and DNA have also held meetings and consultations with institutional stakeholders -the Ministry of Agriculture Development (MIDA) and Electric Transmission Company (ETESA). These consultations will be extended to other governmental actors and other sectors (private, civil society, etc.) in the formulation stage of the full proposal until November 2016. In addition, the formulation of this program concept was based on the results from several consultative processes carried out at Chiriquí Viejo and Santa Maria river watersheds -as part of the development of their management plans-.

Also, the results from consultations made by the Ministry of Environment to date, during the current preparation of the National Plan for Water Security 2015-2030,

National Plan for Energy Security, and Pact for Agriculture were taken into consideration.

Support from key stakeholders is guaranteed. Ministry of environment (MiAmbiente) as fund designated authority has fully endorsed the project concept and has already designated a climate change officer as institutional focal point and member of the proposal writing team. Ministry of Agriculture has also designated a focal point, who actively participated in the proposal writing process; in addition, an endorsement/support letter signed by the Ministry is attached in annex. Support letter from ETESA was submitted. A support letter from SINAPROC, national entity responsible for emergency and disaster risk reduction, is also submitted.

In addition to the abovementioned support letters, institutional arrangements for programme implementation include signing a collaborative agreement between F. Natura and the 3 entities to fully describe the extent and scope of the institutional involvement and support.

The idea is that these agreements will promote preparation of an integrated work plan and also integration of programme outputs and activities within the institutional correspondent operative plans.

See Annex 2 and 3 for report and evidences of the consultation process.

H1. Summary of the consultation process

1. Meetings and participants (lists of participants included in Annex 2).

   a) Technical meetings with partner institutions, specifically: Ministry of Environment; Ministry of Agriculture; ETESA; Sinaproc; Universidad Tecnológica de Panamá (Azuero); IDIAP.
   b) Initial consultation workshop with Climate Change National Committee. Ministry of Environment. April 4, 2016.
   c) Consultation workshop with stakeholders of the Chiriqui Viejo River Watershed. April 27, 2016 held in the house of the Lions Club in Concepción, Province of Chiriqui. With participants from the upper, middle and lower watershed including government representatives, farmers, associations, local authorities, academy.
   d) Consultation workshop with stakeholders of the Santa María River Watershed. April 29, 2016 held in Hotel Mikonos, Santiago Veraguas. With participants from the upper, middle and lower watershed, including government representatives, farmers, associations, local authorities, academy.
   e) Meeting with representatives of civil society organizations and NGOs, held in Panama, Parque Metropolitano, Panama City in May 5, 2016.

f) Final presentation and validation workshop with the Climate Change National Committee held in Panama City in May 6, 2016.
g) Meeting with indigenous inhabitants in Cooperativa La Esperanza de los Campesinos at Santa Fe in November 2016. Full report included below and in Annex 3.

Note that for all the consultation meetings mentioned above, including the meeting held with indigenous peoples, gender disaggregated information is provided regarding the participants (men/women). The figures evidence a significant participation of women across the whole process.

The consultation workshops in the two watersheds were widely disseminated through personal written invitations submitted by Fundacion Natura; ads in national newspapers, radio and social networks and communication through local partner organizations. Logistics (transportation costs and meals) were facilitated by Fundación Natura to minimize barriers for key stakeholders' participation. Invitations included local partner organizations, government and civil society institutions, productive and business associations, organized groups (parents' clubs, "juntas locales", watershed committees and sub-committees, others)

2. Description of the consultation techniques (tailored specifically per target group).

a) The meetings with the partner institutions were conducted as working and discussion sessions with technical staff designated from each institution. Group meetings as well as bilateral meetings were hold.

b) The 2 consultation workshops with stakeholders of the watersheds were conducted as participatory one day events, divided into 3 sections: a) conference/presentation conducted by Fundacion Natura supported with a power point presentation, followed by short interventions from representatives from MiDA and MiAmbiente as key programme implementing partners; b) Plenary for comments, questions and answers; c) Break out groups to discuss specific activities (in CHVRW 4 groups and in SMRW 5 groups). Each participant received a summary of the AP in Spanish and the workshop agenda. For the breakout sessions each group received a set of framing questions to guide the discussion and materials (flip chart, watershed map). Each group designated a spokesperson to present the results of the group work in a final plenary. Technical staff of Fundación Natura participated in both workshops including a facilitator. The facilitator was also responsible for encouraging participation of all persons and moderating the discussion.

c) The meetings with the Climate Change National Committee and the NGOs were conducted as technical sessions, with an initial presentation of the AP and a plenary for reactions, comments and suggestions.

3. Key consultation findings (in particular, suggestions and concerns raised).

a) The technical rationale of the AP proved to be robust, based in the acceptance and validation of programme components and activities by the participants. The participants described the components and activities as relevant and appropriate, since they address the specific climate change risks and threats perceived by the participants.

b) The nexus approach from a water management perspective was clearly understood, positively received and supported by participants.

c) Regarding the water harvest systems, at both workshops, participants expressed their interest for these solutions at the household level. The SCALL (rain water harvest system) Programme leaded by MiAmbiente and MIDA, was not known by the participants, evidencing that the activity proposed by the AP will complement and support escalation of current institutional efforts in this regard. both consultation workshops, the participants emphatically expressed their concern of lack of timely and permanent technical assistance from the competent institutions (MIDA and MiAmbiente). The lack of information, solutions and alternatives associated to climate change adaptation were emphasized, evidencing that the producers are coping with these changing conditions with their own limited resources.

d) Regarding access to climate data or information to support their productive decisions, participants confirmed that this type of service is completely inexistent. Producers mentioned that traditionally they used the Bristol Almanac, based in the lunar (moon) cycle as a source of information for their planting and harvesting calendars, but that it is no longer useful. Producers at both workshops mentioned that their calendars have changed dramatically in some cases changing from March to August, depending on the crop. Producers reported losses in the range of 50% in some cases, due to climate conditions, particulary new pests and extreme winds.

e) Participants in both workshops emphasized the need to engage the Watershed Committees as key stakeholders of the AP and define communication and coordination channels with them.

f) The Alcalde (Major) of the District of Calobre participated in the SMRW and actively expressed interest to support programme activities as a means to improve

the particularly severe situation of the District due to extended drought since 2014. (Calobre has been listed as one of the prioritized areas by MIDA during proposal writing working sessions)

4. Suggestions and concerns raised included:

In the CHVRW:

a) New key climate change threats and impacts were raised by the participants: Extreme wind, forest fires, crop pests and diseases, particularly those caused by fungi, affecting traditional crops, particularly coffee, corn and beans.
b) The participants suggested to review the siting for the irrigation system in Cerro Punta and consider other alternatives, particularly the communities of: Caisán (to support vegetable production), Divalá (to support rice production), Circuito Garichè, southern area of Volcán (San Andres, Gomez, Aserrio), which is the only sub watershed with connectivity with the estuary and is threatened by 4 hidro concessions; Paso Ancho and Volcán.
c) The participants explicitly requested to include the coffee production as a targeted crop along with rice. The agreement was to emphasize coffee production as part of the agroforestry project.
d) Participants explicitly expressed their opposition to major hydroelectric projects, which they perceive as the main threat for the watershed along with climate change. Concerns were raised regarding the water harvest activity, asking for clarification if the concept promoted by the AP included big reservoirs “embalses” as the ones associated to hydro projects. They also expressed the need for strong technical advice regarding the irrigation system design and installation in order to avoid the risks of soil erosion, salinization and depletion of aquifers.
e) An important finding was the fact that the Early Warning System that was supposed to be up and running in the area, does not exist at all, because it was totally lost during extreme flood events 2014. The participants emphasized the importance of the installation of EWS, taking advantage of the lessons learned with the previous systems, and the knowledge that already exists in the communities about these systems. They also mentioned that currently no effort from SINAPROC or other institution is in place to carry out this activity.
f) Participants mentioned that very limited technical assistance is available for producers to cope with climate change events. Some efforts from MIDA, particularly regarding irrigation were mentioned, emphasizing that emphasizing that by no means those efforts are sufficient in light of the needs and problems faced daily by producers.
g) Participants expressed that changes in temperature in some areas of the watershed are dramatic. For example, the community of Rio Sereno which used to be an area with low temperatures ideal for coffee production (until mid-late `80s approximately) is currently warm, evidenced, for example, by changes in clothing.

These changes are “anecdotic” and no scientific or technical information is available for communities, but its impact in their production and lifestyles is significant.

In the SMRW:

a) Participants explicitly requested to extend the agroforestry for water sources conservation in the upper watershed. For this purpose, the 800 hectares for agrosilvopastoril systems to be located in the middle watershed, were reduced to 600 ha, to develop 200 hectares of agroforestry and water/soil conservation adaptation measures in the upper section of the watershed.
b) Coffee and rice were also mentioned as prioritized crops. Participants prioritized technical assistance for climate resilient rice production above naranjilla and orchid cultivation.
c) The siting and characteristics of the new hydro meteorological stations was discussed, indicating that this decision will have to be made jointly with ETESA and MIDA, to secure that the required sensors for agriculture are included, in addition to the hydro meteorological components.
d) Participants recognized the importance of agrosilvopastoral models, but expressed that it is not clear the reason why these systems have not been developed in the region, except for some small isolated pilot projects. The inclusion of this component was highly praised because of the importance of livestock in the area and are the serious problems producers are facing due to the extreme drought in some areas of the basin.
e) The participants confirmed that in the present, small farmers do not have access to the financial facilities and products managed by the Bank for the Development of Agriculture (BDA) and the National Bank, mainly because of the guarantees requested by the banks. The microfinance approach to support ecosystem based adaptation measures, through loan and credit cooperatives existent in the area, was perceived as an opportunity. Participants mentioned that the possibility of establishing a guarantee fund or similar figure could be a tangible and functional approach.

H2. Results of the Public Consultation and Technical Meetings

Table 41. Main Impacts of Climate Change on the CHVRM and SMRW

Repercussions of Climate Change	Agriculture	Affectations		FA /Program
		CHVRM	SMRW	
Soil loss because of water concentration in a short period of time	General	√	√	Agroforestry Silvopastoril

Repercussions of Climate Change	Agriculture	Affectations		FA /Program
		CHVRM	SMRW	
New disease indicators of fungal involvement. Benevolent and symbiotic disappearance of species and ecosystems crops such as the disappearance of pollinating insects (bees), worms and other animal and plant species by moisture change, emergence of new disease indicators of these species	Coffee and crop plants	√	√	Agroforestry Silvopastoril Training plans
New species affecting crops (insects, scorpions, snakes and spiders) Birds do not eat crops for example “Paisanas” and olso opposums (Caisán)	General Corn	√		Agroforestry Training plans
Decreased production by proliferation of pests (Roya and Ojo de Gallo) and Broca on high ground. Coffee berry borer with greater intensity in the lowlands.	Coffee	√	√	Agroforestry (best coffee growing practices including new seed varieties) Agrometeorological node (MIDA)
Affectation of flowering by wind tunnels. New storms cycle patterns.	Coffee	√ (Río Sereno)		Property Management Plans
Calendar change and sowing cycle due to changes in rainfall patterns and floods. (CHVRW: Monte Lirio, Candela-Santa Clara and Rio Sereno; SMRW: Santa Fe)	Coffee	√	√	Agroforestry Acquisition and installation of the hydro-agrometeorological stations network Agrometeorological node (MIDA)
Changing Caisán calendar cycle. In Divalá, Alanje change in the cycle of sowing: 1st was in March, then in April and now in June.	Beans, corn, tomato and sweet pepper	√	√	Agroforestry Acquisition and installation of the hydro-agrometeorological stations network
Livestock sector affected by high temperature causing increased incidence of pests and diseases (ticks, etc). Before bathed every 21 days currently must bathe every 8 days	livestock	√	√	Exchange of experience (4.5.f) Agrometeorological node (MIDA)
Fire increase with frequency	grasslands and forest	√	√	SAT
Real change in temperature in the town of Rio Sereno used to have a "cold" climate and pass to a warm climate similar to the lowlands of the province (there is numerical data and is affecting the production of coffee and bananas)	General	√		Agroforestry
Affectations cattle for heat stress (death of livestock)	Livestock		√	Silvopastoril SAT

Repercussions of Climate Change	Agriculture	Affectations		FA /Program
		CHVRM	SMRW	
				Agrometeorological node (MIDA)
Decreased live weight of cattle by heat stress	Livestock		√	Silvopastoril SAT Agrometeorological node (MIDA)
Floods	General	√		SAT

H3. List of stakeholders consulted throughout the process

Table 42. List of stakeholders consulted during consultation process

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
CUENCA DEL RÍO CHIRIQUÍ VIEJO					
Jorge E. Gaitán	M.E.D.C.A	Local organization	Río sereno	x	
M. Quintero	A. P.A.C.O.M	Local organization	Monte Lirio	x	
Félix Pitty	A.D.P.A.E.L.A.	Local organization	Piedra de candela	x	
Luis Miguel L.	Junta de Desarrollo	Local organization	Cerro Punta	x	
Santiago Morales	Ministerio de Desarrollo Agropecuario	Local organization	Unidad Ambiental	x	
Jasson Elizondro	C.S.R	Local organization	Río sereno	x	
Karian Araúz	C.S.R	Local organization	Río sereno		x
Jhonathan Gonzalez	FUNDICCAP	NGO	Caisán		x
Iris Caballero	Productor	Local organization	Caisán		x
Rossana Thill C.	Productor	Local organization	Caisán		x
Denis Lezcano	Productor	Local organization	Caisán		x
Olmedo Lezcano	Productor	Local organization	Caisán	x	
Carmencita Tedmanmacintyre	Codetis aguas alianza P.	Local organization	Boquete		x
Victor Fuente	Caña blanca arriba	Local organization	Caña blanca arriba	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Flora Amado	ASAELA	NGO	Las Nubes		x
Ana Sánchez	AMIPILA	NGO	Guadalupe		x
Olga Sánchez	ASAELA	NGO	Las Nubes		x
Vilma Samudio	Cruz Roja	Public institution	Concepción		x
Lidio Saldaña	Volcán	Local organization	Volcán	x	
Daniela Pitty	Asepon	Local organization	Palma Real		x
Dario Sánchez	Caisán	Local organization	Guabito	x	
Edward Araúz	ARROCRO	Local organization	Guabito	x	
Estelmira Serrano	Familiar	Private organization	Pacora		x
Fidelina Araúz	Asociación de productores Orgánico	Local organization	Campo Alegre		x
Edilberto Gómez	APAAC	NGO	Altamion	x	
Luis Sánchez	AMIPILA	NGO	Guadalupe	x	
Diogenes Pitti	Junta Administradora de Acueducto Rural (JAAR)	Local organization	Cerro Punta	x	
Marcos Villareal	Ministerio de Obras Públicas	Public institution	David	x	
Rosendo Botello	Productor	Local organization	Río sereno	x	
Noemí Del Pitty	Ministerio de Educación	Public institution	Río sereno		x
Valia Sousa	Ministerio de Ambiente	Public institution	Sede Panamá		x
Kevin Wing	Ministerio de Ambiente	Public institution	Sede Panamá	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
María Quiel	Productor	Local organization	Caisán		x
Margarita Saldaña	Productor	Local organization	Caisán		x
Ariel Contrera	Productor	Local organization	Punta de piedra	x	
Mirta Benítez	Ministerio de Ambiente	Public institution	VCC		x
Javier Moreno	Productor	Local organization	Guabito	x	
Isabel De Lezcano	Productor	Local organization	Centro		x
Elidio Bonilla	Comité de M.	Local organization	Santa Rita	x	
Luis A. Montes	FUNDICCEP	NGO	David	x	
Damaris Sánchez	FUNDICCEP	NGO	Cerro Punta		x
Edilma C.	Ministerio de Educación	Public institution	Río sereno		x
Lelinet Miranda	Productor	Local organization	Caisán		x
Trinidad Sánchez	Productor	Local organization	Caisán		x
Alcibíades Saldaña	Productor	Local organization	Caisán	x	
Oris Contreras	Ministerio de Desarrollo Agropecuario	Public institution	Volcán		x
Nodier Díaz	VSRR	Local organization	Alanje	x	
Roman Gutierrez	Alcaldia de Bugaba	Local Government	Bugaba	x	
Javier Grajales	Junta Comunal	Local Government	San Andrés	x	
Fulvio Morell	Productor	Local organization	San Andrés	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
CUENCA DEL RÍO SANTA MARÍA					
Elizabeth Moreno	Grupo Ambiental AMURAN	Local organization	París		x
Raquel Pascasio	Grupo Ambiental AMURAN	Local organization	París		x
María Mendoza	Grupo Ambiental AMURAN	Local organization	París		x
Boris Espinosa	Ministerio de Desarrollo Agropecuario	Public institution	Santiago	x	
Adic Dalia Hernández	Asociación de Bochela	Local organization	Santa Fe		x
Bolívar González	Ministerio de Desarrollo Agropecuario / Unidad Ambiental	Public institution	David	x	
Sixto Quiros	Nueva Visión	Local organization	Santa Fe	x	
Francisco Pineda	Cooperativa la esperanza de la Campos de Santa Fe	Local organization	Santa Fe	x	
María Pinzón	Grupo Ecológicos las Macanas GEMAS	Local organization	El Rincón Santa Marta		x
Ceviliano Aguilar	Fundación Héctor Gallego	Local organization	Santa Fe	x	
Victor González	Productor	Local organization	Piura	x	
Yelenis Hernández	Productor	Local organization	Piura		x
Fideligna Guevara	Asociación de productores Agrop. 5 de Julio El Alto	Local organization	El Alto		x

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Digno González	Asociación de productores Agrop. 5 de Julio El Alto	Local organization	El Alto	x	
Jacinto Peña	Fundación Héctor Gallego	Local organization	Santa Fé	x	
Luciano Rodriguez	Productor	Local organization	Santa Fé	x	
Purifica María Hernández	Productor	Local organization	El Alto		x
Juan Rodriguez	Productor	Local organization	Piedra Moler	x	
Faustino Hernández	Productor	Local organization	Piedra Moler	x	
Leoncio Mendoza	REDI	Local organization	Las Mendoza	x	
Jairo Alfaro	Ministerio de Desarrollo Agropecuario/ Agricultura	Public institution	Santiago	x	
Francisco Días	Ministerio de Desarrollo Agropecuario/ Herrera	Public institution	Herrera	x	
Enrique Rodriguez	Ministerio de Desarrollo Agropecuario/ Santa Fe	Public institution	Santa Fe	x	
Victoriano Concepción	Ministerio de Desarrollo Agropecuario/ Santa Fe	Public institution	Santa Fé	x	
Yocelin Gonzalez	Municipio de Nata	Local Government	Nata		x
Leopoldo González	ASOPROS	Local organization	Santa Fé	x	
Lázaro Rodriguez	Coopiturismo	Local organization	Santa Fé	x	
Tadeo Rodriguez	Piura	Local organization	El Alto	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Hortencio Palma	Amiparque	NGO	Santa Fe	x	
Gisela Quintero	Ministerio de Ambiente /Chitre	Public institution	Chitré		x
Franklin González	Independiente	Private organization	Chitré	x	
Rogelio C.	Municipio de Calobre	Local Government	Calobre	x	
Mirta Benítez	Ministerio de Ambientee/Unidad Cambio Climático	Local Government	Panamá		x
Eduardo Villa	Ministerio de Ambiente/Santiago	Public institution	Veraguas	x	
Hernán Hernández	Ministerio de Ambiente/Santa Fé	Public institution	Veraguas	x	
Arguimiro Arosemena	APASAN	NGO	El Alto	x	
María Castillo	Grupo Ambiental AMURAN	Local organization	París		x
Sonia Vega	Grupo Ambiental AMURAN	Local organization	París		x
Florencia Ortiz	Grupo Ambiental AMURAN	Local organization	París		x
Israel Torres	Mi Ambiente /Central	Public institution	Panama	x	
Rolando Ruiloba	Mi Ambiente /Santiago	Public institution	Santiago	x	
Zobeida Herrera	Asociada Coop.		Santa Fé		x
José Rodríguez	APASAN	NGO	Santa Fé	x	
Paula	Productor	Local organization	El Alto de Cruz		x
Eduardo Manel Salas	Productor	Local organization	El Juncal	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
David Medina	Productor	Local organization	Piedra Moler	x	
Eugenio Hernández	Productor	Local organization	Piura	x	
Ulises Rodríguez	Productor	Local organization	Piura	x	
Benilda Rodríguez	Productor	Local organization	Fondura		x
Alonso Rodríguez	APASAN	Local organization	Piedra Moler	x	
Ofelia Tenorio	Productor	Local organization	Piedra Moler		x
Rosario Rodríguez	Productor	Local organization	Piura		x
Javier González	Ministerio de Ambiente	Public institution	Santiago	x	
Maykel Marín	Banco de Desarrollo Agropecuario	Public institution	Santiago		x
M. Castillo		Private organization	Santa Fé		x
Edwin Hernández	Ministerio de Desarrollo Agropecuario / Secretaría Técnica	Public institution	Santiago	x	
Diego Pérez	Ministerio de Ambiente	Public institution	Mitre	x	
Raul Higuera	Macanas	Local organization	Ocú	x	
Eusebio López	Ministerio de Ambiente	Public institution	Chitré	x	
Victor Pérez	INAGROPEC S.A.	Private organization	Chitré	x	
Virginia Jimenez	Indigenous	No Applicable	Muela		x
Danilo Gonzalez	Indigenous	No Applicable	Palmar	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Mauricio Jimenez	Indigenous	No Applicable	Bermejo	x	
Petra Jimenez	Indigenous	No Applicable	Bermejo		x
Yaquelin Carpintero	Indigenous	No Applicable	Alto Piedra, Santa Fé		x
Nuestra Santos	Indigenous	No Applicable	Alto Piedra, Santa Fé		x
Ariel Carpintero	Indigenous	No Applicable	Alto Piedra, Santa Fé	x	
Joel Sibala	Indigenous	No Applicable	Quebrada Mamey	x	
Arlen Palma	Indigenous	No Applicable	Quebrada Mamey		x
Silvia Bernaza	Indigenous	No Applicable	Quebrada Mamey		x
Cornelio Sibala	Indigenous	No Applicable	Quebrada Mamey	x	
Eusebio Rodríguez	Indigenous	No Applicable	Nuela	x	
Mercedes	Indigenous	No Applicable	Nuela		x
Meli Carpintero	Indigenous	No Applicable	Santa Fé		x
Marcimiliano Santo	Indigenous	No Applicable	Santa Fé	x	
Tiofila Virola	Indigenous	No Applicable	Santa Fé		x
Lucresia Carpintiro	Indigenous	No Applicable	Santa Fé		x
Luciana Carpintero	Indigenous	No Applicable	Santa Fé		x
Oderay Flores	Indigenous	No Applicable	Santa Fé		x
Pedro Urriola	Indigenous	No Applicable	Santa Fé	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Elvia Virola	Indigenous	No Applicable	Las Lajas		x
Ana Flores	Indigenous	No Applicable	Las Lajas		x
Zoneida Herrera	Indigenous	No Applicable	Santa Fé		x
Camila Peralta	Indigenous	No Applicable	Pantano		x
Lionel Rodríguez	Indigenous	No Applicable	Girotes	x	
Rubén Rodríguez	Ministerio de Desarrollo Agropecuario / Agencia de Santa Fé	Public institution	Santa Fé	x	
NACIONAL					
Tomasa Hernández	A.M.A. Panamá	NGO	Nacional	x	
Elvin Britton	Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)	NGO	Nacional	x	
Antonio Clemente	Fundación MARVIVA	NGO	Nacional	x	
Luiggi Franceschi	Fundación Panamá	NGO	Nacional	x	
Ricardo Wong	Fundación para la Protección del Mar PROMAR	NGO	Nacional	x	
Mirta Benítez	Ministerio de Ambiente	NGO	Nacional		x
Sandy P. Mosquera	Fundación Cuidad del saber	NGO	Nacional	x	
Ramiro A.	Vende Urbano	NGO	Nacional	x	
Carpaijsander	Wetlands International	NGO	Nacional	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Harley Mitechell	Grupo Asesor de Emprendedores Ambientales /Abogados	NGO	Nacional	x	
Yarabi Vega	Parque Natural Metropolitano	NGO	Nacional		x
Beatma Schmitt	Programa de Pequeñas Doaciones-GEF	NGO	Nacional		x
Hlif Linnetvel	Bosques del Mundo	NGO	Nacional	x	
Daniel Holness	Centro de Estudios y Acción Social Panameño	NGO	Nacional	x	
Arturo Dominica	Centro Regional para el Hemisferio Occidental	NGO	Nacional	x	
María Soledad Porcell	Centro de Incidencia Ambiental	NGO	Nacional		x
Pilar López	Hidrometeorología/Empresa de Transmisión Eléctrica,S. A	Public institution	Nacional		x
Diego González	Hidrometeorología/Empresa de Transmisión Eléctrica,S. A	Public institution	Nacional	x	
Edilberto Esquivel	Hidrometeorología/Empresa de Transmisión Eléctrica,S. A	Public institution	Nacional	x	
René López	Ministerio de Ambiente	Public institution	Nacional	x	
Yira Campos	Sistemas Nacional de Protección Civil (Dirección de Prevención y Mitigación de Desastres)	Public institution	Nacional		x
Rafael Bonilla	Sistemas Nacional de Protección Civil	Public institution	Nacional	x	
Juan Carlos Rivas	Sistemas Nacional de Protección Civil	Public institution	Nacional	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Lorena Vargas	Sistemas Nacional de Protección Civil	Public institution	Nacional		x
Tomás Vásquez	Instituto de Investigaciones Agropecuarias de Panamá / Gerencia Recursos Forestales	Public institution	Nacional	x	
Casilda Saavedra	Universidad Tecnológica de Panamá	Academy	Nacional		x
Liz Montilla	Autoridad de los Recursos Acuáticos de Panamá	Public institution	Nacional		x
Graciela Martiz	Ministerio de Desarrollo Agropecuario	Public institution	Nacional		x
Luz Graciela Cruz	Secretaría Nacional de Ciencia y Tecnología	Public institution	Nacional		x
Judith Vargas	Minsiterio de Desarrollo Agropecuario	Public institution	Nacional		x
Virgilio Salazar	Minsiterio de Desarrollo Agropecuario	Public institution	Nacional	x	
Eric De Ycaza	Instituto de Acueductos y Alcantarillados Nacionales	Public institution	Nacional	x	
Héctor Rodríguez	Secretaria de Energía / Ministerio de la Presidencia	Public institution	Nacional	x	

Important facts:

The consultation process conducted in April and onwards was open to all audiences, and widely spread through national and local means of communication (Natura web, page; newspaper, local radio stations).

The specific concerns raised during the consultation process were:

- In CHVRW, concerns expressed were: a) regarding the water harvesting systems, about the possibility that the systems were based in huge dams similar to those of the hydroelectric projects. It is clear that the technical solutions presented by the programme include local infrastructure at the household level, either cisterns or small reservoirs, as indicated in the description of activity 1.1 b) The other concern was in terms of hydroelectric development. It is clearly stated in the proposal that regarding energy dimension, the programme aims to make the case to promote small scale energy developments (using the mini hydro concept currently existent in national regulations), to show that the renewable energy schemes are not restricted to mayor and invasive hydroelectric investments.

- In SMRW the main concern expressed were: a) The need to include actions to address impact of climate change in traditional agriculture, particularly coffee, rice and beans. This concern was reflected in the Programme through the adjustment made to inclue the agroforestry module of 200 hectares (emphasizing coffee production) in activity 1.3. To do this the scale of the agrosilvopastoral module originally designed to cover 800 hectares was reduced to 600 hectares and the module on nontraditional income generating activities (related to producing naranjilla and orchids) was reduced in terms of scale to a small pilot; b) geographical location of meteorological stations solely based in ETESA criteria. To address this concern, a series of technical meetings were made with technical staff of MIDA to obtain technical feedback regarding suggested locations. The location of the new stations will be agreed upon ETESA, MIDA, SINAPROC and MIAMBIENTE, and will be included in the correspondent TORs and bidding documents.

I. Justification for funding requested and full cost of adaptation reasoning

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

The amount of funding requested (US$ 9,967,559) is considered valid and reasonable:

- The Programme scope encompasses interventions both at the local level (CHVRW and SMRVW) and the national level.
- The basis of the Programme is to strengthen the water-food-energy-climate nexus, resulting in a multisectoral approach, which is more complex in terms of the expected interconnected results and the number of activities to actually enable those synergies.
- The Programme includes a balanced suite of implementation of adaptation measures at the local level (water storage and irrigation systems; conservation activities through agroforestry; sustainable cattle raising/ASP project; installation and operation of EWSs), complemented by technical analysis and production of operative and knowledge products (business plans, water security district plans, technical notes, water foot print analysis, systematization documents, Adaptation M&E protocol, adaptation knowledge platform, among others)
- The Programme devotes a significant amount of financial resources to the strengthening of the current hydro meteorological network, evolving into a National System of Climate Data, operatively connected with the Ministry of Agriculture through a special node.
- Adaptation measures described have been budgeted taking into consideration orders of magnitude (cost figures) based in previous interventions of the implementing partners (Fundación Natura, Min. of Environment; ETESA, Ministry of Agriculture). Unitary costs have been revised to present accurate orders of magnitude to each component.

This is additionally supported by the figures of the cost-benefit analysis presented in Part II section C3 of this document (see pages 173-175).

Comparison between a baseline situation (without the programme) and a with programme scenario

Table 43. Comparison of components/products in scenarios with and without proposed program

Component / product	Without project	With project
Component 1		
Water harvest systems	Currently the Scall Program is designed and executed without specific considerations of CC and implemented under user demand system	Climate proof system, based in VIAs (preliminary results). Targeted number of systems installed (50) Integrated approach of the activity by: a) Promoting the concept of rainwater multi-purpose utilization; b) Making visible the associated services to rainwater utilization as income generating activity; c) Emphasizing that the RWH is much more than the system installation, it includes: Knowledge transfer (income generating activities that could be linked to rainwater harvesting, emphasizing women participation); Raise awareness about rainwater environmental services: energy production, aquifer recharge, food security; Potential for Flooding & draught prevention.
Irrigation system	MIDA's planned irrigation system is in Cerro Punta, Bambito in CRCHV, highlands. Non planned irrigation system for the SMRW in the near future	Climate proof irrigation system for the áreas of Alto Pineda, Alto Bambito and Alto Tribaldos (in the highlands of CHVRW); and in the in the rice-growing region Divala. Complemented by awater

Component / product	Without project	With project
		footprint analysis and exploration of SICA system for rice.
Agroforestry	Currently limited agroforestry projects ar implemented by F.Natura in Santa Fe and Caisan Other institutions have provided technical assistance for agroforestry agronomic management not including the issue of climate change.	Coverage area at both sites for a coverage of 240 hectares and with additional benefits of expanding production. Coffee varieties resistant to weather and pest management are introduced. Promote new products (naranjilla and orchid) to diversify revenue sources using local technology applied (orchids) and non-traditional product (naranjilla). Special gender impacto on women. Increased income in vulnerable families and incorporating the family in activities of their farms.
Silvopastoral	Losses in the agricultural sector due to the impact of drought. There is no ASP program for adaptation to climate change in SMRW. What is implemented is the drought (contingency plan) plan with reactive and not preventive character. Limited capacity to provide technical assistance services for small producers	Benefited at least 120 small farmers with training and implementation of ASP management system incorporating climate information Intensive training and capacity building programme to farm owners to install and operate the ASP modules,
Financial Mechanisms of adaptation	There is no such approach particularly aimed at microfinance.	Incorporate in the process of adaptation to support microfinance institutions,

Component / product	Without project	With project
	Traditional programs supporting production supported by BDA Little implementation of the rules of mini-hydros	complementing the efforts of public financing Creation of knowledge and evidence on the feasibility of these projects for the productive sector and small farmers
Component 2		
VIAs analysis	Lack of community awareness about the existence of approved planning tools No CC via analysis has been conducted for the SMRW	Intense awareness process to support the implementation of the planning instruments through component 4. CC driven VIA for
water balance and flow	Currently conducted at the watershed level by	In depth process for two critical subwatersheds (Gallito y Caisan), emphasizing the water-food-energy and climate nexus
District water safety plans	This instrument has not been developed in Panama	Two vulnerable districts implementing the WSP, providing in the field experience to support the implementation of the Plan Nacional de Seguridad Hídrica ..
Component 3		
Hydrometeorological stations	National network of stations to be modernized and a few stations in production areas.	Support the modernization and strengthening of the National Network of weather stations (hydro and agro-meteorological) existing, improving climate information products to support planning and reporting adaptation measures also on risks particularly local and regional level as in the areas of agricultural production in the country.

Component / product	Without project	With project
SATs	There are no systems in place at selected sites Preliminary efforts to re-operate the system in Cerro Punta by local authorities	• Using lessons learned from previous processes for system design • System development jointly with SINAPROC • Generation of technical guidelines to guide the development of future EWSs and continuous improvement
Nodo ETESA-MIDA	There is no node in the MIDA and information agrometeorological is not available in simple language so that producers can benefit from them.	Interconnection and equipment with a common node with MIDA, to generate and manage climate information and reach producers. They will be installed in regional offices and branch offices of the MIDA, in the most vulnerable areas to climate change in the country. MIDA technicians and producers strengthened so that they can give and understand information on disease control, pests, planting dates, etc.
M & E protocol of adaptation measures to CC	There is no national protocol for measuring the results of adaptation of individual projects	The program will develop a protocol and train staff for follow-up
Component 4		
	Limited public access to technical information CC in Panama, on a project basis. There is no open knowledge platform directed to the general public on adaptation to cc	Democratize access to information CC adaptation, targeting different audiences (officers, NGOs, community based organizations, academia, others) “One stop shop” for climate change adaptation learning, encompassing national and subnational information Promoted networking in climate change adaptation action at a national scale

Component / product	Without project	With project
	Limited offer of specialized training opportunities on topics, usually directed at officials from headquarters (Panama)	Suite of specialized courses in cc adaptation, emphasizing the participation of officers and stakeholders at the local level (regional directorates, counties, districts), targeting a minimum of participants (TBD).

J. Consideration of the sustainability in design of the project/programme's outcomes

Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project / programme

Sustainability of programme outcomes particularly relies in the fact that the proposed lines of action are part of current explicit institutional planning and operative plans. Based on this, the programme reasoning is that the results will serve as building blocks of future institutional efforts to cope with climate change.

Also, sustainability of programme outputs is envisioned as the result of positive socio-economic results derived from the implementation of productive good practices and promoting stakeholders' appropriation at the farm owner level. At the national scale, the hypothesis is that as a result of the programme actions, authorities and communities will perceive an improvement in water governance as a consequence of added transparency in the decisions to grant water rights (concessions and permits), promoting the permanence of the adaptation measures implemented by the programme.

Although a detailed sustainability analysis shall be presented with the full proposal document, it is important to mention that the proposed activities at both watersheds can be sustained overtime due to the alignment with the national and local agenda for climate change. This programme is connected with priorities established by the National Climate Change Committee, as well as the priorities identified by the recently established watershed committees at Chiriquí Viejo and Santa María.

Furthermore, the programme proposes the establishment of an advisory committee for the National Climate Change Committee, to follow up on the advances, results and impacts of the proposed activities, as well as lessons learned for future interventions.

Regarding the socio-economic aspects of the proposed activities, all of them have been designed to develop and install climate-smart / best practices that will be able to continue after the program ends. In this regard, it is especially important to note that the agriculture, cattle-rising, agri-business, water harvest, gallery forests and related activities will be implemented with the technical assistance of the Ministry of Agriculture Development and Ministry of Environment, both of which have proven experience in extension initiatives to ensure sustained results beyond the programme end.

Approach to sustainability

Sustainability analysis

Sustainability is the capacity to be sustainable/continual in time. Key aspects considered in sustainability are: a) the explicit support of stakeholders involved, and b) knowing the resources needed to maintain results or processes in time. These two aspects contribute to the irreversibility of changes achieved by the intervention. Another key aspect is the history of the practice or project, resource analysis, key stakeholder support.

The following considerations were considered to ensure sustainability of the proposed program:

Economic and financial sustainability

Sustainability will be achieved through: Ensuring Appropriation of the technical solutions by the beneficiaries.

To achieve this the programme will: a) establish in kind co-funding requirements as a means to ensure long term involvement with the technical solution provided; b) provision of intense technical assistance to guarantee capacity building of the farm owners-producers mitigating the dependence on permanent outsourced advise; c) Generate baseline and monitoring data to provide evidence about the improvements in productivity and income; d) promote exchange of experiences among beneficiaries to promote a multiplying effect; e) promote and provide technical support to improve traditional activities considering climate change variations to increase resilience of traditional practices, instead of promoting a conversion process to new activities (for ex: SICA scheme for rice production; alternative mini hydro projects (as opposed to the traditional mega hydro projects developed by big corporations) to facilitate buy in of communities and landowners.

Financial sustainability will be fostered by involving finance institutions -particularly microfinance- into local adaptation schemes.

At the institutional level:

a) technical criteria for the selection of participants in training events, will be defined balancing participation among government officers of the national and regional level; local authorities and consultants. The purpose is to strengthen a critical mass of experts in different adaptation approaches, generating an offer and demand of adaptation technical skills.
b) as part of the institutional arrangements, the collaborative agreements with government entities will include provisions to integrate AP activities in their own

planning, so that adaptation solutions will be institutionalized and the institutions could provide long term monitoring and follow up.

At the social level:

Another aspect of sustainability is that the solutions delivered by the programme will generate quantifiable improvements in income/social inclusion or empowerment, so beneficiaries will be willing/capable of personally undertake future improvements needed, not depending exclusively on public extension services.

The beneficiary selection process wich will include the need to celebrate collaborative agreements with specific comitments of the farmowners, including, for example, provisions to convert the TA in future payments in case of non-compliance with mid and long term obligations.

Solutions related to RHS and EWS will help increase the adaptive capacity of the communities.

At the environmental level:

Through the agroforestry, agrosilvopastoral, the provision of ecosystem services will be improved in the long term.

Generating information to improve granting of the water concessions based on climate data will strengthen hydrological cycle and water resources management.

In the overall design of the program, since the AP privileges Managerial and Awareness strategies rather than hard infrastructure and maintenance strategies to foster adaptation benefits, the schemes envisioned by the AP to address long term sustainability of project results, include:

- Promoting a behavioral change of individuals (to sustainably apply ecosystem based adaptation and natural resources practices installed by the project); government institutions (to qualitatively improve decision making process regarding water concessions and land zoning regulations to conduct it based in technical and climate information) + (define operative protocols to transform current generation of hydrometeorological data into affordable and useful information for other sectors, particularly the agriculture sector), among other profound changes.
- Support the behavioral change with capacity building efforts through training opportunities, a brand-new adaptation knowledge process in the country, evidence generation about climate change and adaptation needs.the extent possible, include legal obligations to force ownership and long term commitments of the beneficiaries in relation with gray and green infrastructure investments.
- Promote institutional ownership of project results, particularly ETESA and MIDA regarding the climate data infrastructure, through participating and/or influencing

strategic processes such as the Climate Change National Committee, the Water Security Plan and the National Energy Programme.

- Based in the experience of rapid obsolescence of online portals after the umbrella projects finishes; and aiming to sustain the adaptation knowledge exchange dynamic, Fundacion Natura is willing to continue the portal operation, delivering early efforts to collaborate with potential partner institutions.

K. Overview of the identified environmental and social impacts and risks relevant to the project / programme

Provide an overview of the environmental and social impacts and risks identified as being relevant to the project / programme.

As part of the proposal design, an extensive analysis was developed to assess environmental and social impacts and risks, considering results from consultations. This by using the risk analysis matrix which was approved as part of the accreditation process of Fundación Natura as a NIE. The results are as follows.

Table 44. Overall risk analysis for the proposed program and mitigation measures

Overall Risk Analysis for the Proposed Program´s Activities and Mitigation Measures

Risk level scale
= <2 : Low
3 to 4 : Medium
5 to 6 : High

*The weighting scale goes from 1-3, where 1 is the lowest risk and 3 is the highest. Risk weight is the sum of probability and impact.

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
Type of Risk: Environmental													
E-1 Could climate variability affect the production cycle of the project (eg. change of season or increased rainfall, extended dry season) and therefore the achievement of the expected quality, quantity and time? For example, would tree species to be planted be suffering an alteration in the project calendar (production of seedlings, planting date, and survival rate after planted?) Would rice crops be suffering for lack of water to allow expected yields?		x			x				x		4		To prevent negative impacts on the production cycle of the projects due to climate variability, the final design of all interventions will introduce the climate change perspective. Projects bidding documents and work plans must include observation to the dates of cultivation (according to MIDA guidelines), the use of species resilient to such variabilities, the strategic location in the farm crops distribution (considered in the farm management plans), the use of pilot low cost irrigation systems, among others.
E-2. Could the adverse weather conditions affect the schedule for installing i) water harvest systems, ii) hydro-agro meteorological stations, iii) EWS?		x		x				x			2		Installation of these components will be carried out during dry season of the year. Work plans for implementation of these activities must comply with this requisite.
E-3. Are infrastructure elements (named in E-2) in zones susceptible to seasonal flooding or landslides, flooding rivers or other environmental phenomena that may affect the works?		x			x				x		4		Installation of these components will be carried out during dry season of the year. In addition, all bidding documents and contracts for works will comply with technical specifications to stand such potential adverse climate conditions. Class A contractors will be secured to develop highest quality execution of works.
E-4. Could the program generate adverse environmental impacts?		x		x				x			2		The program does not include activities that could generate significant environmental impacts. Nonetheless, specifications and all bidding documents and contracts for works will require that before starting any activities on the ground, required permits / authorizations / licenses are obtained from incumbent authorities. Technical specifications also will ensure that all feasible measures will be taken to prevent any adverse environmental impacts.
E-5. Are the program areas susceptible to fire (whether caused by human or natural actions)?		x			x			x			3		Areas located at the "Arco Seco" at the mid and lower parts of the Santa María river watershed are susceptible to fires -mainly caused by human actions (traditional practice to clear land plots from vegetation before planting new crops every year, that often go uncontrolled). To mitigate this risk, work plans for production and reforestation activities will introduce technical measures (such as reforesting at the beginning of rainy season, construction of land strips at the perimeter of plots and farms). Also, education measures will be implemented through the outreach mechanisms of the program to stay in touch with stakeholders, during public consultations, radio messages, etc.
E-6. Could the presence of pests in the program areas affect the production process? (i.e. agroforestry systems, agro-silvo pastoral systems, rice / orchids crops)		x		x					x		3		It could be possible that pests may affect some of the production systems to be established.

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
													Every productive activity to be implemented by the program will include detailed technical specifications (with proper and proven techniques and measures) regarding pest prevention and control. For instance, the farm management plans will consider the proper variety of crops to reduce/avoid this risk (as intensive and large areas of a single crop is prone to pests' attacks); the use of natural species that prevent pests' presence; and if extremely necessary, the use of chemical products authorized by MIDA (using proper application techniques to prevent harm to human health).
E-7. Could changes in the context (ex. large infrastructure projects, changing government policies, etc.) affect the relevance of the project to achieve the environmental goals set?		x		x					x		3		Continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change, which meets regularly) will ensure the NIE and implementation organizations learn in advance any change of context, thus allowing to make adjustments in time to ensure a successful implementation and achievement of expected outputs/outcomes. Regular coordination meetings as well as actions under output 4.1 will be monitored to include in agenda context analysis that could pose risk to the program.
E-8. The scale of the program is not appropriate in the context of the level of the threat and the pressure that is intended to address?				x					x		3		The M&E plan for the program will include a variable to follow up on pertinence of adaptation and resilience building of activities being implemented. Periodic meetings with beneficiaries and implementation partners will address also progress on program objectives and continued pertinence and proper (planned) scale to respond to pressures being addressed by the program. Continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change, which meets monthly) will ensure the NIE and implementation organizations learn in advance any inconsistencies of context, thus allowing to make adjustments in time to ensure a successful solution is achieved from implementation and expected outputs/outcomes are met. Regular coordination meetings as well as actions under output 4.1 will also be monitored to include in agenda context analysis that could affect effectiveness of the program at the proper scale.
Subtotal environmental risks											24		
Type of Risk: Information													
I-1. Is there scarce information that prevents Natura Foundation to mitigate or take the risks to which it is exposed in the program?		x		x				x			2		A strategy to capture the experiences and lessons learned will be implemented as soon as the program starts (as stipulated in the proposal). Also, a programme strategy to promote knowledge sharing across the different components must be monitored to ensure that: a) the climate change national committee remains the technical advisory instance for the programme; a knowledge subcommittee within the Climate Change National Committee is established, whose purpose will be to permanently look for information and knowledge pieces that could be derived from the different programme activities. b) the overall work plan for the Programme includes explicit and periodic milestones to share advances/limitations among programme partners and projects staff. c) RBM recommendations are observed, the M&E process is launched in a very initial stage of programme implementation, and captures lessons learned from the very beginning and introduces adjustments in the plan as needed. d) The knowledge sharing process is fed by systematization of adaptation experiences described in output 4.4.

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
													e) operative/functional communication channels are established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions, as well as learn any change in context. f) Reporting documents at all levels (program partners, project staff, consultants) include the requirement of documenting interactions with stakeholders, coordination meetings with government and nongovernment partners during the implementation of the contract/agreement and outline knowledge products envisioned or limitations to reach those.
I-2. Is there insufficient information that prevents the implementing organizations to mitigate or take the risks to which it is exposed in the program?		x		x					x		3		See mitigation measures included for Risk I-1. Comprehensive available information about climate related issues faced by the country delivered to Fundacion Natura by key government institutions related to the program´s proposed activities will be shared with implementing organizations. In addition, after the program is completed, all stakeholders will count on an adaptation knowledge platform than will foster effective and wide-ranging info on adaptation, lessons learned, and a national system for climate data (that will monitor hydro meteorological activity as well as the effectiveness of adaptation efforts).
I-3 Other information risks				x					x		3		To prevent this, Fundacion Natura will ensure a budget line (as it was stated in the proposed program´s budget) in implementing organizations contracts, specially to provide travel stipend or similar means to vulnerable population. Also, radio ads and programs will be made in order to inform ahead of time when meetings or other coordination will be developed in program areas.
Subtotal information risks											8		
Type of Risk: Social													
S-1. Is the program in an area of actual or potential conflicts over natural (land, water) resource use?		x				x			x		5		Current / potential conflicts at the local scale of the program (especially present at the Chiriqui Viejo river watershed) are about water resource uses. To address conflicts in the medium – long terms at the program target areas and national level, the National government has already started a dialogue in the process for establishing the National Plan for Water Security. Because of this, the proposed program ***is not intended to solve*** existing / potential conflicts among stakeholders in this regard. The proposed program to the AF will do influence the conflict situation by generating tools and information to create a science-policy interface (technical information that will be made available to inform the dialogue, for all participants in an equal access basis). This is i) to help involved individuals to broaden their views toward a common solution to conflict; and ii) support incumbent authorities and stakeholders to count with scientific tools (component 2) to plan and make informed decisions (with a systematic approach) on water uses respecting environmental flows and the integrity of watercourses. Also, operative/functional communication channels will be established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
													committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions, as well as learn any change in context. The communication and exchanges among stakeholders during implementation of the program (for example, through quarterly meetings to review progress on implementation) will foster better mutual understanding. The proposed program will include a participatory and IWM course emphasizing conflict management skills to create capacities in stakeholders to better deal with this situation. Finally, during design of technical specifications for every activity to be implemented near conflict areas (no project will be planned-carried out with conflicting persons), it will be included a requirement for implementation organizations to report to Fundacion Natura conflict issues over natural resource uses no later than 24 hours after learning about them. This will help taking timely action through incumbent national authorities
S-2. Are there tense situations between stakeholders needed to be solved to implement the program?		x		x						x	4		Idem.
S-3. Does the local workforce lack the necessary profile to implement the program?		x		x						x	4		To prevent any knowledge/skills gap to be able to implement all the components of the program, it has been included an induction for personnel at the beginning of the program implementation. This includes local workforce at the technician and management level (even at the local promotion agents). Recruiting specifications will include criteria to be met on knowledge and skills required for program implementation. Also, a series of courses will be offered to help build better local capacities to ensure continued and successful results from activities.
S-4. Is there an adequate level of training of involved individuals and communities to implement the program? Consider, skills training and the ability to react proactively to address the problems that can be encountered in implementing the program.		x			x				x		4		The program will include a variety of people with a very diverse academic background. At the communities for instance, there are people with elementary, middle and high school mainly. A small percentage is also illiterate. The program will hire local communities' individuals as program promoters. These personnel will be trained when hired, and knowledge assessed in order to fill any gaps. Also to make them familiar with every detail of the program and expected tasks from them to ensure a successful program implementation and coordination with communities.
S-5. Are key actors or beneficiaries highly unlikely to continue in the process of the program in the short, medium and long term?		x		x					x		3		Disengagement of key actors and beneficiaries once the program is over will be prevented since the program has included a series of mechanisms for improved awareness and professional and technical skills in local people regarding the causes, impacts and effects of climate change (mainly component 4 and activities from components 1, 2 and 3). Behavioral change will be induced throughout implementation of the different projects, toward climate change preparedness; as will generate better living conditions and higher income (thus creating interest to keep on such good practices). Monitoring and evaluation system will include proper means to follow up likeliness/readiness of beneficiaries to continue beyond program´s end.
S-6. Are there current or potential projects (hydropower, mining, roads, or other) that could transform the land use and thereby affect the participation of direct or indirect beneficiaries of the program?		x		x						x	4		Currently there is no envisioned large projects in the program areas that could affect participation of beneficiaries. The monitoring and evaluation system will include proper means to follow up likeliness for such projects to happen nearby the program sites, in order to respond readily to the situation. Should this situation develop, effective interagency coordination among incumbent authorities will allow making arrangements not to affect farms or sites included in the projects.

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
													The information exchanges and delivery of quarterly meetings with beneficiaries and stakeholders will bring opportunity for updated plans on any of such large projects if it happened.
S-7. Could there be social or behavioral patterns resulting from the presence of labor introduced through the projects (mentioned in S-6) that could transform land-use and bring problems to communities that may affect the program implementation and the intended transformation?		x		x					x		3		Idem (effective interagency coordination among incumbent authorities will allow making arrangements not to affect farms or sites included in the projects; and information exchanges and delivery of quarterly meetings with beneficiaries and stakeholders will bring opportunity for updated plans on any of such large projects if it happened).
S-8. Is there a lack of leadership in the program areas, especially amongst the young people, that might affect the program?		x			x				x		4		The knowledge exchange strategies included in the program design (especially component 4) have taken into account a strong focus on several audiences including young people. Besides those activities, the program will ensure that during socialization activities regarding vulnerability analyses and other studies for watersheds, a critical mass of young people will be included and participate. Also, special consideration will be given when distributing knowledge materials (compilations and articles on adaptation to climate change for example). Finally, young participants will be included in training events on the use of the portal for different audiences (producers, institutions, academic, etc.).
S-9. Are the communities and beneficiaries of the program indifferent to the problems that affect them in order to find solutions?		x	x						x		2		Local communities and potential beneficiaries are open to the problems that currently affect them due to climate variability and change; so there is little probability of lack of empathy. To mitigate such situation to happen during implementation, a baseline survey will be conducted on the level of awareness in the target population about impacts and the climatic cause of the problem to be addressed by the program. From the survey data results, information materials will be generated and distributed to begin filling the knowledge gaps identified. From the beginning, meetings and workshops will be held, and printed materials distributed to inform stakeholders about the objectives of the program.
S-10. Can a lack of partners for the program (that can take a leadership role and mobilize action to create local cohesion and participation to the program and its processes), be possible?		x		x				x			2		Fundacion Natura will include in specifications for contracting implementation organizations, that these (Non-governmental organizations -NGOs) have experience working in target areas preferably; that they have developed leadership roles in projects it has carried out; and that they hire local personnel with leadership talent, among others. The Climate Change National Committee will remain the technical advisory instance for the programme. The overall work plan for the Programme will include explicit and periodic milestones to keep informed and share advances/limitations among programme partners. These will include Local government bodies (they participated during general consultation and expressed their willingness to participate in the proposed processes and some even provided support letters submitted to the AF). The M&E process will follow up participation of partners (of several contexts). Operative/functional communication channels will be established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions. Reporting documents at all levels (program partners, project staff, consultants) will include the requirement of documenting interactions with stakeholders, and coordination meetings with government and nongovernment partners during the implementation of the contract/agreements. In the program design, also participated incumbent institutions (for example, MIDA, MiAmbiente, SINAPROC, ETESA) that will remain partners during program implementation and have specific roles to play.

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
													Finally, in order to keep interaction and communication channels with community beneficiaries, the program will count on local promoters (hired from the same communities); these will remain in the communities with capacities built to continue making positive impacts during and well after program completion.
S-11. Are there no conditions for the empowerment and leadership of communities, organizations and / or key individuals -with gender considerations- after completion of the processes provided from the Natura Foundation?		x	x						x		2		See mitigation strategies in S-8, S-9, and S-10.
S-12. Is there a scarce inclusion of prior, free and informed stakeholders at the various stages of design or implementation of the program?		x		x						x	4		Since the lack of proper inclusion of stakeholders would pose a high risk of negative impact on the program, this has been a matter of outmost importance since the design of the program (and expected to be properly dealt with during implementation). All interventions were designed based on several previous planning and consultation processes at the national level (National Plan for Water Security, National Plan for Energy, National Pact for Agriculture, National Plan for Integrated Water Resource Management) and regional/local level (Chiriqui Viejo and Santa Maria River Management Plans, Conservation Area Plan for Gallito Microwatershed and Caisán Subwatershed). These processes were designed based on the views and recommendations of informed stakeholders. See mitigation strategies in S-10.
S-13. Is there any indigenous population in the area of program implementation that would require further efforts to ensure its proper participation?		x	x				x				0		It was confirmed during public consultations that no indigenous communities are located in the area of the program implementation. However, there are indigenous people who are part of the inhabitants of the area. The majority are indigenous who temporarily reside in the area; do not settle in a permanent place but take advantage of any job opportunity that is presented. The M&E system will include reporting on any change of this situation (for example, that indigenous families migrate to program implementation areas), and will include strategies to ensure its proper participation.
S-14. Is there a potential lack of receptivity to the information and activities generated by the program due to absence of awareness, among the beneficiary institutions and stakeholders, about the climate related origin of the problem, instead of considering it is a result of deficient management of natural resources?		x		x						x	4		See mitigation measures in S-1. A baseline survey will be conducted on the level of awareness in the target population about impacts and the climatic cause of the problem to be addressed by the program. From the survey data results, information materials will be generated and distributed to begin filling the knowledge gaps identified. From the beginning, during the programmed inception workshops, it will be clearly stated that the program ***is not intended to resolve the conflict***, but to provide technical information for the discussion that will address this conflict. From day 1, meetings and workshops will be held, and printed materials distributed to inform stakeholders about the objectives and what the program will and will not address.
Subtotal social risks											45		
Type of Risk: Legal													
L-1. Is the area of the program suitable and free from conflicts over land tenure? Or it isn´t?		x		x				x			2		The area of the program is free from such conflicts. If this sort of conflict arises, and it could affect implementation of the program, the risk will be mitigated by requiring (as a condition in all technical specifications/contracts with implementing organizations) that all permits and compliance regulations be met -including verification of land

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
													property rights (for on the ground delivered products, such as installation of EWS, water harvest systems, hydromet stations, agroforestry/ silvo pastoral systems). The M&E system will include reporting on any change of this situation, and will include further strategies to address risks.
L-2. Could the lack of an environmental license to implement the program in any or all phases affect its performance?		x	x							x	3		To prevent this risk (which would have a high impact on the program implementation), incumbent authorities -most of them responsible for ensuring compliance with environmental license- have been involved from the design of the program; and will remain as partners during implementation (members of the National Committee for Climate Change). Compliance with all required licenses / permits will be a pre-requisite for any disbursement in order to implement projects activities (and will be mandatory in every term of reference and contract with implementing partners – organizations). See measures in I-1 on information and knowledge sharing to ensure communication (as timely communication will ensure no regulations are ignored).
L-3. Are permits and / or required licences in the different phases of the program clearly identified? Can these not be obtained or fulfilled on schedule, and within the scope, and budget of the program?		x		x						x	4		Required licenses / permits for building and productive activities* ***similar*** to those in the proposed program implementation have been identified. They include environmental impact studies, municipal permits for construction, water extraction permits. However, according to Executive Decree 123 of 14 August 2009 (by which the Chapter II of Title IV of Law 41 -General Law for Environment- is regulated), ***none of the activities proposed in the adaptation program*** requires an Environmental Impact Study -given its nature (not included in the fixed list of activities requiring it) or scope (the proposed activity is of smaller scale than indicated in the list). Even so, when implementing these activities, rigorous observation of environmental criteria to prevent negative impacts will be followed (and required in terms of reference). Other requirements identified above will be complied with and have been taken into account in the budget. ** Refers to on the ground delivered products, such as installation of EWS, water harvest systems, hydromet stations, agroforestry/ silvo pastoral systems*.
L-4. Are there inadequate public security conditions for implementing the program?		x		x					x		3		The program implementation areas are free of unsecure conditions that can jeopardize achievement of outputs and outcomes at the present. Adequate coordination channels have been established with government institutions, and will continue throughout program implementation (corresponding indicators will be included in the M&E system). Coordination will facilitate the continuous assurance of public security through direct links with related protection authorities. See mitigation measures in S-1.
Subtotal legal risks											12		
Type of Risk: Economic													
Ec-1. Does the program fail to generate viable economic alternatives or conditions for the participation of key stakeholders, including individuals?		x		x					x		3		Awareness and capacity building activities through different components of the program will contribute to keep engagement and participation of key stakeholders and individuals. The continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change) will ensure the NIE and implementation organizations learn in advance any adverse condition leading to this risk, thus allowing to make adjustments in time to ensure a successful implementation and achievement of expected outputs/outcomes.

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
													M&E will include indicators to follow up on delivering viable economic alternatives/conditions generation as expected in the program. See mitigation measures in I-1.
Ec-2. Does the program lack of a component that provides some economic support to achieve a viable long-term success of the actions, processes and ensures continued environmental impacts from the program?		x	x							x	3		To ensure viable long-term success of the activities started by the program, the final design took into consideration economic (as well as material - technical – advisory) support for beneficiaries. Activities included for implementation incorporate developing and installing climate-smart / best practices; implementation arrangements will be secured to facilitate that will continue after the program ends. In this regard, it is especially important to note that the agriculture, cattle-rising, agri-business, water harvest, gallery forests and related activities will be implemented with the technical assistance of the MIDA and MiAmbiente, both of which have proven experience in extension initiatives to ensure sustained results beyond the programme end. M&E will include criteria to monitor achievement of improved economic conditions in beneficiaries. In case an external factor affects negatively expected economic alternatives, regular consultations will ensure a timely adjustment of planned investments. The learning component of the program will also promote capacity building in beneficiaries so they remain better prepared to respond to external effects. See also mitigation measures in I-1.
Ec-3. Is there a current or potential presence of land speculation arising from improving farms, attracting buyers who could transform land use or reverse the progress and achievements of the program?		x		x						x	4		No, but there is always a risk that once farms are improved, buyers could be attracted to make purchase offers. To mitigate this, specific criteria for choosing beneficiaries include, among other considerations, they have strong ties, and long term residence in the site (for example, family and socioeconomic connections in situ). Also, as part of the projects to be developed, special agreement (honorary) will be signed by F Natura and beneficiary, where he/she agrees to continue their commitment for long term proper management of farm (including not selling their estate at least in the short-medium term). Better preparedness to adapt to climate change impacts will contribute to increased income and socio economic condition of beneficiaries (that in turn, decreases probability of them wanting to sell their estate).
Ec-4. Is the population of the area influenced by factors of access to service facilities and job offers which makes them less interested in the program?		x	x						x		2		The target areas are mainly located far from cities or sources of job different from agricultural or primary production areas. In the program design, it was considered: i) the creation of improved sources of income (especially for agriculture, cattle-rising, agri-business) and wellbeing-better knowledge capacities, for making staying in the area attractive and beneficial for local population, and avoiding a decrease of farming activities while adapting to climate change. ii) the inclusion -in the M&E plan for the program- of a variable to follow up on factors in Ec-4 that may risk activities being implemented and achievement of program´s outputs/outcomes.
Subtotal economic risks											12		
Type of Risk: Organizational													
O-1. Is there insufficient involvement and coordination among institutions to maintain EWS, hydro stations, as well as the forest cover and ecosystem features that help prevent (among other impacts) floods and erosion?		x		x						x	4		To mitigate this risk, all AF and national guidelines and previsions have been carefully followed/observed since the beginning of the program design. It essentially includes establishing an effective, continued and strong communication mechanism with incumbent governmental institutions, local NGOs, local authorities in the program areas, all of which have agreed on the

Risks	Risk exist?		Probability				Impact				Risk Weight*	Risk Level	Mitigation Measures
	NO	YES	0	1	2	3	0	1	2	3			
													benefits of this program and are willing to continue participating and taking on follow up for lasting results. The M&E plan for the program will include variables to follow up on coordination of activities being implemented. See mitigation measures for E-7, E-8 and I-1, I-3, S-1.
O-2. Do implementing organizations lack the strengths, skills and institutional capabilities in administrative, financial and technical areas to implement the projects?		x		x						x	4		To prevent or mitigate the risk of scarce capabilities to implement the projects, implementing organizations will be selected on the basis of (among other criteria) their experience and capabilities implementing similar/related projects. On the side of the NIE, Natura Foundation has a long standing experience and capacity built in administration of similar/related projects. Also, once established the program´s team, and induction will be developed to ensure clear knowledge, expectations and goals to be achieved with this adaptation program. Finally, component 4 is aimed at creating / enhancing capacities, and improving professional and technical skills in locals regarding the causes, impacts and effects of climate change.
Subtotal institutional risks											8		

Table 45. Values of risks identified

Risks	Risk Weight subtotal	Risk Value**
Environmental		
Subtotal environmental risks (8 v)	24	0.5
Information		
Subtotal information risks (3 v)	8	0.44
Social		

Risks	Risk Weight subtotal	Risk Value**
Subtotal social risks (14 v)	45	0.53
Legal		
Subtotal legal risks (4 v)	12	0.5
Economic		
Subtotal economic risks (4 v)	12	0.5
Organizational		
Subtotal institutional risks (2 v)	8	0.66

** Risk value is the result of (risk weight subtotal) / (number of risk variables x 6 [max possible risk weight in scale]). The closer to 1, the higher caution and increased efforts should be invested to prevent failure in achieving program objectives.
Results suggest risk values are manageable through mitigation efforts as none is equal to, or near 1.

Table 46. Risks management plan

Risk Management Plan

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
Type of Risk: Environmental					

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
E-1 Could climate variability affect the production cycle of the project (eg. change of season or increased rainfall, extended dry season) and therefore the achievement of the expected quality, quantity and time? For example, would tree species to be planted be suffering an alteration in the project calendar (production of seedlings, planting date, and survival rate after planted?) Would rice crops be suffering for lack of water to allow expected yields?		To prevent negative impacts on the production cycle of the projects due to climate variability, the final design of all interventions will introduce the climate change perspective. Projects bidding documents and work plans must include observation to the dates of cultivation (according to MIDA guidelines), the use of species resilient to such variabilities, the strategic location in the farm crops distribution (considered in the farm management plans), the use of pilot low cost irrigation systems, among others.	FN Program coordinator FN Project officer	3rd quarter	To be reported monthly until completed
E-2. Could the adverse weather conditions affect the schedule for installing i) water harvest systems, ii) hydro-agro meteorological stations, iii) EWS?		Work plan for installation of water harvest systems, the hydro stations and EWS will schedule that this be carried out during dry season of the year. Work plans for implementation of these activities must comply with this requisite.	FN Program coordinator FN Project officer	4th quarter	To be reported monthly until completed
E-3. Are infrastructure elements (named in E-2) in zones susceptible to seasonal flooding or landslides, flooding rivers or other environmental phenomena that may affect the works?		Installation of these components will be carried out during dry season of the year. In addition, all bidding documents and contracts for works will comply with technical specifications to stand such potential adverse climate conditions. Class A contractors will be secured to develop highest quality execution of works.	FN Program coordinator FN Project officer	4th quarter	To be reported monthly until completed
E-4. Could the program generate adverse environmental impacts?		The program does not include activities that could generate significant environmental impacts. Nonetheless, specifications and all bidding documents and contracts for works will require that before starting any activities on the ground, required permits / authorizations / licenses are obtained from incumbent authorities. Technical specifications also will ensure that all feasible measures will be taken to prevent any adverse environmental impacts. During implementation, also will be ensured that incumbent state entities oversee compliance with national standards and specifications.	FN Program coordinator FN Project officer ETESA liaison person SINAPROC liaison person MiAmbiente liaison person MINSA liaison person	4th quarter through program end	To be reported monthly until completed
E-5. Are the program areas susceptible to fire (whether caused by human or natural actions)?		Areas located at the "Arco Seco" at the mid and lower parts of the Santa María river watershed are susceptible to fires -mainly caused by human actions (traditional practice to clear land plots from vegetation before planting new crops every year, that often go uncontrolled).	FN Program coordinator FN Project officer MIDA liaison person SINAPROC liaison person MiAmbiente liaison person	2th quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		To mitigate this risk, work plans for production and reforestation activities will introduce technical measures (such as reforesting at the beginning of rainy season, construction of land strips at the perimeter of plots and farms). Also, education measures will be implemented through the outreach mechanisms of the program to stay in touch with stakeholders, during public consultations, radio messages, etc.			
E-6. Could the presence of pests in the program areas affect the production process? (i.e. agroforestry systems, agro-silvo pastoral systems, rice / orchids crops)		It could be possible that pests may affect some of the production systems to be established. Every productive activity to be implemented by the program will include detailed technical specifications (with proper and proven techniques and measures) regarding pest prevention and control. For instance, the farm management plans will consider the proper variety of crops to reduce/avoid this risk (as intensive and large areas of a single crop is prone to pests' attacks); the use of natural species that prevent pests' presence; and if extremely necessary, the use of chemical products authorized by MIDA (using proper application techniques to prevent harm to human health).	FN Program coordinator FN Project officer MIDA liaison person MINSA liaison person MiAmbiente liaison person IDIAP liaison person	2th quarter through program end	To be reported monthly until completed
E-7. Could changes in the context (ex. large infrastructure projects, changing government policies, etc.) affect the relevance of the project to achieve the environmental goals set?		Continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change, which meets regularly) will ensure the NIE and implementation organizations learn in advance any change of context, thus allowing to make adjustments in time to ensure a successful implementation and achievement of expected outputs/outcomes. Regular coordination meetings as well as actions under output 4.1 will be monitored to include in agenda context analysis that could pose risk to the program.	FN Program coordinator FN Project officer National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed
E-8. The scale of the program is not appropriate in the context of the level of the threat and the pressure that is intended to address?		The M&E plan for the program will include a variable to follow up on pertinence of adaptation and resilience building of activities being implemented. Periodic meetings with beneficiaries and implementation partners will address also progress on program objectives and continued pertinence and proper (planned) scale to respond to pressures being addressed by the program. Continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change, which meets monthly) will ensure the	FN Executive Director and Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		NIE and implementation organizations learn in advance any inconsistencies of context, thus allowing to make adjustments in time to ensure a successful solution is achieved from implementation and expected outputs/outcomes are met. Regular coordination meetings as well as actions under output 4.1 will also be monitored to include in agenda context analysis that could affect effectiveness of the program at the proper scale.			
Type of Risk: Information					
I-1. Is there scarce information that prevents Natura Foundation to mitigate or take the risks to which it is exposed in the program?		A strategy to capture the experiences and lessons learned will be implemented as soon as the program starts (as stipulated in the proposal). Also, a programme strategy to promote knowledge sharing across the different components must be monitored to ensure that: a) the climate change national committee remains the technical advisory instance for the programme; a knowledge subcommittee within the Climate Change National Committee is established, whose purpose will be to permanently look for information and knowledge pieces that could be derived from the different programme activities. b) the overall work plan for the Programme includes explicit and periodic milestones to share advances/limitations among programme partners and projects staff. c) RBM recommendations are observed, the M&E process is launched in a very initial stage of programme implementation, and captures lessons learned from the very beginning and introduces adjustments in the plan as needed. d) The knowledge sharing process is fed by systematization of adaptation experiences described in output 4.4. e) operative/functional communication channels are established with existing local governance instances, particularly Watersheds Committees,	FN Executive Director and Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions, as well as learn any change in context. f) Reporting documents at all levels (program partners, project staff, consultants) include the requirement of documenting interactions with stakeholders, coordination meetings with government and nongovernment partners during the implementation of the contract/agreement and outline knowledge products envisioned or limitations to reach those.			
I-2. Is there insufficient information that prevents the implementing organizations to mitigate or take the risks to which it is exposed in the program?		See mitigation measures included for Risk I-1. Comprehensive available information about climate related issues faced by the country delivered to Fundacion Natura by key government institutions related to the program´s proposed activities will be shared with implementing organizations. In addition, after the program is completed, all stakeholders will count on an adaptation knowledge platform than will foster effective and wide-ranging info on adaptation, lessons learned, and a national system for climate data (that will monitor hydro meteorological activity as well as the effectiveness of adaptation efforts).	FN Executive Director and Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed
I-3 Other information risks: The most vulnerable population does not learn in time (nor have the time or conditions) to travel and attend meetings programmed by Fundacion Natura or program´s implementing organizations		To prevent this, Fundacion Natura will ensure a budget line (as it was stated in the proposed program´s budget) in implementing organizations contracts, specially to provide travel stipend or similar means to vulnerable population. Also, radio ads and programs will be made in order to inform ahead of time when meetings or other coordination will be developed in program areas.	FN Program coordinator FN Project officer Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed
Type of Risk: Social					
S-1. Is the program in an area of actual or potential conflicts over natural (land, water) resource use?		Current / potential conflicts at the local scale of the program (especially present at the Chiriqui Viejo river watershed) are about water resource uses. To address conflicts in the medium – long terms at the program target areas and national level, the National	FN Executive Director and Program coordinator FN Project officers National Committee for Climate Change	1rst quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		government has already started a dialogue in the process for establishing the National Plan for Water Security. Because of this, the proposed program ***is not intended to solve*** existing / potential conflicts among stakeholders in this regard. The proposed program to the AF will do influence the conflict situation by generating tools and information to create a science-policy interface (technical information that will be made available to inform the dialogue, for all participants in an equal access basis). This is i) to help involved individuals to broaden their views toward a common solution to conflict; and ii) support incumbent authorities and stakeholders to count with scientific tools (component 2) to plan and make informed decisions (with a systematic approach) on water uses respecting environmental flows and the integrity of watercourses. Also, operative/functional communication channels will be established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions, as well as learn any change in context. The communication and exchanges among stakeholders during implementation of the program (for example, through quarterly meetings to review progress on implementation) will foster better mutual understanding. The proposed program will include a participatory and IWM course emphasizing conflict management skills to create capacities in stakeholders to better deal with this situation. Finally, during design of technical specifications for every activity to be implemented near conflict areas (no project will be planned-carried out with conflicting persons), it will be included a requirement for implementation organizations to report to Fundacion Natura conflict issues over natural resource uses no later than 24 hours after learning about them. This will help taking timely action through incumbent national authorities.	Implementing partners and organizations Beneficiaries		
S-2. Are there tense situations between stakeholders needed to be solved to implement the program?		Idem.	Idem	Idem	Idem

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
S-3. Does the local workforce lack the necessary profile to implement the program?		To prevent any knowledge/skills gap to be able to implement all the components of the program, it has been included an induction for personnel at the beginning of the program implementation. This includes local workforce at the technician and management level (even at the local promotion agents). Recruiting specifications will include criteria to be met on knowledge and skills required for program implementation. Also, a series of courses will be offered to help build better local capacities to ensure continued and successful results from activities.	FN Executive Director and Program coordinator Implementing partners and organizations	1rst quarter through program end	To be reported monthly until completed
S-4. Is there an adequate level of training of involved individuals and communities to implement the program? Consider, skills training and the ability to react proactively to address the problems that can be encountered in implementing the program.		The program will include a variety of people with a very diverse academic background. At the communities for instance, there are people with elementary, middle and high school mainly. A small percentage is also illiterate. The program will hire local communities' individuals as program promoters. These personnel will be trained when hired, and knowledge assessed in order to fill any gaps. Also to make them familiar with every detail of the program and expected tasks from them to ensure a successful program implementation and coordination with communities.	FN Program coordinator Program officers Implementing partners and organizations	1rst quarter through program end	To be reported monthly until completed
S-5. Are key actors or beneficiaries highly unlikely to continue in the process of the program in the short, medium and long term?		Disengagement of key actors and beneficiaries once the program is over will be prevented since the program has included a series of mechanisms for improved awareness and professional and technical skills in local people regarding the causes, impacts and effects of climate change (mainly component 4 and activities from components 1, 2 and 3). Behavioral change will be induced throughout implementation of the different projects, toward climate change preparedness; as will generate better living conditions and higher income (thus creating interest to keep on such good practices). Monitoring and evaluation system will include proper means to follow up likeliness/readiness of beneficiaries to continue beyond program´s end.	FN Program coordinator Program officers Implementing partners and organizations	Every other quarter through program end	To be reported every other quarter until completed
S-6. Are there current or potential projects (hydropower, mining, roads, or other) that could transform the land use and thereby affect the		Currently there is no envisioned large projects in the program areas that could affect participation of beneficiaries.	FN Executive Director and Program coordinator FN Project officers	1rst quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
participation of direct or indirect beneficiaries of the program?		The monitoring and evaluation system will include proper means to follow up likeliness for such projects to happen nearby the program sites, in order to respond readily to the situation. Should this situation develop, effective interagency coordination among incumbent authorities will allow making arrangements not to affect farms or sites included in the projects. The information exchanges and delivery of quarterly meetings with beneficiaries and stakeholders will bring opportunity for updated plans on any of such large projects if it happened.	National Committee for Climate Change Implementing partners and organizations Beneficiaries		
S-7. Could there be social or behavioral patterns resulting from the presence of labor introduced through the projects (mentioned in S-6) that could transform land-use and bring problems to communities that may affect the program implementation and the intended transformation?		Idem (effective interagency coordination among incumbent authorities will allow making arrangements not to affect farms or sites included in the projects; and information exchanges and delivery of quarterly meetings with beneficiaries and stakeholders will bring opportunity for updated plans on any of such large projects if it happened).	Idem	Idem	Idem
S-8. Is there a lack of leadership in the program areas, especially amongst the young people, that might affect the program?		The knowledge exchange strategies included in the program design (especially component 4) have taken into account a strong focus on several audiences including young people. Besides those activities, the program will ensure that during socialization activities regarding vulnerability analyses and other studies for watersheds, a critical mass of young people will be included and participate. Also, special consideration will be given when distributing knowledge materials (compilations and articles on adaptation to climate change for example). Finally, young participants will be included in training events on the use of the portal for different audiences (producers, institutions, academic, etc.).	Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed
S-9. Are the communities and beneficiaries of the program indifferent to the problems that affect them in order to find solutions?		Local communities and potential beneficiaries are open to the problems that currently affect them due to climate variability and change; so there is little probability of lack of empathy. To mitigate such situation to happen during implementation, a baseline survey will be conducted on the level of awareness in the target population about impacts and the climatic cause of the problem to be addressed by the program. From the survey data results,	Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		information materials will be generated and distributed to begin filling the knowledge gaps identified. From the beginning, meetings and workshops will be held, and printed materials distributed to inform stakeholders about the objectives of the program.			
S-10. Can a lack of partners for the program (that can take a leadership role and mobilize action to create local cohesion and participation to the program and its processes), be possible?		Fundacion Natura will include in specifications for contracting implementation organizations, that these (Non-governmental organizations -NGOs) have experience working in target areas preferably; that they have developed leadership roles in projects it has carried out; and that they hire local personnel with leadership talent, among others. The Climate Change National Committee will remain the technical advisory instance for the programme. The overall work plan for the Programme will include explicit and periodic milestones to keep informed and share advances/limitations among programme partners. These will include Local government bodies (they participated during general consultation and expressed their willingness to participate in the proposed processes and some even provided support letters submitted to the AF). The M&E process will follow up participation of partners (of several contexts). Operative/functional communication channels will be established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions. Reporting documents at all levels (program partners, project staff, consultants) will include the requirement of documenting interactions with stakeholders, and coordination meetings with government and nongovernment partners during the implementation of the contract/agreements. In the program design, also participated incumbent institutions (for example, MIDA, MiAmbiente, SINAPROC, ETESA) that will remain partners during program implementation and have specific roles to play. Finally, in order to keep interaction and communication channels with community beneficiaries, the program will count on local promoters (hired from the same	FN Executive Director Program coordinator Project officers / staff National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		communities); these will remain in the communities with capacities built to continue making positive impacts during and well after program completion.			
S-11. Are there no conditions for the empowerment and leadership of communities, organizations and / or key individuals -with gender considerations- after completion of the processes provided from the Natura Foundation?		See mitigation strategies in S-8, S-9, and S-10.	Same as in S-8, S9, and S10.	Same as in S-8, S9, and S10.	Same as in S-8, S9, and S10.
S-12. Is there a scarce inclusion of prior, free and informed stakeholders at the various stages of design or implementation of the program?		Since the lack of proper inclusion of stakeholders would pose a high risk of negative impact on the program, this has been a matter of outmost importance since the design of the program (and expected to be properly dealt with during implementation). All interventions were designed based on several previous planning and consultation processes at the national level (National Plan for Water Security, National Plan for Energy, National Pact for Agriculture, National Plan for Integrated Water Resource Management) and regional/local level (Chiriqui Viejo and Santa Maria River Management Plans, Conservation Area Plan for Gallito Microwatershed and Caisán Subwatershed). These processes were designed based on the views and recommendations of informed stakeholders. See mitigation strategies in S-10.	FN Executive Director Program coordinator Project officers / staff National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed
S-13. Is there any indigenous population in the area of program implementation that would require further efforts to ensure its proper participation?		It was confirmed during public consultations that no indigenous communities are located in the area of the program implementation. However, there are indigenous people who are part of the inhabitants of the area. The majority are indigenous who temporarily reside in the area; do not settle in a permanent place but take advantage of any job opportunity that is presented. The M&E system will include reporting on any change of this situation (for example, that indigenous families migrate to program implementation areas), and will include strategies to ensure its proper participation.	Program coordinator Project officers / staff Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported quarterly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
S-14. Is there a potential lack of receptivity to the information and activities generated by the program due to absence of awareness, among the beneficiary institutions and stakeholders, about the climate related origin of the problem, instead of considering it is a result of deficient management of natural resources?		See mitigation measures in S-1. A baseline survey will be conducted on the level of awareness in the target population about impacts and the climatic cause of the problem to be addressed by the program. From the survey data results, information materials will be generated and distributed to begin filling the knowledge gaps identified. From the beginning, during the programmed inception workshops, it will be clearly stated that the program ***is not intended to resolve the conflict***, but to provide technical information for the discussion that will address this conflict. From day 1, meetings and workshops will be held, and printed materials distributed to inform stakeholders about the objectives and what the program will and will not address.	FN Executive Director and Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed
Type of Risk: Legal					
L-1. Is the area of the program suitable and free from conflicts over land tenure? Or it isn´t?		The area of the program is free from such conflicts. If this sort of conflict arises, and it could affect implementation of the program, the risk will be mitigated by requiring (as a condition in all technical specifications/contracts with implementing organizations) that all permits and compliance regulations be met -including verification of land property rights (for on the ground delivered products, such as installation of EWS, water harvest systems, hydromet stations, agroforestry/ silvo pastoral systems). The M&E system will include reporting on any change of this situation, and will include further strategies to address risks.	Program coordinator FN Project officers Implementing partners and organizations	1rst quarter through program end	To be reported every other quarter until completed
L-2. Could the lack of an environmental license to implement the program in any or all phases affect its performance?		To prevent this risk (which would have a high impact on the program implementation), incumbent authorities - most of them responsible for ensuring compliance with environmental license- have been involved from the design of the program; and will remain as partners during implementation (members of the National Committee for Climate Change). Compliance with all required licenses / permits will be a pre-requisite for any disbursement in order to implement projects activities (and will be mandatory in every term of reference and contract with implementing partners – organizations).	Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported quarterly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		See measures in I-1 on information and knowledge sharing to ensure communication (as timely communication will ensure no regulations are ignored).			
L-3. Are permits and / or required licenses in the different phases of the program clearly identified? Can these not be obtained or fulfilled on schedule, and within the scope, and budget of the program?		Required licenses / permits for building and productive activities* ***similar*** to those in the proposed program implementation have been identified. They include environmental impact studies, municipal permits for construction, water extraction permits. However, according to Executive Decree 123 of 14 August 2009 (by which the Chapter II of Title IV of Law 41 -General Law for Environment- is regulated), ***none of the activities proposed in the adaptation program*** requires an Environmental Impact Study -given its nature (not included in the fixed list of activities requiring it) or scope (the proposed activity is of smaller scale than indicated in the list). Even so, when implementing these activities, rigorous observation of environmental criteria to prevent negative impacts will be followed (and required in terms of reference). Other requirements identified above will be complied with and have been taken into account in the budget. ** Refers to on the ground delivered products, such as installation of EWS, water harvest systems, hydromet stations, agroforestry/ silvo pastoral systems.*	Program coordinator Project officers Implementing partners and organizations	1rst quarter through program end	To be reported quarterly until completed
L-4. Are there inadequate public security conditions for implementing the program?		The program implementation areas are free of unsecure conditions that can jeopardize achievement of outputs and outcomes at the present. Adequate coordination channels have been established with government institutions, and will continue throughout program implementation (corresponding indicators will be included in the M&E system). Coordination will facilitate the continuous assurance of public security through direct links with related protection authorities. See mitigation measures in S-1.	FN Executive Director and Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed
Type of Risk: Economic					
Ec-1. Does the program fail to generate viable economic alternatives or conditions for the participation of key stakeholders, including individuals?		The program has been designed based on several previous consultation processes that respond to local needs (including of economic nature), to prevent this risk from the program design stage (for example, viable economic alternatives include agroforestry / silvo pastoral systems, as well as orchids production – sale).	Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations	1rst quarter through program end	To be reported quarterly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		During the final general consultation with stakeholders, these activities were confirmed to be suitable and attractive enough to ensure successful involvement and commitment from local stakeholders. Awareness and capacity building activities through different components of the program will contribute to keep engagement and participation of key stakeholders and individuals. The continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change) will ensure the NIE and implementation organizations learn in advance any adverse condition leading to this risk, thus allowing to make adjustments in time to ensure a successful implementation and achievement of expected outputs/outcomes. M&E will include indicators to follow up on delivering viable economic alternatives/conditions generation as expected in the program. See mitigation measures in I-1.	Beneficiaries		
Ec-2. Does the program lack of a component that provides some economic support to achieve a viable long-term success of the actions, processes and ensures continued environmental impacts from the program?		To ensure viable long-term success of the activities started by the program, the final design took into consideration economic (as well as material - technical – advisory) support for beneficiaries. Activities included for implementation incorporate developing and installing climate-smart / best practices; implementation arrangements will be secured to facilitate that will continue after the program ends. In this regard, it is especially important to note that the agriculture, cattle-rising, agri-business, water harvest, gallery forests and related activities will be implemented with the technical assistance of the MIDA and MiAmbiente, both of which have proven experience in extension initiatives to ensure sustained results beyond the programme end. M&E will include criteria to monitor achievement of improved economic conditions in beneficiaries. In case an external factor affects negatively expected economic alternatives, regular consultations will ensure a timely adjustment of planned investments. The learning component of the program will also promote capacity building in beneficiaries so they remain better prepared	Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		to respond to external effects. See also mitigation measures in I-1.			
Ec-3. Is there a current or potential presence of land speculation arising from improving farms, attracting buyers who could transform land use or reverse the progress and achievements of the program?		No, but there is always a risk that once farms are improved, buyers could be attracted to make purchase offers. To mitigate this, specific criteria for choosing beneficiaries include, among other considerations, they have strong ties, and long term residence in the site (for example, family and socioeconomic connections in situ). Also, as part of the projects to be developed, special agreement (honorary) will be signed by F Natura and beneficiary, where he/she agrees to continue their commitment for long term proper management of farm (including not selling their estate at least in the short-medium term). Better preparedness to adapt to climate change impacts will contribute to increased income and socio economic condition of beneficiaries (that in turn, decreases probability of them wanting to sell their estate).	Program coordinator FN Project officers Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported quarterly until completed
Ec-4. Is the population of the area influenced by factors of access to service facilities and job offers which makes them less interested in the program?		The target areas are mainly located far from cities or sources of job different from agricultural or primary production areas. In the program design, it was considered: i) the creation of improved sources of income (especially for agriculture, cattle-rising, agri-business) and wellbeing-better knowledge capacities, for making staying in the area attractive and beneficial for local population, and avoiding a decrease of farming activities while adapting to climate change. ii) the inclusion -in the M&E plan for the program- of a variable to follow up on factors in Ec-4 that may risk activities being implemented and achievement of program´s outputs/outcomes.	Program coordinator FN Project officers Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported every other quarter until completed
Type of Risk: Organizational					
O-1. Is there insufficient involvement and coordination among institutions to maintain EWS, hydro stations, as well as the forest cover and ecosystem features that help prevent (among other impacts) floods and erosion?		To mitigate this risk, all AF and national guidelines and previsions have been carefully followed/observed since the beginning of the program design. It essentially includes establishing an effective, continued and strong communication mechanism with incumbent governmental institutions, local NGOs, local authorities	FN Executive Director Program coordinator FN Project officers National Committee for Climate Change	1rst quarter through program end	To be reported monthly until completed

Risk description	Risk	Mitigation measures	Responsible person	Planned completion	Status
		in the program areas, all of which have agreed on the benefits of this program and are willing to continue participating and taking on follow up for lasting results. The M&E plan for the program will include variables to follow up on coordination of activities being implemented. See mitigation measures for E-7, E-8 and I-1, I-3, S-1.	Implementing partners and organizations Beneficiaries		
O-2. Do implementing organizations lack the strengths, skills and institutional capabilities in administrative, financial and technical areas to implement the projects?		To prevent or mitigate the risk of scarce capabilities to implement the projects, implementing organizations will be selected on the basis of (among other criteria) their experience and capabilities implementing similar/related projects. On the side of the NIE, Natura Foundation has a long standing experience and capacity built in administration of similar/related projects. Also, once established the program´s team, and induction will be developed to ensure clear knowledge, expectations and goals to be achieved with this adaptation program. Finally, component 4 is aimed at creating / enhancing capacities, and improving professional and technical skills in locals regarding the causes, impacts and effects of climate change.	Program coordinator FN Project officers National Committee for Climate Change Implementing partners and organizations Beneficiaries	1rst quarter through program end	To be reported quarterly until completed

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Table 47. Risk rating matrix

Risk rating matrix			
PROBABILITIES	**IMPACT**		
	Minor	**Moderate**	**Major**
Likely	**Risk Level 1**	**Risk Level 2**	**Risk Level 3**
Possible	**Risk Level 1**	**Risk Level 2**	**Risk Level 2**
Unlikely	**Risk Level 1**	**Risk Level 1**	**Risk Level 2**

RISK LEVEL	RATING KEY – RISK LEVEL DESCRIPTION
3	**MAJOR - Intolerable Risk Level** **Immediate Action required to reduce risk to a broadly acceptable level and monitoring**
2	**MODERATE - Tolerable Risk Level** **Action required to reduce risk to a lower level within a reasonable time period or close monitoring**
1	**MINOR - Inconsequential Risk Level** **Periodic monitoring required.**

According to the ESP guidelines and the identified risks, the proposed programme is considered to fall in category B (programmes/projects with potential adverse impacts that are less adverse than Category A) with potential small adverse environmental or social impacts that would be easily mitigated.

The potential impacts were identified jointly with key stakeholders during the consultation process, in order to include in the project implementation arrangements and actions to prevent or mitigate them through a risk management plan.

Sources and current status of conflicts among water users; and strategies that the project will follow to cope with such conflicts

Conflict among water users is a particularly sensitive issue in the CHVRW. MiAmbiente has initiated processes to suspend some water concessions for hydropower generation granted during previous administrations, but this is not perceived by some local organizations as sufficient strong measures. A dialogue process “Mesa de diálogo” initiated a couple of months ago, is the participatory instance recognized by the parties. Consultations for the Water Security Plan conducted provided also room for some discussions in this regard.

The AP strategy to cope with this latent conflict scenario is based mainly in the communications strategy by continuously reinforcing the following key messages:

- Clarifying the objective and scope of the Programme, emphasizing the orientation to generate technical evidence to support decision-making processes in the water, energy and agriculture sector. The AP is not aimed to replace the existent dialogue instances, but to deliver timely information derived from program activities to feed/illustrate the debate. The AP will not look to participate as a member in the “mesa de diálogo”.
- Even the AP includes the energy dimension as part of the Nexus Approach, the Programme does not promotes major hydroelectric development, since it has been denounced as harmful for environmental sustainability. Nevertheless, the AP will not either undertake opposition actions to the hydro sector. AP role is to produce and disseminate technical information and recommendations to improve water licensing process based in climate information and data generated by the project.
- Make clear the AP governance, describing Fundacion Natura´s role as Program Leader and responsible for program management and accountability, with the participation in equal conditions of MiAmbiente and MIDA as institutional partners, and other implementing partners.
- Establish a direct communication channel between AP Program Coordination and the Energy National Plan (PEN for its initials in Spanish) and the Water Security Plan to enable that technical inputs from both processes feed the AP and vice versa.

- Generate and disseminate technical information about renewable sources of energy and how these sources relate to climate change adaptation and are affordable solutions for small landholders (1.5b, 4.5c)
- The AP Programme will include a specialized technical advisory to provide recommendations to improve programe implementation regarding potential conflicts, means of solution and foster knowledge sharing among the programme components. This advisory is not envisioned as a permanent or evaluation service, but as punctual interventions as part of a quality assurance control of the adaptation process. The advisor will use special techniques, particularly the "hearing process" used in the REDD Pogramme in Panama, which proved to be a useful methodology to facilitate implementation during sensitive moments of the programme. The advisor will present recommendations directly to Program Coordination and Fundación Natura management staff.

Special considerations regarding the approach and engagement of indigenous population in the project implementation

(see also information provided in B5)

Consistency of the Program with UNDRIP, and particularly regarding Free, Prior, Informed Consent (FPIC) during project/program design and implementation.

Public queries were held in which the entire population (the different ethnic groups) of the areas where the program will be implemented were invited and a call in the Santa Fe sector for the indigenous ethnic group that permanently or temporarily resides in the Program's advocacy area.

The call for the indigenous ethnicity workshop was made through the Ministry of Agricultural Development (MIDA) and La Esperanza de Los Campesinos Cooperative as well as through other NATURA Foundation partners.

In the work group for the query done to the indigenous persons that live in the area of implementation of the Program, permanently or temporarily, the presentation was made in a participatory manner with images and photographs of the work that was done in the area to have a more effective communication system, more understandable among the participants and we also had the support of translation for those who had difficulty understanding in Spanish (specifically for women). This system provides an opportunity for participants to exert an influence on the proposed activities of the Program through a peer-to-peer dialogue between the partners.

In these public queries the scope of the whole project was presented with its activities as well as its purpose, duration and areas where the program will be implemented. It was indicated that the program will select partners with equitable and fair benefits. Indigenous people residing in the Program area may participate on equal terms with other residents of the area.

Likewise, it was indicated that the proposal of the Program that will be presented to the Adaptation Fund proposes to include the community promoters from the area in particular that are of indigenous ethnicity as long as they fulfill the requirements that are needed. 16 women and 10 men participated in the query.

Involvement of indigenous people in the design and the implementation of the project/program, and detailed outcomes of the query process of the indigenous people

(See Annex 3 for details of the results of the indigenous ethnicity queries)

Among the main points highlighted are:

- The permanent or temporary indigenous resident population in the communities surrounding the Santa Fe area actively participated in the workshops discussing the different issues that were mentioned.
- The indigenous population of the communities surrounding the area of Santa Fe actively participated in the workshops.
- The participation was mainly of indigenous women.
- The majority indicated that women should be trained to strengthen them.
- There have been changes in the agricultural cycle, increase of plagues and diseases, dry rivers and before there was more production, now it costs more to produce. Also the migration of the settlers to the urban areas in search of work.
- Among the consulted were day laborers, housewives and subsistence farmers.
- Those participants who have land to cultivate indicated that they intend to participate in the Program.
- The query revealed that there isn't an indigenous community in the area of program implementation; however, there are indigenous people who are part of the inhabitants of the area. The majority are indigenous who temporarily reside in the area; do not settle in a permanent place but take advantage of any job opportunity that is presented. This results in the majority living with some relatives, in temporary shelters or acquiring small areas of land to build their home without having land to use for production.

Documented evidence of the mutually accepted process between the project/program and the affected communities and evidence of agreement between the parties as the outcome of the negotiations

A signed agreement is not presented since the indigenous people are part of the inhabitants of the area of incidence of the program and not as a closed community between them.

Summary of any reports, specific cases, or complaints that have been made with respect to the rights of indigenous peoples by the Special Rapporteur and that are relevant to the program (the proponent may refer to the guidance document for implementing entities on compliance with the Fund's ESP; available at: https://www.adaptation-fund.org/document/guidance-document-implementing-entities-compliance-adaptation-fund-environmental-social-policy/

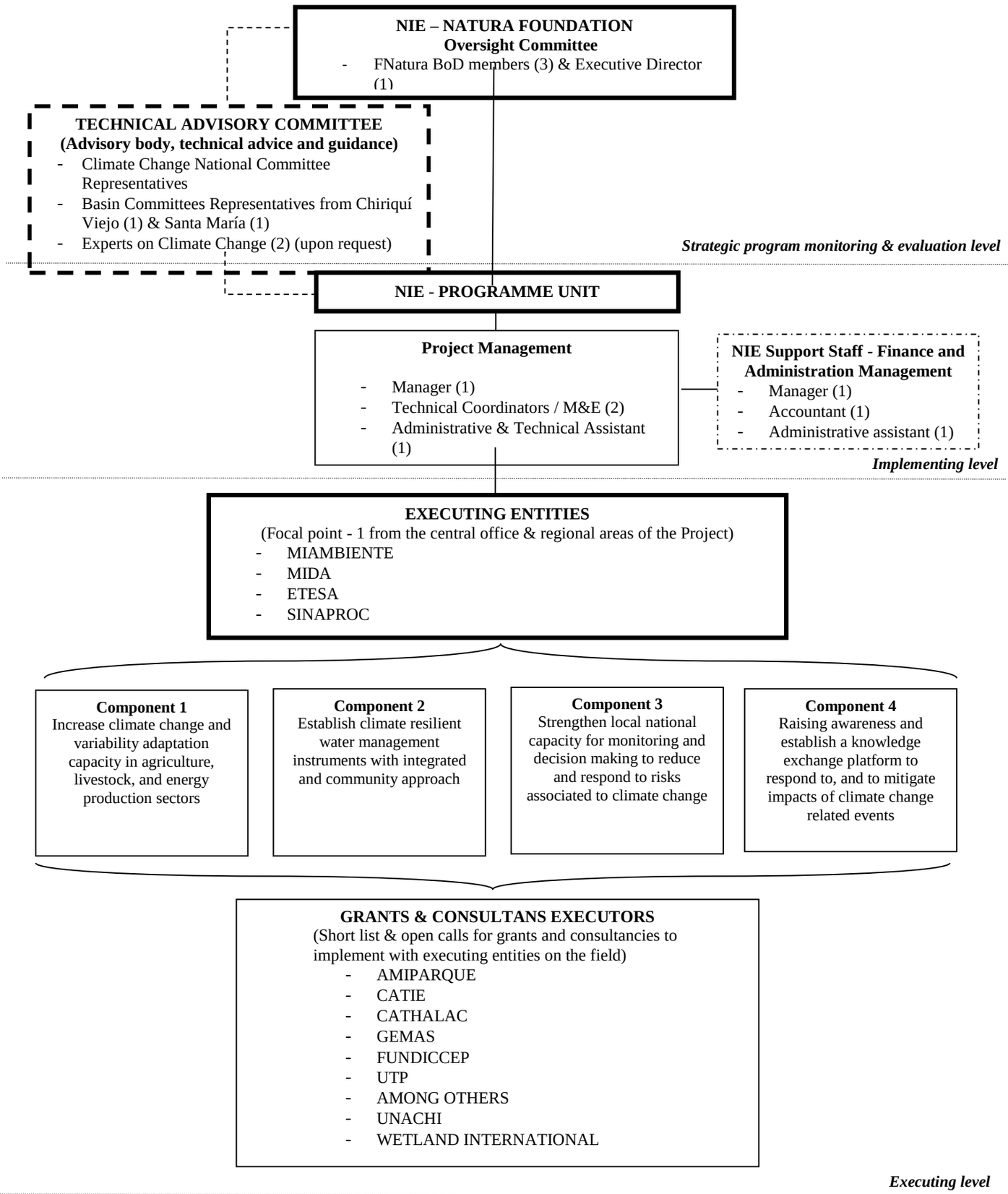
Queries were held with different government agencies and NGOs working in the area to verify if there are reports of indigenous safeguards indicating that there have been no reports of indigenous safeguards in the project area.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project/programme implementation

Institutional arrangements were reviewed and include the feedback from the consultation process. Institutional arrangements are organized in three levels, which include: strategically program monitoring, implementing level, execution level. The figure 5 below presents also the structure for operation and the relation with partners and other stakeholders identified during the consultation process.

Figure 5 Institutional arrangements



A1. Institutional arrangements at the implementing level

a) **Programme Oversight Committee:** integrated by three members of the Board of Trustees of Natura and the Executive Director of Natura.

This committee of will monitoring strategically the program, in order to follow up the compliance of the terms and contractual agreements acquired by the Natura Foundation as NIE. A quarterly technical and financial report prepare by the Programme Unit will be reviewed by this committee and feedback will be provided if needed. This Committee will be responsible as well to approve annual reports, annual work plan and budget prepared accordingly with the program contractual arrangements with the Adaptation Fund.

b) **Programme Unit Management:** Located in F. Natura Foundation will be integrated by the staff involved directly in the daily execution, monitoring and evaluation of the programme. This staff is identified in two groups: project staff responsible of the monitoring and evaluation of the program and support staff responsible to provide administrative, financial and technical support to the programme unit.

c) **Technical Advisory Committee**: Is an external arrangement identified during the consultation process. Is a consultation body to the Oversight Committee and the Programme Unit Management. This committee will provide technical review and guidance to include adjustments, when appropriate, and feedback during the preparation of the annual planning, procuring the objectives achievement following the overall vision of the programme. Will be established with participation of representatives at institutional level and at local level, as follows:

- **Climate Change National Committee Representatives:** will participate under a representative delegation to provide technical advice and interinstitutional coordination, through the program implementation. The Climate Change Committee was created in Panama under an Executive Decree No.1, 2009. The composition of this committee is:

  - Ministry of Environment (MiAmbiente - Permanent Presidency)
  - Ministry of Economy and Finance (MEF)
  - Ministry of Agricultural Development (MIDA -Vice Presidency 2014 - 2015)
  - Ministry of Health (MINSA)
  - Ministry of Education (MEDUC)
  - Ministry of Commerce and Industries (MICI)
  - Ministry of Public Works (MOP)
  - Ministry of Social Development (MIDES)
  - Aquatic Resources Authority of Panama (ARAP)
  - Institute of Agricultural Research of Panama (IDIAP)

- National Secretariat of Science, Technology and Innovation (SENACYT)
- National Civil Protection System (SINAPROC)
- University of Panama (UP)
- Technological University of Panama (UTP - Secretariat 2014 - 2015)
- Panama Canal Authority (ACP)
- Secretariat of Energy
- Electric Transmission Company
- Ministry of Foreign Affairs (MINRE)
- Civil Aeronautics Authority (AAC)
- Panama Maritime Authority (AMP)
- Ministry of Housing and Territorial Ordering (MIVIOT)
- Authority of Tourism (ATP)
- National Aqueduct and Sewer Institute - IDAAN
- Public Services Authority - ASEP
- Commission on Population, Environment and Development of the National Assembly
- Transit Authority and Land Transport - ATTT
- National Land Authority - ANATI

Participation of the CCNC representatives in the Technical Advisory Committee will be established accordingly to the engagement of the institutions with the correspondent AP components. The CCNC in plenary will be convened periodically as part of the M&E programme.

Note: Regarding the Technical Advisory Committee (TAC) and to avoid any conflict between the members of the Climate Change Committee and the executing entities, when an issue to be discussed by the TAC is related to a Climate Change Committee member with an execution responsibility, that entity will abstain to take part on that specific session.

- **Basin Committees for Chiriquí Viejo and Santa María (two participatory structures at local level):** Basin Committees for Chiriquí Viejo and Santa María. These community structures will provide feedback for the AP implementation to establish communication and implementation actions at the local level, as appropriate. During the life of the AP they will participate in the Advisory Committee through a representative for each basin.

A2. Institutional arrangements at the executing level

Arrangements for Program Implementation based on Potential Executing Entities

Figure 6 Arrangements with potential EE per component

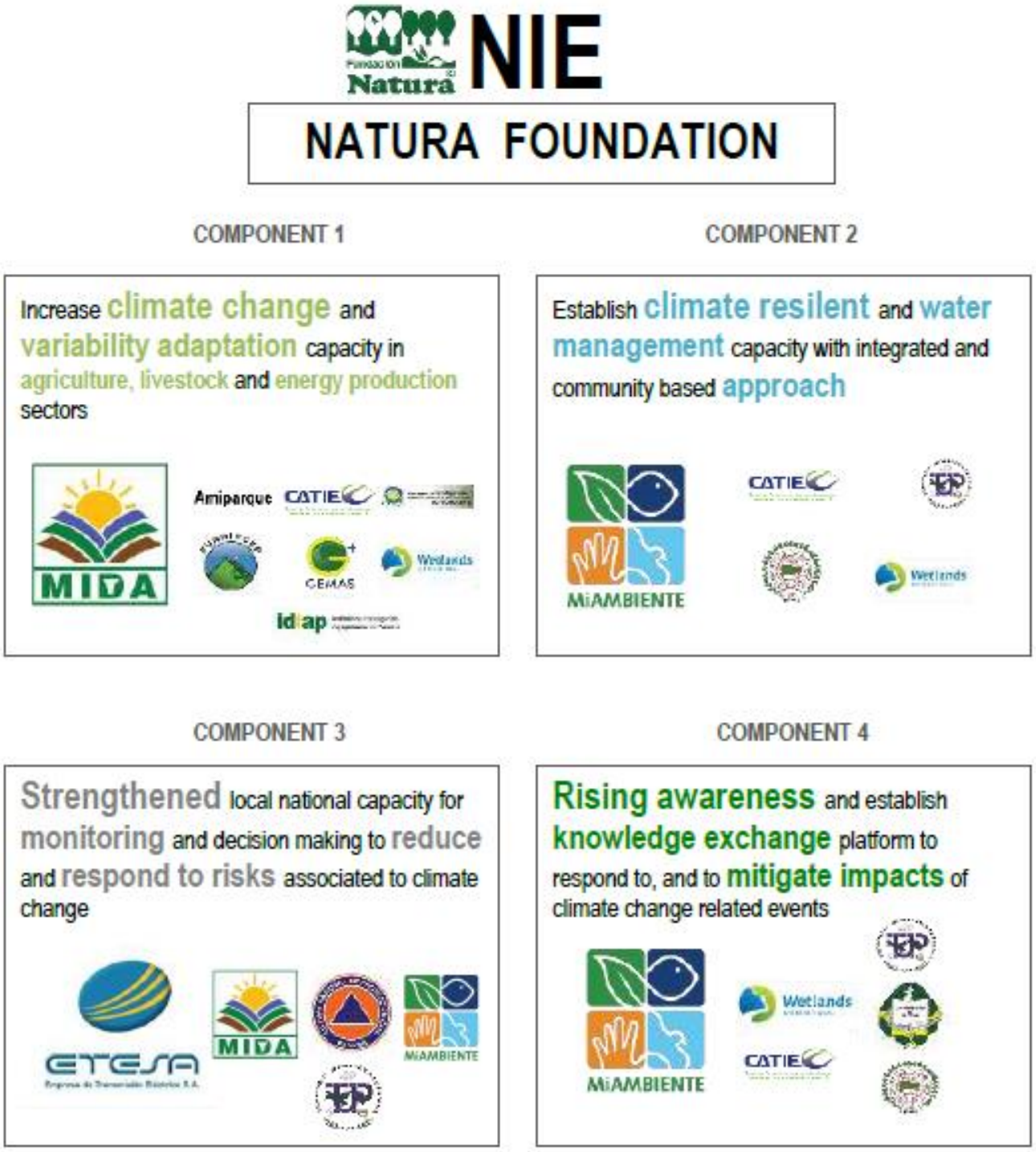


Table 48. Institutional arrangements based on potential executing entities and role of NIE.

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
1. Increase climate change and variability adaptation capacity in agriculture, livestock, and energy production sectors					
Output 1.1	Concrete adaptation measures implemented for household water security	a) Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems.	FUNDICCEP CATIE GEMAS Wetlands International	Grant call and contract follow up	Grant
Output 1.2	Pilot climate-smart farming projects implemented	a) Implementation of agroforestry and soil conservation in 20 farms located in the district of Renacimiento and establishing reforestation for protection of watercourse. This activity includes identification los sitios en el distrito de Renacimiento (Caisán, Río Sereno, Renacimiento) to results from the Vulnerability Analysis, Farm Management Plan (with identification of species, crops/area zonification, costs) and the design	FUNDICCEP CATIE GEMAS	Grant call and contract follow up	Grant
		Development of Farm Management Plans (PMF) in 20 farms			
		Implementation of agroforestry and soil conservation in 20 farms / 40 ha (located in the Renacimiento district.			

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		Harvesting, marketing, infrastructure (silos, dryers), preparation of cost or production, selling price, profit margin is included, quality control and establishment of business agreements (coffee beans). Includes 2 community promoters			
		Facilitating access to climate-resistant seeds with 2 demonstration plots (coffee)	MIDA IDIAP	Procurement support	Agreement
		Establishment of gallery forests 6,000 seedlings (6,000 linear meters) of streams of the river Caisan (CHVRW) (establishment and maintenance)	FUNDICCEP	Grant call and contract follow up	Grant
		Preparation of planting schedule for coffee and rice	MIDA IDIAP	Procurement support	Agreement
		Training plan of pest control techniques, shade coffee system	EE selected to implement agroforestry systems. Possible: FUNDICCEP CATIE	Grant call and contract follow up	Grant
		b) Establish irrigation systems, with efficient and low cost technologies, to enhance agricultural production and increase crops yields. This includes: irrigation needs diagnostic; installation of pilot low cost irrigation system; technical assistance to farmers and companies for the	MIDA IDIAP	Procurement support	Agreement

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		implementation of the irrigation system; and monitoring and evaluation. It also includes -at Divalá-, a complement to the irrigation system consisting of an analysis of the water footprint for rice crops, which will allow identification of technological schemes for climate-smart rice production.			
		Irrigation needs analysis (consultant / including Sys. Irrigation installation)		Consultancy selection and contract follow up	Consultancy
		Installation of low-cost irrigation systems			goods + services
		Maintenance			Services
		Technical Assitance			Consultancy
		Training Plan (4 workshops and 2 exchanges)			Goods + Services
		Analysis of the rice water footprint and identification schemes for climate smart rice production			Consultancy
Output 1.3	Pilot diversified financing and income source models implemented in vulnerable population areas	a) Implement the strategic action of agroforestry - soil conservation systems	CATIE GEMAS AMIPARQUE	Grant call and contract follow up	Grant
		Development of Farm Management Plans (FMPs) in 40 farms; It includes soil analysis			
		Implementation of agroforestry and soil conservation in 200 ha in CRSM (coffee). It Includes 2 community promoters			
		Training plan			

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		b) Implement the strategic action of creating capacities for operating orchid and "naranjilla" crops, as well as establishing the correspondent commercialization scheme at CRSM. It includes training on establishment and management of orchid and "naranjilla" crops; design of business plans; development/improvement of seedling nurseries; advice and technical assistance for commercialization		Grant call and contract follow up	Grant
		Development / improvement of nurseries			
		Business plan design			
		Training on issues of orchids and naranjilla			
		Marketing system			
		Technical assistance			
Output 1.4	Concrete adaptation measures implemented for sustainable cattle ranching	a) Sustainable cattle ranching project implemented at SMRW, covering cover 600 ha	GEMAS CATIE CIPAV	Grant call and contract follow up	Grant
		Development of PMF (sustainable livestock)			
		Implementation. It Includes 2 community promoters			
		Maintenance			
		Training Plan			
Output 1.5	Enhanced sectorial	a) Review current credit products offered to	Wetlands International	Contract follow up	Consultancy

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
	support through climate financing instruments	agriculture and energy sectors.			
		Study and technical recommendations on climate financial products			
		b) Develop 4 business plans (2 for each watershed) to establish and operate mini-hydro energy projects, including the correspondent farm management plan, informative prospectus to access financing sources for climate change adaptation activities, and technical assistance offered to obtain such financing.			
		Development of business plans and support for mini hydro projects			
		c) Socialize the concept of Microfinance, based on ecosystems and climate change adaptation. It includes: Development of Microfinance Institutions mapping for both watersheds; Informative/instructional meetings on Microfinance for Ecosystem-based Adaptation (MEbA) with Microfinance Institutions, and identification of those interested/willing to participate in the training and technical assistance, - Selection of 2 Microfinance Institutions			

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		(one at each watershed) to develop the training and technical assistance in order to design and offer one finance product. * To complete this activity, the program will take into consideration the experiences and products developed in the context of the MEbA project at Perú and Colombia.			
		Mapping of microfinance institutions in both basins			
		MEbA Meetings with microfinance institutions			
		Training and Technical Assistance			
		Promotion and piloting the MEbA			
		M&E			
2. Establish climate resilient water management instruments with integrated and community based approach					
Output 2.1	Analysis for climate change vulnerability done in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds.	a) Update SMRW Management Plan, incorporating the climate change dimension. It must include the analysis of current tendencies, future scenarios, potential socioeconomic impacts on the watershed, and duly prioritized adaptation measures.	Ministry of Environment / CATIE	Contract follow up	Agreement / Consultancy
		Update RSM Management Plan incorporating the variability of climate change (consulting)			

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		b) Analyze vulnerability of the CHVRW, and validate/adjust climate change adaptation measures identified by the Adaptation Program outlined in the watershed Management Plan.	CATIE Wetlands International UTP	Grant call and contract follow up	Grant
		Vulnerability analysis and validation of measures identified by the adaptation program PM (consulting)			
Output 2.2	Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress	a) Identify the hydrological balance and environmental flow for the SMRW, specifically at the Gallito river microwatershed.	CATIE UTP	Grant call and contract follow up	Grant
		Development of water balance and environmental flow - Microcuenca Gallito (consulting)			
		b) Identify the hydrological balance and environmental flow of the CHVRW, specifically at the Caisán river microwatershed.	CATIE UNACHI	Grant call and contract follow up	Grant
		Development of water balance and environmental flow - Subwatershed Caisán (consulting)			
		c) Develop a technical document with criteria to consider during the process of granting water use permits for agriculture and power generation -based on information and findings from the environmental flows analysis	UTP UNACHI CATIE	Grant call and contract follow up	Consultancy

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		Document elaboration with technical criteria to consider in the process of awarding water concessions for agriculture and electricity generation based on the analysis of environmental flows and other information exists at national level			
		d) Review current concessions on both watersheds, based on the technical document, in order to determine recommendations for improving or restoring the water cycle			
		With the result of the product "c" document elaboration with recommendations to improve or restore the hydrological cycle in both areas of intervention			
Output 2.3	Increased hydrological security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security	a) Design 2 district plans for water security, incorporating climate information (1 at each watershed, SMRW and CHVRW)	Ministry of Environment (MiAmbiente)	Procurement support	Agreement / Consultancy
		Design of two (2) district plans (one in each basin) of water security incorporating climate information			
		b) Complement current technical analisys to elaborate a new national map for agriculture and	Consultan identify by open call	Procurement support	Consultancy

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		livestock production in the country, based on climate and water management data generated by the program.			
		Development of national agricultural zoning map with current weather data and water			
3. Strengthened local-national capacity for monitoring and decision making to reduce and respond to risks associated with climate change					
Output 3.1	Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds	a) Design and operation of the National System for Climate Data, by upgrading ETESA´s existing network for recording hydro-agro meteorological information from hydrographic watersheds.	ETESA	Procurement support	Agreement /Goods
		Acquisition and installation of the network of hydro-agro-meteorological stations			
Output 3.2	Established an early warning system to identify in advance, the necessary measures in case of hydro-	a) Implement the sound warning system at the communities included in the CHVRW early warning system; and complete signposts along communities at risk areas. This EWS is focused on floods	SINAPROC UTP	Contracto follow up	Agreement / services
		Diagnostic of SAT			

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
	climatic events that could affect food production and power generation	Design of an early warning system for flood in the Rio CHV (consulting)			
		Maintenance			
		b) Implement an early warning system for floods and droughts at the SMRW			
		Design of an early warning system for floods and droughts in the SM River (consulting)			
		Acquisition and installation of early warning system			
		Maintenance			
		c) Workshops and simulations to train technical staff and communities on the early warning system			
		Training and simulations plans			
Output 3.3	The NSCD interfaced and equiped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information	a) Interface and equip the NSCD with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information.	MIDA	Procurement support	Agreement / goods + services
		Acquisition of equipment (computing, printers, etc.)			
		Plan training for technicians and producers			
Output 3.4	Designed a monitoring and evaluation tool to assess effectiveness	a) Design a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program.	MiAmbiente	Procurement support	Agreement /consultancy

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
	of climate change adaptation measures implemented by the program and national efforts*	This includes program inception workshops with public and nongovernmental relevant stakeholders (at least three workshops). *This program will serve MiAmbiente in starting to evaluate progress of other adaptation efforts being implemented in the country (such as....).			
		Design and implementation of M&E tool to measure the effectiveness of the adaptation measures to CC with the Program and other national interventions			
4. Rise awareness and establish a knowledge exchange platform to respond to, and mitigate impacts of climate-related events from local and national scope					
Output 4.1	Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures	a) Technical working sessions with key implementing partners and project staff to define WorkPlan, coordination arrangements and kick off meetings/requirements. These activity also includes the development and facilitation of training sessions with key project staff and partners about the nexus approach to water–energy–food security as an option for adaptation to climate change.	Wetlands International	Contract follow up	Consultancy

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		Working sessions with the technical team and key Implementing partners			
		b) Inception workshops with local and national stakeholders to present the approved programme; revisit programme rationale, scope, define shared visions and operational arrangements for programme implementation. At least 2 local workshops, one for each watershed with local stakeholders. One national workshop with government and civil society stakeholders to present the Programme, identify sinergies with other ongoing adaptation efforts/initiatives and define operational and coordination aspects.	Wetlands International Universidad de Panamá (UP) Universidad Tecnológica de Panamá (UTP) UNACHI	Procurement support	per diem +services+goods
		National Workshop for presentation of the approved program			
		Workshops (2) Presentation of the approved program: 1 in each basin			
		Program information documents			
		c) Socialize the SMRW and the CHVW vulnerability analysis to facilitate the implementation of identified adaptation measures.	EE selected to execute output 2.1	Grant call and contract follow up	

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		c) Socialize the SMRW and the CHVW vulnerability analysis to facilitate the implementation of identified adaptation measures			
Output 4.2	Strengthened professional capacities for the climate data analysis and processing, for different sectors involved	a) Offer a Climate Modelling Course with special emphasis on future scenarios impacting food-energy generation activities (at least 45 participants)	CATIE	Grant call and project execution follow up	Consultancy
		International course on climate modeling with emphasis on future scenarios that affect food and energy generation			
		b) Offer an international course on Adaptation to Climate Change: Role of Ecosystem Services (45 participants nationwide, including stakeholders in the two prioritized watersheds)	Open call for consultant(s) from academy and/or reserarch internacional centers		
		International Course on adaptation to climate change: the role of ecosystem services			
Output 4.3	Strengthened professional capacities on water resources management by incorporating climate change	a) Offer an international course on participatory and integrated watershed management emphasizing conflict management skills (40 participants nationwide, including stakeholders in the two prioritized watersheds)	Wetlands International	Grant call and project execution follow up	Consultancy
		International course on watershed management			

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
	adaptation approach	with an emphasis on conflict resolution			
		b) Offer an international course on ecosystem-based adaptation at marine-coastal zones. (20 participants)	Wetlands International		
		International Course on adaptation to climate change based on marine-coastal ecosystems			
Output 4.4	Systematized and disseminated experiences on climate changes adaptation, nationwide	a) Mapping and analysis of projects / initiatives undertaken. A technical and practical document that will be available in print and digital format will be developed	Wetlands International	Grant call and project execution follow up	Consultancy
		Document development (consulting)			
		Document printing			
		b) 10 workshops will be held at national level (1 per province) to present the document	Wetlands International		
		Workshops on sharing experiences Program			
Output 4.5	Portal for Climate Change Adaptation in Panama, implemented	a) Communication strategy and systematization of experiences from the program	Wetlands International		
		Design and implementation of the communication strategy			Consultancy
		b) Design and operation of the Portal for Climate Change Adaptation in Panama	Wetlands International		
		Portal design and implementation of			Consultancy

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		adaptation to Climate Change in Panama (consulting and licensing portal / Hosting)			
		Updating and maintenance			Consutlancy
		c) Compilation and synthesis of materials for different audiences on adaptation to climate change.	Wetlands International		
		Generation of knowledge products and materials development program for different audiences (academy, institutions, producers)			Consultancy
		d) Training on the use of the portal for different audiences (producers, institutions, academia, etc.).	Wetlands International		
		Training in use of the site for different audiences (workshops)			Consultancy
		e) Establishment of an advisory technical committee within the Climate Change National Committee to orient the program´s knowledge management process	Ministry of Environment (MiAmbiente)		Agreement
		Establishment of a technical advisory committee in the National Climate Change Committee to guide the process of knowledge management program includes meetings			
		f) Experience exchanges activities at the local level,	Wetlands International		Consultancy

INSTITUTIONAL ARRANGEMENTS BASED ON POTENTIAL EXECUTING ENTITIES (BY SHORLIST CALLS WHEN MORE THAN ONE IS IDENTIFIED) AND ROLE OF THE NIE

Output No.	Description	Budget Notes/Activities	Possible Executing Entities (EE)	NIE	Type of expenditure
		including at least one international technical guided visit			
		Exchange activities locally, including at least one technical guided tour. Exchange to accompany the silvopastoral system and system of (international) functional irrigation Exchange early warning system	EE selected to implement related outputs		Goods+services + consultancy

As part of the implementation arrangements, a specific project strategy will be in place to ensure synergies between components 1 and 3:

1. Related to programme management:
   a) Permanent interaction among AP manager and technical officers, to define component logic of intervention, partners, TORs, project implementation.
   b) Coordination meetings among AP manager and execution partners, including ETESA and MIDA focal points, conducted in a monthly basis.
   c) Technical workshop to discuss adaption technical challenges/solutions/limitations in a quarterly basis.

2. Technical linkage:
   a) Technical focal points formally designated at ETESA and MIDA for AP follow up, particularly in relation to 3.1 and 3.3 (related to the Technical Advisory Committee).
   b) ToRs for output 3.4 will include mandatory interactions with executing partners of outputs 1.1-1.4, 2.1, 3.1, 3.2, 4.5
   c) TORs for output 1.1, 1.4, 3.2 will include information exchange with ETESA´s focal point, aligned with NSCD architecture
   d) ToRs for 3.1 developed and validated jointly among AP manager, ETESA, MIDA and MiAmbiente focal points

A3. Instruments for institutional arrangements

Some instruments were identified for institutional arrangements:

a) A Programme Operational Manual will be developed following the standardized procedures currently established in F. Natura under its Quality Management System and applied to project cycle as well as for administrative and financial support processes (as example: calls for grants, procurement, audits, among others).

b) A communications protocol to include the recognition, as appropriate, of each implementation and executing partner at institutional level as well as at local and community level.

c) MoU/Collaborative agreement signed among F. Natura, Ministry of Environment, Ministry of Agriculture, ETESA and SINAPROC as executing entities responsible to coordinate and lead their corresponding component during the project execution jointly with the executing entities. The agreement will be an expression of commitment between the entities to advance climate change adaptation actions in Panama, based in the Adaptation Programme components and results. The institutions recognize that the programme activities and results are part of their interinstitutional planning strategies and goals. The institutions express their willingness to provide technical guidelines and support to implement the programme approved activities by the AF and commit to devote the necessary institutional resources.

Each result from the program will be coordinated jointly with a governmental counterpart, according to the following:

- The Ministry of Agricultural Development will be responsible for Component 1 through its regional direction, located in Chiriqui, Herrera and Veraguas, which include priority areas of Chiriquí Viejo River and Santa Maria Watershed.
- These Regional Offices are composed of specialized units, such as: livestock technical, environmental, agro technology, agricultural development, infrastructure, irrigation and planning. These offices will provide support to the Implementation and Monitoring Component ensuring that technical standards are met.
- The regional office of the Ministry of Agriculture (MIDA) in Chiriqui will be responsible to follow up the output 1.1.12.
- MIDA Regional offices in Veraguas will follow the Product 1.3 and the Regional MIDA in Herrera and Veraguas will follow the Product 1.4.
- Output 3.3 Component 3 will be coordinated with the Department of Computer Science, Agricultural-Agrotechnology Management and Environmental Unit of MIDA and the Department of Hydrometeorology and Climatology in ETESA.
- ETESA, will lead the Product 3.1, and in collaboration with MIDA, the Technical Secretariat and the Agricultural-Agrotechnology Direction, MiAMbiente, UTP and SINAPROC, which includes the preparation of technical specifications for

acquisition and installation of the Network of Weather Stations and definition of sites to install them.

- Component 2 and 4 will be under the Ministry of Envionment and will be executed on the field through executor (NGOs, firms or individuals.

d) Periodic informative events to present programme advances, lessons learned and necessary adjustments considering national and local circumstances, if needed. It is expected to develop the operational plan for the project implementation during the first semester, and present it during the installation workshop. At the same time the team building will be carried out, jointly with the training of the team responsible of the project. It is expected that call for proposals, and procurement will be set for the second semester.

A4. Roles and responsibilities

Table 49. Overall roles and responsibilities for the implementation of proposed program

Organizations	Composition	Roles and responsibilities
Fundación NATURA	• Three members of the Board of Trustees and the Executive Director of Natura integrate the Project Oversight Committee	• Monitoring strategically the program, in order to follow up the compliance of the terms and contractual agreements acquired by the Natura Foundation as NIE. A quarterly technical and financial report prepare by the implementation unit will be reviewed by this committee and feedback will be provided if needed. This Committee will be responsible as well to approve annual reports, annual work plan and budget prepare accordingly with the program contractual arrangements
	• Climate Change Management and support staff responsible to provide administrative, financial to the project staff.	• Will conduct public calls for the allocation of resources to those projects that will be implemented by NGOs, academia and local government using Quality Management System for Processes at NATURA Foundation. • Coordination for evaluations of proposals for resource allocation. • Tracking, monitoring and evaluation.
Technical Advisory Committee	• Climate Change National Committee	• Provide technical/peer to peer recommendations to improve programme implementation and impact.

Organizations	Composition	Roles and responsibilities
(Advisory Committee)	• Basin Committees for Chiriquí Viejo and Santa María; and JAARS • Formed by local and/or international experts in climate change adaptation	Ad honorem participation; members will be jointly identified by the programme partners.
Executing entities	• ETESA • SINAPROC • MIDA (Natoinal and Regional Directions when they are needed) • MiAmbiente (Climate Chance Office, and Watershed National Direction) • IDIAP	• These EE will directly implement through its regional directorates (technical) certain products of the program and will be directly responsible for them. • Development and / or review of terms of reference. • Follow-up of projects will be implemented by NGOs, academia and local government. Note: 1. For projects to be implemented directly by governmental institutions, administrative support will be offered by NATURA Foundation with its Procurement of Goods and Services Manual used by NATURA under its quality management system. This support will help an expedite project implementation.
	• ONGs • Academy	• Will carry out each assigned project activities on the field based on grants and short list call open by Natura to execute the project. • Will promote alliances at local level.

Regarding the role of the governmental institutions: Ministry of Environment, Ministry of Agriculture, ETESA and SINAPROC identified as executing entities, they will lead the execution of its component in agreement that will be signed to establish the procedures to execute the component activities.

Based on the lack of personnel on these institutions to execute on the field the activities, is expected to grant the resources to NGOs, academy and consultants under open calls for grants and consultancy services.

In terms of cost-relation it is not expected to double cost, as the institutions will receive in kind the results of services and goods, delivered by de NGOs and consultants.

B. Measures for financial and project / program risk management

Table 50. Measures for environmental, information, social, legal, economic, and organizational risks' mitigation

Risk Description	Mitigation Measures
Type of Risk: Environmental	
E-1 Could climate variability affect the production cycle of the project (eg. change of season or increased rainfall, extended dry season) and therefore the achievement of the expected quality, quantity and time? For example, would tree species to be planted be suffering an alteration in the project calendar (production of seedlings, planting date, and survival rate after planted?) Would rice crops be suffering for lack of water to allow expected yields?	To prevent negative impacts on the production cycle of the projects due to climate variability, the final design of all interventions will introduce the climate change perspective. Projects bidding documents and work plans must include observation to the dates of cultivation (according to MIDA guidelines), the use of species resilient to such variabilities, the strategic location in the farm crops distribution (considered in the farm management plans), the use of pilot low cost irrigation systems, among others.
E-2. Could the adverse weather conditions affect the schedule for installing i) water harvest systems, ii) hydro-agro meteorological stations, iii) EWS?	Installation of these components will be carried out during dry season of the year. Work plans for implementation of these activities must comply with this requisite.
E-3. Are infrastructure elements (named in E-2) in zones susceptible to seasonal flooding or landslides, flooding rivers or other environmental phenomena that may affect the works?	Installation of these components will be carried out during dry season of the year. In addition, all bidding documents and contracts for works will comply with technical specifications to stand such potential adverse climate conditions. Class A contractors will be secured to develop highest quality execution of works.
E-4. Could the program generate adverse environmental impacts?	The program does not include activities that could generate significant environmental impacts. Nonetheless, specifications and all bidding documents and contracts for works will require that before starting any activities on the ground, required permits / authorizations / licenses are obtained from incumbent authorities. Technical specifications also will ensure that all feasible measures will be taken to prevent any adverse environmental impacts.
E-5. Are the program areas susceptible to fire (whether caused by human or natural actions)?	Areas located at the "Arco Seco" at the mid and lower parts of the Santa María river watershed are susceptible to fires -mainly caused by human actions (traditional practice to clear land plots from vegetation before planting new crops every year, that often go uncontrolled). To mitigate this risk, work plans for production and reforestation activities will introduce technical measures (such as reforesting at the beginning of rainy season, construction of land strips at the perimeter of plots and farms). Also, education measures will be implemented through the outreach mechanisms of the program to stay in touch with stakeholders, during public consultations, radio messages, etc.
E-6. Could the presence of pests in the program areas affect the production process? (i.e. agroforestry systems, agro-silvo pastoral systems, rice / orchids crops)	It could be possible that pests may affect some of the production systems to be established. Every productive activity to be implemented by the program will include detailed technical specifications (with proper and proven techniques and measures) regarding pest prevention and control. For instance, the farm management plans will consider the proper variety of crops to reduce/avoid this risk (as intensive and large areas of a single crop is prone to pests' attacks); the use of natural species that prevent pests' presence; and if extremely necessary, the use of chemical products authorized by MIDA (using proper application techniques to prevent harm to human health).
E-7. Could changes in the context (ex. large infrastructure projects, changing government policies, etc.) affect the relevance of the project to achieve the environmental goals set?	Continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change, which meets regularly) will ensure the NIE and implementation

Risk Description	Mitigation Measures
	organizations learn in advance any change of context, thus allowing to make adjustments in time to ensure a successful implementation and achievement of expected outputs/outcomes. Regular coordination meetings as well as actions under output 4.1 will be monitored to include in agenda context analysis that could pose risk to the program.
E-8. The scale of the program is not appropriate in the context of the level of the threat and the pressure that is intended to address?	The M&E plan for the program will include a variable to follow up on pertinence of adaptation and resilience building of activities being implemented. Periodic meetings with beneficiaries and implementation partners will address also progress on program objectives and continued pertinence and proper (planned) scale to respond to pressures being addressed by the program. Continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change, which meets monthly) will ensure the NIE and implementation organizations learn in advance any inconsistencies of context, thus allowing to adjust in time to ensure a successful solution is achieved from implementation and expected outputs/outcomes are met. Regular coordination meetings as well as actions under output 4.1 will also be monitored to include in agenda context analysis that could affect effectiveness of the program at the proper scale.
Subtotal environmental risks	
Type of Risk: Information	
I-1. Is there scarce information that prevents Natura Foundation to mitigate or take the risks to which it is exposed in the program?	A strategy to capture the experiences and lessons learned will be implemented as soon as the program starts (as stipulated in the proposal). Also, a programme strategy to promote knowledge sharing across the different components must be monitored to ensure that: a) the climate change national committee remains the technical advisory instance for the programme; a knowledge subcommittee within the Climate Change National Committee is established, whose purpose will be to permanently look for information and knowledge pieces that could be derived from the different programme activities. b) the overall work plan for the Programme includes explicit and periodic milestones to share advances/limitations among programme partners and projects staff. c) RBM recommendations are observed, the M&E process is launched in a very initial stage of programme implementation, and captures lessons learned from the very beginning and introduces adjustments in the plan as needed. d) The knowledge sharing process is fed by systematization of adaptation experiences described in output 4.4. e) operative/functional communication channels are established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions, as well as learn any change in context. f) Reporting documents at all levels (program partners, project staff, consultants) include the requirement of documenting interactions with stakeholders, coordination meetings with government and nongovernment partners during the implementation of the contract/agreement and outline knowledge products envisioned or limitations to reach those.

Risk Description	Mitigation Measures
I-2. Is there insufficient information that prevents the implementing organizations to mitigate or take the risks to which it is exposed in the program?	See mitigation measures included for Risk I-1. Comprehensive available information about climate related issues faced by the country delivered to Fundacion Natura by key government institutions related to the program´s proposed activities will be shared with implementing organizations. In addition, after the program is completed, all stakeholders will count on an adaptation knowledge platform than will foster effective and wide-ranging info on adaptation, lessons learned, and a national system for climate data (that will monitor hydro meteorological activity as well as the effectiveness of adaptation efforts).
I-3 Other information risks	To prevent this, Fundacion Natura will ensure a budget line (as it was stated in the proposed program´s budget) in implementing organizations contracts, specially to provide travel stipend or similar means to vulnerable population. Also, radio ads and programs will be made in order to inform ahead of time when meetings or other coordination will be developed in program areas.
Subtotal information risks	
Type of Risk: Social	
S-1. Is the program in an area of actual or potential conflicts over natural (land, water) resource use?	Current / potential conflicts at the local scale of the program (especially present at the Chiriqui Viejo river watershed) are about water resource uses. To address conflicts in the medium – long terms at the program target areas and national level, the National government has already started a dialogue in the process for establishing the National Plan for Water Security. Because of this, the proposed program ***is not intended to solve*** existing / potential conflicts among stakeholders in this regard. The proposed program to the AF will do influence the conflict situation by generating tools and information to create a science-policy interface (technical information that will be made available to inform the dialogue, for all participants in an equal access basis). This is i) to help involved individuals to broaden their views toward a common solution to conflict; and ii) support incumbent authorities and stakeholders to count with scientific tools (component 2) to plan and make informed decisions (with a systematic approach) on water uses respecting environmental flows and the integrity of watercourses. Also, operative/functional communication channels will be established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions, as well as learn any change in context. The communication and exchanges among stakeholders during implementation of the program (for example, through quarterly meetings to review progress on implementation) will foster better mutual understanding. The proposed program will include a participatory and IWM course emphasizing conflict management skills to create capacities in stakeholders to better deal with this situation. Finally, during design of technical specifications for every activity to be implemented near conflict areas (no project will be planned-carried out with conflicting persons), it will be included a

Risk Description	Mitigation Measures
	requirement for implementation organizations to report to Fundacion Natura conflict issues over natural resource uses no later than 24 hours after learning about them. This will help taking timely action through incumbent national authorities
S-2. Are there tense situations between stakeholders needed to be solved to implement the program?	Idem.
S-3. Does the local workforce lack the necessary profile to implement the program?	To prevent any knowledge/skills gap to be able to implement all the components of the program, it has been included an induction for personnel at the beginning of the program implementation. This includes local workforce at the technician and management level (even at the local promotion agents). Recruiting specifications will include criteria to be met on knowledge and skills required for program implementation. Also, a series of courses will be offered to help build better local capacities to ensure continued and successful results from activities.
S-4. Is there an adequate level of training of involved individuals and communities to implement the program? Consider, skills training and the ability to react proactively to address the problems that can be encountered in implementing the program.	The program will include a variety of people with a very diverse academic background. At the communities for instance, there are people with elementary, middle and high school mainly. A small percentage is also illiterate. The program will hire local communities' individuals as program promoters. These personnel will be trained when hired, and knowledge assessed in order to fill any gaps. Also to make them familiar with every detail of the program and expected tasks from them to ensure a successful program implementation and coordination with communities.
S-5. Are key actors or beneficiaries highly unlikely to continue in the process of the program in the short, medium and long term?	Disengagement of key actors and beneficiaries once the program is over will be prevented since the program has included a series of mechanisms for improved awareness and professional and technical skills in local people regarding the causes, impacts and effects of climate change (mainly component 4 and activities from components 1, 2 and 3). Behavioral change will be induced throughout implementation of the different projects, toward climate change preparedness; as will generate better living conditions and higher income (thus creating interest to keep on such good practices). Monitoring and evaluation system will include proper means to follow up likeliness/readiness of beneficiaries to continue beyond program´s end.
S-6. Are there current or potential projects (hydropower, mining, roads, or other) that could transform the land use and thereby affect the participation of direct or indirect beneficiaries of the program?	Currently there is no envisioned large projects in the program areas that could affect participation of beneficiaries. The monitoring and evaluation system will include proper means to follow up likeliness for such projects to happen nearby the program sites, in order to respond readily to the situation. Should this situation develop, effective interagency coordination among incumbent authorities will allow making arrangements not to affect farms or sites included in the projects. The information exchanges and delivery of quarterly meetings with beneficiaries and stakeholders will bring opportunity for updated plans on any of such large projects if it happened.
S-7. Could there be social or behavioral patterns resulting from the presence of labor introduced through the projects (mentioned in S-6) that could transform land-use and bring problems to communities that may affect the program implementation and the intended transformation?	Idem (effective interagency coordination among incumbent authorities will allow making arrangements not to affect farms or sites included in the projects; and information exchanges and delivery of quarterly meetings with beneficiaries and stakeholders will bring opportunity for updated plans on any of such large projects if it happened).

Risk Description	Mitigation Measures
S-8. Is there a lack of leadership in the program areas, especially amongst the young people, that might affect the program?	The knowledge exchange strategies included in the program design (especially component 4) have taken into account a strong focus on several audiences including young people. Besides those activities, the program will ensure that during socialization activities regarding vulnerability analyses and other studies for watersheds, a critical mass of young people will be included and participate. Also, special consideration will be given when distributing knowledge materials (compilations and articles on adaptation to climate change for example). Finally, young participants will be included in training events on the use of the portal for different audiences (producers, institutions, academic, etc.).
S-9. Are the communities and beneficiaries of the program indifferent to the problems that affect them in order to find solutions?	Local communities and potential beneficiaries are open to the problems that currently affect them due to climate variability and change; so there is little probability of lack of empathy. To mitigate such situation to happen during implementation, a baseline survey will be conducted on the level of awareness in the target population about impacts and the climatic cause of the problem to be addressed by the program. From the survey data results, information materials will be generated and distributed to begin filling the knowledge gaps identified. From the beginning, meetings and workshops will be held, and printed materials distributed to inform stakeholders about the objectives of the program.
S-10. Can a lack of partners for the program (that can take a leadership role and mobilize action to create local cohesion and participation to the program and its processes), be possible?	Fundacion Natura will include in specifications for contracting implementation organizations, that these (Non-governmental organizations -NGOs) have experience working in target areas preferably; that they have developed leadership roles in projects it has carried out; and that they hire local personnel with leadership talent, among others. The Climate Change National Committee will remain the technical advisory instance for the programme. The overall work plan for the Programme will include explicit and periodic milestones to keep informed and share advances/limitations among programme partners. These will include Local government bodies (they participated during general consultation and expressed their willingness to participate in the proposed processes and some even provided support letters submitted to the AF). The M&E process will follow up participation of partners (of several contexts). Operative/functional communication channels will be established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions. Reporting documents at all levels (program partners, project staff, consultants) will include the requirement of documenting interactions with stakeholders, and coordination meetings with government and nongovernment partners during the implementation of the contract/agreements. In the program design, also participated incumbent institutions (for example, MIDA, MiAmbiente, SINAPROC, ETESA) that will remain partners during program implementation and have specific roles to play. Finally, in order to keep interaction and communication channels with community beneficiaries, the program will count on local promoters (hired from the same communities); these will remain in the communities with capacities built to continue making positive impacts during and well after program completion.
S-11. Are there no conditions for the empowerment and leadership of communities, organizations and / or key individuals -with gender considerations- after completion of the processes provided from the Natura Foundation?	See mitigation strategies in S-8, S-9, and S-10.

Risk Description	Mitigation Measures
S-12. Is there a scarce inclusion of prior, free and informed stakeholders at the various stages of design or implementation of the program?	Since the lack of proper inclusion of stakeholders would pose a high risk of negative impact on the program, this has been a matter of outmost importance since the design of the program (and expected to be properly dealt with during implementation). All interventions were designed based on several previous planning and consultation processes at the national level (National Plan for Water Security, National Plan for Energy, National Pact for Agriculture, National Plan for Integrated Water Resource Management) and regional/local level (Chiriqui Viejo and Santa Maria River Management Plans, Conservation Area Plan for Gallito Microwatershed and Caisán Subwatershed). These processes were designed based on the views and recommendations of informed stakeholders. See mitigation strategies in S-10.
S-13. Is there any indigenous population in the area of program implementation that would require further efforts to ensure its proper participation?	It was confirmed during public consultations that no indigenous community live in the area of the program implementation. Specific queries were conducted with indigenous individuals living in the target areas (which are not indigenous communities), to ensure their views are taken into account in the program design and to ensure their proper participation, given their culture and traditions. The M&E system will include reporting on specific participation of such indigenous families.
S-14. Is there a potential lack of receptivity to the information and activities generated by the program due to absence of awareness, among the beneficiary institutions and stakeholders, about the climate related origin of the problem, instead of considering it is a result of deficient management of natural resources?	See mitigation measures in S-1. A baseline survey will be conducted on the level of awareness in the target population about impacts and the climatic cause of the problem to be addressed by the program. From the survey data results, information materials will be generated and distributed to begin filling the knowledge gaps identified. From the beginning, during the programmed inception workshops, it will be clearly stated that the program ***is not intended to resolve the conflict***, but to provide technical information for the discussion that will address this conflict. From day 1, meetings and workshops will be held, and printed materials distributed to inform stakeholders about the objectives and what the program will and will not address.
Subtotal social risks	
Type of Risk: Legal	
L-1. Is the area of the program suitable and free from conflicts over land tenure? Or it isn´t?	The area of the program is free from such conflicts. If this sort of conflict arises, and it could affect implementation of the program, the risk will be mitigated by requiring (as a condition in all technical specifications/contracts with implementing organizations) that all permits and compliance regulations be met -including verification of land property rights (for on the ground delivered products, such as installation of EWS, water harvest systems, hydromet stations, agroforestry/ silvo pastoral systems). The M&E system will include reporting on any change of this situation, and will include further strategies to address risks.
L-2. Could the lack of an environmental license to implement the program in any or all phases affect its performance?	To prevent this risk (which would have a high impact on the program implementation), incumbent authorities -most of them responsible for ensuring compliance with environmental license- have been involved from the design of the program; and will remain as partners during implementation (members of the National Committee for Climate Change).

Risk Description	Mitigation Measures
	Compliance with all required licenses / permits will be a pre-requisite for any disbursement in order to implement projects activities (and will be mandatory in every term of reference and contract with implementing partners – organizations). See measures in I-1 on information and knowledge sharing to ensure communication (as timely communication will ensure no regulations are ignored).
L-3. Are permits and / or required licences in the different phases of the program clearly identified? Can these not be obtained or fulfilled on schedule, and within the scope, and budget of the program?	Required licenses / permits for building and productive activities* ***similar*** to those in the proposed program implementation have been identified. They include environmental impact studies, municipal permits for construction, water extraction permits. However, according to Executive Decree 123 of 14 August 2009 (by which the Chapter II of Title IV of Law 41 -General Law for Environment- is regulated), ***none of the activities proposed in the adaptation program*** requires an Environmental Impact Study -given its nature (not included in the fixed list of activities requiring it) or scope (the proposed activity is of smaller scale than indicated in the list). Even so, when implementing these activities, rigorous observation of environmental criteria to prevent negative impacts will be followed (and required in terms of reference). Other requirements identified above will be complied with and have been taken into account in the budget. ** Refers to on the ground delivered products, such as installation of EWS, water harvest systems, hydromet stations, agroforestry/ silvo pastoral systems*.
L-4. Are there inadequate public security conditions for implementing the program?	The program implementation areas are free of unsecure conditions that can jeopardize achievement of outputs and outcomes at the present. Adequate coordination channels have been established with government institutions, and will continue throughout program implementation (corresponding indicators will be included in the M&E system). Coordination will facilitate the continuous assurance of public security through direct links with related protection authorities. See mitigation measures in S-1.
Subtotal legal risks	
Type of Risk: Economic	
Ec-1. Does the program fail to generate viable economic alternatives or conditions for the participation of key stakeholders, including individuals?	Awareness and capacity building activities through different components of the program will contribute to keep engagement and participation of key stakeholders and individuals. The continued, permanent coordination with governmental institutions (for example in the National Committee for Climate Change) will ensure the NIE and implementation organizations learn in advance any adverse condition leading to this risk, thus allowing to make adjustments in time to ensure a successful implementation and achievement of expected outputs/outcomes. M&E will include indicators to follow up on delivering viable economic alternatives/conditions generation as expected in the program. See mitigation measures in I-1.
Ec-2. Does the program lack of a component that provides some economic support to achieve a viable long-term success of the actions, processes and ensures continued environmental impacts from the program?	To ensure viable long-term success of the activities started by the program, the final design took into consideration economic (as well as material - technical – advisory) support for beneficiaries. Activities included for implementation incorporate developing and installing climate-smart / best practices; implementation arrangements will be secured to facilitate that will continue after the program ends. In this regard, it is especially important to note that the agriculture, cattle-rising, agri-business, water harvest, gallery forests and related activities will be implemented with the technical assistance of the MIDA and MiAmbiente, both of which have proven experience in extension initiatives to

Risk Description	Mitigation Measures
	ensure sustained results beyond the programme end. M&E will include criteria to monitor achievement of improved economic conditions in beneficiaries. In case an external factor affects negatively expected economic alternatives, regular consultations will ensure a timely adjustment of planned investments. The learning component of the program will also promote capacity building in beneficiaries so they remain better prepared to respond to external effects. See also mitigation measures in I-1.
Ec-3. Is there a current or potential presence of land speculation arising from improving farms, attracting buyers who could transform land use or reverse the progress and achievements of the program?	No, but there is always a risk that once farms are improved, buyers could be attracted to make purchase offers. To mitigate this, specific criteria for choosing beneficiaries include, among other considerations, they have strong ties, and long term residence in the site (for example, family and socioeconomic connections in situ). Also, as part of the projects to be developed, special agreement (honorary) will be signed by F Natura and beneficiary, where he/she agrees to continue their commitment for long term proper management of farm (including not selling their estate at least in the short-medium term). Better preparedness to adapt to climate change impacts will contribute to increased income and socio economic condition of beneficiaries (that in turn, decreases probability of them wanting to sell their estate).
Ec-4. Is the population of the area influenced by factors of access to service facilities and job offers which makes them less interested in the program?	The target areas are mainly located far from cities or sources of job different from agricultural or primary production areas. In the program design, it was considered: i) the creation of improved sources of income (especially for agriculture, cattle-rising, agri-business) and wellbeing-better knowledge capacities, for making staying in the area attractive and beneficial for local population, and avoiding a decrease of farming activities while adapting to climate change. ii) the inclusion -in the M&E plan for the program- of a variable to follow up on factors in Ec-4 that may risk activities being implemented and achievement of program´s outputs/outcomes.
Subtotal economic risks	
Type of Risk: Organizational	
O-1. Is there insufficient involvement and coordination among institutions to maintain EWS, hydro stations, as well as the forest cover and ecosystem features that help prevent (among other impacts) floods and erosion?	To mitigate this risk, all AF and national guidelines and previsions have been carefully followed/observed since the beginning of the program design. It essentially includes establishing an effective, continued and strong communication mechanism with incumbent governmental institutions, local NGOs, local authorities in the program areas, all of which have agreed on the benefits of this program and are willing to continue participating and taking on follow up for lasting results. The M&E plan for the program will include variables to follow up on coordination of activities being implemented. See mitigation measures for E-7, E-8 and I-1, I-3, S-1.
O-2. Do implementing organizations lack the strengths, skills and institutional capabilities in administrative, financial and technical areas to implement the projects?	To prevent or mitigate the risk of scarce capabilities to implement the projects, implementing organizations will be selected on the basis of (among other criteria) their experience and capabilities implementing similar/related projects. On the side of the NIE, Natura Foundation has a long standing experience and capacity built in administration of similar/related projects. Also, once established the program´s team, and induction will be developed to ensure clear knowledge, expectations and goals to be achieved with this adaptation program.

Risk Description	Mitigation Measures
	Finally, component 4 is aimed at creating / enhancing capacities, and improving professional and technical skills in locals regarding the causes, impacts and effects of climate change.
Subtotal institutional risks	

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

Environmental and Social (E&S) risks were further analyzed per AF Environmental and Social Principles, once the consultations process was completed. Results are as follows.

Table 51. Measures for environmental and social risk management in line with the E&S Policy and Gender Policy of the AP

Measures for environmental and social (E&S) risks management, according to AF Environmental and Social Policy and Gender Policy			
1	2	3	4
E&S / G policy of the AF **Risk Description**	**Risk Level**	**Actions addressing risk** *** Responsible person** ***Planned completion**	**Status*** *** This column only for demonstrative purpose. To be completed with baseline analysis.**
1 Compliance with applicable domestic and international law	**Level 1**	According to Executive Decree 123 of 14 August 2009 (by which the Chapter II of Title IV of Law 41 -General Law for Environment- is regulated), none of the activities proposed in the adaptation program (that include construction	

Measures for environmental and social (E&S) risks management, according to AF Environmental and Social Policy and Gender Policy			
1	**2**	**3**	**4**
E&S / G policy of the AF **Risk Description**	**Risk Level**	**Actions addressing risk** *** Responsible person** ***Planned completion**	**Status*** *** This column only for demonstrative purpose. To be completed with baseline analysis.**
• **The program could generate adverse environmental impacts, regarding activities that include construction components (such as EWS, installation of hydro stations, irrigation systems)**		components) require an Environmental Impact Study -given its nature (not included in the fixed list of activities requiring it) or scope (the proposed activity is of smaller scale than indicated in the list). Nonetheless, specifications and all bidding documents and contracts for works will require that before starting any activities on the ground, all applicable and required permits / authorizations / licenses are obtained from incumbent authorities. Technical specifications also will ensure that all feasible measures will be taken to prevent any adverse environmental impacts. During implementation, also will be ensured that incumbent state entities oversee compliance with national standards and specifications**.** Compliance with all required licenses / permits will be a pre-requisite for any disbursement in order to implement projects activities (and will be mandatory in every term of reference and contract with implementing partners – organizations) *** Program coordinator, FN Project officer; ETESA liaison person; SINAPROC liaison person; MiAmbiente liaison person; MINSA liaison person** **Continuous**	
2 Fair and equitable access to benefits • **Perceptions of being "left out" could deprive project of support and ownership by involved individuals and communities**	**Level 2**	The program will include a variety of people with a very diverse academic background. At the communities for instance, there are people with elementary, middle and high school mainly. A small percentage is also illiterate. The program will hire local communities' individuals as program promoters. These personnel will be trained when hired, and knowledge assessed to fill any gaps. Also to make them familiar with every detail of the program and expected tasks from them to ensure a successful program implementation and coordination with communities. The knowledge exchange strategies included in the program design (especially component 4) have considered a strong focus on the many audiences. Besides those activities, the program will ensure that during socialization activities regarding vulnerability analyses and other studies for watersheds, people from different stakeholders will be included and participate.	

Measures for environmental and social (E&S) risks management, according to AF Environmental and Social Policy and Gender Policy			
1	**2**	**3**	**4**
E&S / G policy of the AF **Risk Description**	**Risk Level**	**Actions addressing risk** *** Responsible person** ***Planned completion**	**Status*** *** This column only for demonstrative purpose. To be completed with baseline analysis.**
		Also, special consideration will be given when distributing knowledge materials (compilations and articles on adaptation to climate change for example). Finally, participants will be included in training events on the use of the portal for different audiences (producers, institutions, academic, etc.). Data on project activities will be maintained and shared with all stakeholders, including local NGOs to demonstrate equitable distribution of project benefits *** Program coordinator, FN Project officer, implementing partners and NGOs** **Continuous**	
3 Avoidance of disproportionate impact on marginalized and vulnerable groups • **Activities in the program could lead to conflicts over land tenure rights for vulnerable population at the watersheds.**	**Level**	The area of the program is free from such conflicts. If this sort of conflict arises, and it could affect implementation of the program, the risk will be mitigated by requiring (as a condition in all technical specifications/contracts with implementing organizations) that all permits and compliance regulations be met -including verification of land property rights (for on the ground delivered products, such as installation of EWS, water harvest systems, hydromet stations, agroforestry/ silvo pastoral systems). The M&E system will include reporting on any change of this situation, and will include further strategies to address risks. *** Program coordinator, Project officers, Implementing partners and organizations** **Continuous**	
4 Respect for and promotion of international human rights • **There is promotion and assurance of public security conditions for implementing the program**	**Level**	The program implementation areas are free of unsecure conditions that can jeopardize achievement of outputs and outcomes at the present. Adequate coordination channels have been established with government institutions, and will continue throughout program implementation (corresponding indicators will be included in the M&E system). Coordination will facilitate the continuous assurance of public security through direct links with related protection authorities.	

Measures for environmental and social (E&S) risks management, according to AF Environmental and Social Policy and Gender Policy			
1	**2**	**3**	**4**
E&S / G policy of the AF **Risk Description**	**Risk Level**	**Actions addressing risk** *** Responsible person** ***Planned completion**	**Status*** *** This column only for demonstrative purpose. To be completed with baseline analysis.**
		*** Program coordinator, Project officers, Implementing partners and organizations** **Continuous**	
5 Gender equality and women's empowerment • **No conditions have been established for the empowerment and leadership of communities, organizations and / or key individuals -with gender considerations- after completion of the program**	**Level**	In addition to previsions outlined under Risk 2, a baseline survey will be conducted on the level of awareness in the target population (with equality and gender considerations) about impacts and the climatic cause of the problem to be addressed by the program. From the survey data results, information materials will be generated and distributed to begin filling the knowledge gaps identified. From the beginning, meetings and workshops will be held, and printed materials distributed to inform stakeholders about the objectives of the program. Also, specifications for contracting implementation organizations, will express that these (Non-governmental organizations -NGOs) have experience working in target areas preferably; that they have developed leadership roles in projects it has carried out; and that they hire local personnel with leadership talent, among others, without gender-based discrimination. The overall work plan for the Programme will include explicit and periodic milestones to keep informed and share advances/limitations among programme partners. The M&E process will follow up participation of partners (of several contexts) and will include gender specific indicators in the M&E protocol. Operative/functional communication channels will be established with existing local governance instances, particularly Watersheds Committees, juntas locales de agua (water local committees), boards of rural aqueducts, and the municipalities to present programme advances and coordinate actions. Reporting documents at all levels (program partners, project staff, consultants) will include the requirement of documenting interactions with stakeholders, and coordination meetings with government and nongovernment partners during the implementation of the contract/agreements. Finally, in order to keep interaction and communication channels with community beneficiaries, the program will count on local promoters (hired from the same communities); these will remain in the communities with capacities built to continue making positive impacts during and well after program completion.	

Measures for environmental and social (E&S) risks management, according to AF Environmental and Social Policy and Gender Policy			
1	**2**	**3**	**4**
E&S / G policy of the AF **Risk Description**	**Risk Level**	**Actions addressing risk** *** Responsible person** ***Planned completion**	**Status*** *** This column only for demonstrative purpose. To be completed with baseline analysis.**
		*** Program coordinator, Project officers, Implementing partners and organizations** **Continuous**	
6 Respect for core labor rights **Personnel hired by Fundacion Natura is entitled to a competitive wage and a proper work schedule, working not more than 45 hours per week. The same applies to workforce involved in the program through implementing organizations/contractors.**	**Level**	Labor conditions clauses stating observance / compliance with these fundamental principles will be included in all legally-binding instruments between Fundacion Natura and implementing organizations/contractors to carry out program activities. The M&E process will follow up on specific indicators regarding this requirement, and failure to comply may cause termination of contractual relationship. *** Program coordinator, Project officers, Implementing partners and organizations** **Continuous**	
7 Respect for UN declaration of the Rights of Indigenous peoples • **Presence of indigenous population in the area of program implementation would require further efforts to ensure their proper participation (respecting their culture and traditions)**	**Level**	It was confirmed during public consultations that no indigenous community live in the area of the program implementation. Specific queries were conducted with indigenous individuals living in the target areas (which are not indigenous communities), to ensure their views are taken into account in the program design and to ensure their proper participation, given their culture and traditions. The M&E system will include reporting on specific participation of such indigenous families. *** Program coordinator, Project officers, Implementing partners and organizations** **Continuous**	
8 Avoidance of involuntary settlement	**Level**	Resettlement is not envisaged under this program´s activities. No initiative has been identified with orientation or execution requiring involuntary resettlement.	

Measures for environmental and social (E&S) risks management, according to AF Environmental and Social Policy and Gender Policy			
1	**2**	**3**	**4**
E&S / G policy of the AF **Risk Description**	**Risk Level**	**Actions addressing risk** *** Responsible person** ***Planned completion**	**Status*** *** This column only for demonstrative purpose. To be completed with baseline analysis.**
9 Protection of natural habitats	**Level**	The proposed program does not encourage, in any form, conversion or degradation of natural habitats, critical areas known and protected for special purposes according to national laws. The project does not encourage conversion or habitat degradation; by contrast, it enhances protection of natural habitats by facilitating the implementation of strategies prioritized in conservation area planning processes, and for areas with significant conservation values, associated to protected areas.	
10 Conservation of biological diversity **Construction activities in the program can harm biological diversity/resources**	**Level**	The proposed activities are focusing on enhancing protection of natural habitats by facilitating the implementation of strategies prioritized in conservation area planning processes, and for areas with significant conservation values, associated to protected areas. No risk was identified so far that threatens integrity of biological diversity. Even so, activities that include construction components (such as EWS, installation of hydro stations, irrigation systems) will only be implemented after obtaining authorization from incumbent state entities, and under their supervision -according to national standards -including regarding biological diversity conservation. *** Program coordinator, Project officers, Implementing partners and organizations, MiAmbiente** **Continuous**	
11 Avoidance of significant increase in GHG emissions and other climate change drivers **The program areas are susceptible to fire (whether caused by human or natural actions), that can increase GHG emissions or other climate change drivers**	**Level**	None of the proposed initiatives have been identified as potential source of, or cause, unjustified greenhouse gases. On the contrary, some of the proposed interventions will lead to greenhouse gas reduction. However, areas located at the "Arco Seco" at the mid and lower parts of the Santa María river watershed are susceptible to fires -mainly caused by human actions (traditional practice to clear land plots from vegetation before planting new crops every year, that often go uncontrolled). To mitigate this risk, work plans for production and reforestation activities will introduce technical measures (such as reforesting at the beginning of rainy season, construction of land strips at the perimeter of plots and farms).	

Measures for environmental and social (E&S) risks management, according to AF Environmental and Social Policy and Gender Policy			
1	**2**	**3**	**4**
E&S / G policy of the AF **Risk Description**	**Risk Level**	**Actions addressing risk** *** Responsible person** ***Planned completion**	**Status*** *** This column only for demonstrative purpose. To be completed with baseline analysis.**
		Also, education measures will be implemented through the outreach mechanisms of the program to stay in touch with stakeholders, during public consultations, radio messages, etc. *** Program coordinator, Project officers, MIDA liaison person, SINAPROC liaison person, MiAmbiente liaison person** **Continuous**	
12 Pollution prevention and resource efficiency	**Level**	None of the proposed initiatives has been identified as huge energy demanding. Furthermore, no initiatives have been identified as big consumers of natural resources and therefore would require measures for their efficient use. On the contrary, some initiatives are oriented towards the better use of available resources, especially water. Also, no initiative has been identified that generates solid waste that requires any treatment. Even so, activities that include construction (such as EWS, installation of hydro stations, irrigation systems) and production (like agricultural, silvo pastoral, orchids) components will only be implemented after obtaining authorization from incumbent state entities, and under their supervision -according to national standards -including regarding pollution control. Criteria to follow up compliance will be included in the M&E system. *** Program coordinator, Project officers, Implementing partners and organizations, MiAmbiente** **Continuous**	
13 Avoidance of significant negative impact on public health	**Level**	Some of the agricultural activities proposed could generate health risks if they fail to comply with pertinent national regulations (for example, during use of fertilizers). To avoid this, executing organizations and beneficiaries will be required to ensure, by formal means (contractual clause or agreement), compliance with the laws and to take any further measures in their power to avoid risks on public health. Criteria to follow up compliance will be included in the M&E system.	

Measures for environmental and social (E&S) risks management, according to AF Environmental and Social Policy and Gender Policy			
1	**2**	**3**	**4**
E&S / G policy of the AF **Risk Description**	**Risk Level**	**Actions addressing risk** *** Responsible person** ***Planned completion**	**Status*** *** This column only for demonstrative purpose. To be completed with baseline analysis.**
		In addition, co-benefits in health sector are envisioned related to improved water management skills at the local level, contributing to efforts to fight *Aedes aegypti* propagation related diseases (dengue and zika). *** Program coordinator, Project officers, Implementing partners and organizations, MiAmbiente** **Continuous**	
14 Protecting physical and cultural change	**Level**	None of the proposed activities pose a risk that there will be alteration or damage to sites or cultural resources with natural or scenic value. Despite of this, criteria to follow up compliance with this principle will be included in the M&E system. *** Program coordinator, Project officers, Implementing partners and organizations, MiAmbiente** **Continuous**	

Table 52. Risk rating key

3	**MAJOR - Intolerable Risk Level** **Immediate Action required to reduce risk to a broadly acceptable level and monitoring**
2	**MODERATE - Tolerable Risk Level** **Action required to reduce risk to a lower level within a reasonable time period or close monitoring**
1	**MINOR - Inconsequential Risk Level** **Periodic monitoring required.**

D. Monitoring and evaluation arrangements and budgeted M&E plan

. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan, in compliance with the ESP and Gender Policy of the Adaptation Fund.

D1. Description of Monitoring & Evaluation mechanisms

Monitoring and evaluation will be carried out according to the provisions of the Quality Management System of NATURA Foundation (NIE), following the Policies, guidelines, and the procedures of the Adaptation Funds.

A Climate Change Manager will be responsible for monitoring program progress and personnel of the program implementation unit. The intermediate and final evaluation, the annual audits will be done by external consultants.

Monitoring and evaluation will be conducted in two (2) levels:
1. Program Level (Management of Climate Change).
2. Implementing organizations / partners Level.

Interinstitutional implementation mechanisms will also provide support to the monitoring and evaluation scheme.

At program level:
The monitoring plan will be based on performance indicators, targets and means of verification and will be prepared by the program implementation unit (Climate Change Office within NATURA Foundation) during the program planning stage. It will also establish the information system to be used to assess progress, performance and the impact of the program.
At this level will be the participation of the NATURA Board of Trustees (JS) and the National Committee of Climate Change (CONACCP), composed by 27 Government Institutions, Experts and academy.
The CONACCP and the JS will meet twice a year in order to revise the progress of the Program. The NATURA Foundation should present a trimestral report and annual audits, as well as the Work Planning and the Annual Budget for the Program in order to be validated. Every single document should be posted on the NATURA Foundation WEB PAGE as a part of the Monitoring Program.

Monitoring Field Trip will be done with the participation of CONACCP and JS as a verification of the project progress, where, they (CONACCP and JS) will do the recommendation of the project implementation.

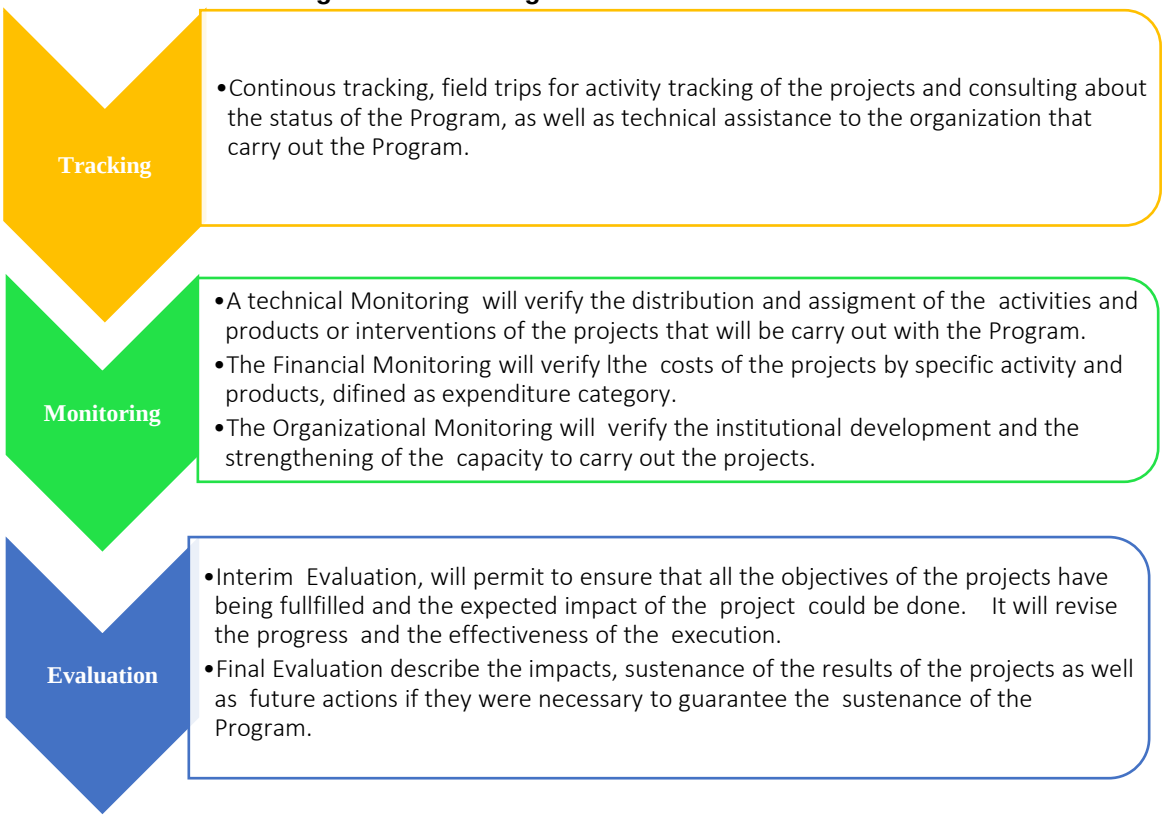
The Reports presented to CONACCP and JS will be sent to the Adaptation Funds, according to the established requirements.

At the Implementing organizations / partners Level:
At this level, will be the participation of the regional institutions like Mi Ambiente, MIDA, IDIAP, Academic Institutions, Basin Committee, and the specific local Government of the target watersheds SMRW and CHVRW to ensure the good implementation of the Projects.

Trimestral meeting will be realized with the regional institutions in order to present the progress of the projects. The EE should present a report of the trimestral progress.
The process of assessing and monitoring during the implementation of projects is aimed at ensuring planned progress, and that the program is advancing on annual operating plans and makes proper use of financial resources. Fundación Natura will verify whether each implementing organization complies with the operating manuals that should include internal control systems.
Continuous monitoring of progress on projects -activities and products- will be conducted to analyze the current situation, identify incidents / problems and seek solutions, keep project activities within the timeframes established in the Annual Operating Plan, and measure progress against expected results.
Jointed Field Trips should be done between NATURA Foundation and Regional Institutions.

Interim evaluations will be carried out to assess the effectiveness of projects, check methodologies and draw lessons as well as make improvements where required.
The process for monitoring and evaluation of projects is shown in the following chart:

Figure 7 Monitoring and evaluation mechanism



NATURA will technically supervise the projects through:

1. Review of quarterly reports of the executing agencies.
2. Field visits where the degree of progress of activities according to the Operational Plan be verified.
3. Participation in the project activities.
4. Regular meetings to follow up with regional institutions, implementing organizations and beneficiaries.
5. Satisfaction of beneficiaries through implementation of interviews / direct surveys or case studies in which direct beneficiaries could express their assessment of the project intervention.

D2. Detailed Budget for M&E plan

Table 53. Detailed budget for the monitoring and evaluation plan

Detail		Responsible	Timeframe/ Frequency	Budgeted Costs (USD)	Type of expenditure	Budgetary Reference
Baseline survey	To be determined at the beginning of the project.	NIE	In the first half of the program	20,000	Consultancy	M&E included in implementing entity fee
Meetings	Presentation of quarterly progress to the National Committee on Climate Change and MiAmbiente. At different stages of the projects, with implementation organizations/partners (IO/P), regarding the development of projects and products.	NIE IO/P	Quarterly According to the project needs	7,000	Services	M&E included in implementing entity fee
Workshops	Launch Program with institutions Will be held with each IO/P to develop a M&E plan for corresponding projects. To prepare annual operating plans. To conduct external evaluations.	NIE IO/P	In the first three months of project implementation. Annual Evaluation dates	5,500	Per diem+ services	M&E included in implementing entity fee

Detail		Responsible	Timeframe/ Frequency	Budgeted Costs (USD)	Type of expenditure	Budgetary Reference
Quarterly reports	Include technical and financial reports to be submitted to the NIE, based on annual operating plans. Annual plans should include actions to be undertaken in the year and the budget required for the implementation of activities. The financial report includes the quarterly disbursement request.	IO/P	Quarterly		Personal	M&E included in project execution cost
Annual /final reports	Technical annual report. External audit report. The IO/P presents to NIE its annual report. The NIE presents to AF and stakeholders its annual report for accountability.	IO/P NIE	At the end of each year (90 días)	3,500	Services	M&E included in project execution cost
Field visits	Technical, administrative and financial	NIE	Monthly	22,320	Per diem + Gas + Transport +	M&E included in implementing entity fee

Detail		Responsible	Timeframe/ Frequency	Budgeted Costs (USD)	Type of expenditure	Budgetary Reference
	monitoring of IO/P from NIE staff. • Checking the progress of tasks according to the Operational Plan of each IO/P. • Beneficiary satisfaction: apply direct survey/interviews regarding each aspect of the Project: perception of implementers, beneficiaries, collaborators. • Problems found: includes at implementer level, project technical aspects, with partners or collaborators and/or project management. • Technical assistance					
Quarterly monitoring reports	These will be elaborated after field visits by NIE officers. These reports must be prepared against targets and products, and include interviews,	NIE	Quarterly	2,000		M&E included in implementing entity fee

Detail		Responsible	Timeframe/ Frequency	Budgeted Costs (USD)	Type of expenditure	Budgetary Reference
	photographs, field visit reports and meetings memory aids.					
External Audit resources of implemented projects final	The purpose is to conduct a financial audit on resources of implemented projects, based on the opinion of independent external auditors for each project. An external audit of the program will be performed and presented to the AF.	IO/P	End of each Project (grant)		Consultancy+ Per diem	M&E included in project execution cost
External Audit	Will be held annually a financial audit to the Fund, based on the opinion of independent external auditors of each project.	NIE	Anual	90,000 (30,000 per year)	Consultancy+ Per diem	M&E included in implementing entity fee
Intermediate external evaluation	The first (Intermediate external evaluation) is carried out at mid-term of the program. Must provide reliable information, recommendations and lessons learned that contribute to the	NIE	At the mid-point of programme implementation.	30,000	Consultancy+ Per diem	M&E included in implementing entity fee

Detail		Responsible	Timeframe/ Frequency	Budgeted Costs (USD)	Type of expenditure	Budgetary Reference
	successful development of the subsequent stage of the project. This assessment is made by an external consultant.					
Final external evaluation	This assessment is made by an external consultant.	NIE	Final, three months before the completion of Execution	100,000	Consultancy+ Per diem	M&E included in implementing entity fee

Note: Budgeted Costs (USD), do not include costs of NIE personnel salary neither travel allowances or costs of M&E of executing agencies.

Quarterly reports:
Executing agencies will submit technical and financial reports NATURA Foundation. The technical report shall record the results of the technical implementation achieved in the reported quarter. In it, the actions taken and the results will be included; arrears, justifications and corrective and rescheduling, if any. The technical report shall include graphics, photos, reports, brochures, newsletters, videos, reports of meetings and other documents generated in the period and to complement the information.
Financial reports record the expenditures made in the period, according to the distribution of the approved budget and in accordance with the approved Annual Operating Plan.

Semiannual / Annual / Final Report:
Reports program progress meetings will be presented biannually to CONACCP and JS to 20 days after the end of each period.
These reports present the performance according to the Annual Operating Plan, constraints and challenges, budget execution report as well as the status and evaluation of projects of each program component.
NATURA Foundation as NIE submit semiannual and annual reports to the Adaptation Fund Program, according to the requirements established by the Fund.

Field Visits / Monitoring Reports:
The NIE made periodic visits to field projects to monitor progress in its work plan as well for interviews / surveys beneficiaries.

External audits:
Executing agencies perform external audit following the procedures of the Quality Management System of NATURA. The specific objectives of the audit is to express an opinion on whether the states of accountability of the funds managed by the executing agency, present fairly, in all material respects, revenues received and costs incurred during the period audited in accordance with the terms of contracts and with the generally accepted accounting principles or other comprehensive basis of accounting (including revenue base and cash disbursements and modifications to the cash basis), determine whether there is breach of contract and illegal acts that have occurred or is likely to have occurred, to be properly identified, determine whether the executing agency has taken adequate on the recommendations of previous audit reports corrective actions. This audit is presented by the EE to the NIE.
NATURA Foundation as NIE conducts annual audits of the program which will be submitted to the Adaptation Fund, according to the requirements established by the Fund

Intermediate Evaluation:
It was developed in the mid-period of implementation of the program with a (independent) external consultancy. The result of the evaluation should provide reliable and useful recommendations and lessons learned that contribute to the successful development of the subsequent stage of the program; the progress and effectiveness in implementing the program in terms of objectives and outputs, mechanisms for cooperation between the executing agencies and regional institutions among others to identify possible improvements to the product or program interventions will be reviewed.

The specific purpose is:

- Evaluate the process of attaining, state, and use of the project key products. Determining the quality thereof.
- Identify the main difficulties encountered in implementing the project, how they affected it, if they were outdone or if they persist.
- Identify achievements and lessons learned.
- Consolidate and propose recommendations to the different actors regarding their roles and expected contributions to project continuity.
- Allows to ensure that the objectives are being met and the expected impact can be delivered (Interim Evaluation)
- Evaluate efforts on monitoring and support provision of NIE to projects, and issue recommendations.

The result of the interim evaluation will be delivered to the CONACCP and shared with regional institutions and implementing agencies to make adjustments if necessary.

Final Evaluation:
Three months will be developed before the end of the financing with a (independent) external consultancy. The assessment will contribute to building knowledge, to identify whether the design, timing and funding of the program were appropriate to the scope of

the results, especially if they have contributed to the progress of the changes set out as targets. An important aspect of this final assessment is that it will observe whether outputs or outcomes need to be strengthened to achieve sustainability or maturity to the extent planned changes was reached.

The result of the final evaluation will be delivered to the CONACCP and regional institutions in order to ensure continuity of processes started with the program

Procedure of Fundación Natura According to the EMS

To ensure successful implementation of all programs / projects, Fundación Natura operates according to a detailed procedure, which will be used for the monitoring and evaluation of the proposed AF program. A general budget is provided below.

Procedure

1. ***PURPOSE:***

To establish the steps observed by NATURA Foundation for follow up of sub-projects in order to ensure the successful execution of allocated sub-projects.

2. ***SCOPE:***

Responsible for the procedure: Project Manager.
This procedure is applicable to the Trustees Board, the Executive Director, the Executive Director Assistant, the Project Manager, the Administration and Finances Manager, the Project Coordinator, the Administrative Assistant, Accounting and Receptionist; goes from the organization and undertaking of the installation visit by the Project Coordinator up to when the Administrative Assistant receives notice of receipt of Note and Report with sub-projects' performance comments, by the Executing Agency.

3. ***RELATED PROCEDURES AND OTHER DOCUMENTS:***

Documentation Level	***Code***	***Related Documents***
ISO 9001 Standard	*7.5.1*	*Control of the production and service provision*
Management Manual:	*M-GO-2*	*Production and service provision*
This procedure		
Work instructions:	*I-GO-10.1*	*Installation Visit*

	I-GO-10.2 *I-GO-10.3* *I-GO-10.4*	*Revision of the Quarterly Technical and Financial Report and of the request for payment* *Penalty for noncompliance in report delivery* *Technical and administrative monitoring of the sub-project*
Records:	*F-GO-10.1.1* *D* *D* *D* *F-GO-10.0.1* *D* *F-GO-10.4.1* *F-GO-10.0.2*	*Visit of Installation Minutes* *Quarterly Technical Report* *Quarterly Financial Report* *Request for Disbursement* *Note of Comments to the Quarterly Reports or/and Request for Disbursement* *Payment Control Sheet and Financial Plan* *Sub-project's technical and administrative monitoring report* *Note and Report with comments to sub-project's performance*
External documentation:	*N/A*	*N/A*
Related MS documentation:	*P-GO-9* *P-GO-11* *P-GO-14*	*Contracting* *Sub-projects evaluation* *Accountability*

4. PROCEDURE:

***Note 1:** This procedure is not applicable to the Annual Operational Plan and Budget presented by the National Environmental Authority.*

*4.1. Once the Administrative Assistant sends the notarized contract and receives notification of receipt from the Executing Agency, informs the Project Coordinator who organizes and carries out the installation visit, according to **I-GO-10.1 Installation Visit** then prepares the **Installation Visit Minutes, F-GO-10.1.1**, uploads the digital file to the corresponding activity in SIIAP and informs the Project Management.*

*4.2. The Receptionist receives from the Executing Agency: **D-Quarterly Technical Report**, **D-Quarterly Financial Report**, **D-Request for Disbursement** and sends them to the Administrative Assistant, who records the entry and uploads the progress report in SIIAP during the sub-project's monitoring phase with input data from the technical and financial reports and during the sub-project's supervision and control phase with the input data from the Request for Disbursement.*

*4.3. The Project Coordinator revises the Technical and Financial Report and the Request for Disbursement, according to instructions: **I-GO-10.2 Revision of the Quarterly Technical***

and Financial Reports and Request for Disbursement *and* ***I-GO-10.3 Penalty for Noncompliance in Report Delivery****, then proceeds as per case:*

Note 2: *Technical and financial quarterly reports from Executing Agency are due 15 calendar days prior to the termination of the reported quarter and shall be submitted to NATURA Foundation 7 calendar days prior the end of the reported quarter.*

4.3.1. If the Project Coordinator has comments to any of the documents in item 4.2; goes to 4.4.

4.3.2. If the Project Coordinator has no comments to any of the documents in 4.2; goes to 4.6.

4.4. The Project Coordinator prepares prints and signs the ***Note of Comments to Quarterly Reports and/or Request for Disbursement, F-GO-10.0.1*** *and sends it to the Administrative Assistant.*

4.5. The Administrative Assistant delivers then Note of Comments to Quarterly Reports and/or Request for Disbursement, F-GO-10.0.1, gives follow up to the receipt and to the response of respondent to them; goes to 4.2.

4.6. The Project Coordinator prepares a quarterly report for donors and sends it to the Project Management for it to be considered in ***Accountability, P-GO-14****, files the technical and financial reports; goes to 4.7 for carrying out the payment to the organization and goes to 4.15 for monitoring.*

4.7. The Project Coordinator prepares the ***Request for Payment, F-GO-9.2.1****, according to* ***I-GO-9.2 Request for Payment****, submits Request for Payment to the Project Management, who signs it in approval by the superior in line, the Project Coordinator sends the Administrative Assistant the Request for Payment together with the Request for Disbursement of the Executing Agency.*

4.8. The Administrative Assistant sends the Request for Payment and Request for Disbursement and updates their disbursement status in SIIAP.

4.9. Accounting compares the stipulated amount in the request for payment to the request for disbursement and the modified budget (the period indicated in the request for disbursement) of the sub-project. If all documentation is in compliance, accounting updates ***D-Disbursement Control Sheet and Financial Plan****, prepares* ***D-Prepared Payment****, fills out the information in the Request for Payment and files them in the disbursement files, and then sends the file to the Administration and Finances Management and registers the file exit.*

Note 3: *If Accounting finds and discrepancy between the documents verified, it informs the Administrative Assistant, who will correct the discrepancy together with the Project Coordinator and if necessary with the Project Manager and/or respondent.*

4.10. The Administration and Finance Management verifies the file and marks the D-Payment prepared in conformity with the documentation and forwards to accounting where it they register file entry, and send it to the Executive Direction and register file exit.

4.11. The Executive Direction Assistant sends the Executive Director the file, and the Director marks the prepared D-Payment in conformity and sends it to the Executive Direction Assistant, who coordinates the delivery of the full file to the President of the Board of Trustees who verifies the documentation and sign payment.

***Note 4:** When the payment amount requires two signatures the Executive Direction Assistant will coordinate the delivery of the contract file to another member of the Board of Trustees signatory of the bank account from which the payment is to be withdrawn and then he shall proceed with verifying and signature.*

4.12. The Executive Direction Assistant received the file with the signed payment and sends it to Accounting.

4.13. Accounting executes disbursement in favor of the Executing Agency and informs via email to the Project Management, the Administrative Assistant and the Project Coordinator.

4.14. The Administrative Assistant informs the Executing Agency that the disbursement has been executed and registers it in SIIAP the disbursement of 100% with the date on which it was informed to the Executing Agency.

*4.15. The Project Coordinator prepares and carries out the Sub-project monitoring, according to instructions **I-GO-10.5 Sub-project technical and administrative monitoring** and prepares the **Sub-project technical and administrative monitoring Report, F-GO-10.5.1** and sends it to the Project Management. Updates in SIIAP: status of the monitoring activity and uploads digital monitoring report to monitoring activity and updates the progress status on each' sub-project outcome.*

4.16. The Project Management revises the technical and administrative monitoring Report for the sub-project and if it has any comments or suggestions informs them the Project Coordinator who will include them in the sub-project technical and administrative Report.

*4.17. The Project Coordinator prepares, prints and signs the **Note and Report with comments to sub-project's performance, F-GO-10.0.2** to be considered by the Executing Agency in the next technical and financial report and sends it to the Administrative Assistant. Uploads the note and report with comments to sub-project's performance in SIIAP in the corresponding monitoring activity.*

***Note 5:** In the revision of the next-to-last technical and financial report, the Project Coordinator includes in the note a reminder for finishing the works and about the delivery of final technical and financial reports.*

4.18. The Administrative Assistant delivers the Note and Report with comments to sub-project's performance and gives follow up to the receipt by the Executing Agency.

END OF PROCEDURE

E. Results framework for the project proposal, including milestones, targets and indicators

Include a results framework for the project proposal, including milestones, targets and indicators, including one or more core outcome indicators of the Adaptation Fund Results Framework, and in compliance with the Gender Policy of the Adaptation Fund.

Program level results framework with targets set

Table 54. Program level results framework with targets and indicators

Narrative summary	Indicators	Baseline	Target
Objective: Increase climate resilience in water management to enhance food and energy security at the national level, through an integrated and community based approach in the Chiriqui Viejo and Santa Maria Watersheds.			
Impact: Enhanced food and energy security at the national level, through an integrated and community based approach in the Chiriqui Viejo and Santa Maria watersheds.			
Outcome 1: Enhanced climate change resilience for improved food, water, and energy security in target watersheds	- No. of people with improved access to water from water harvest systems implemented in targeted watersheds	0	250 people in both of the targeted watersheds, of which, at least 50% will include women.

Narrative summary	Indicators	Baseline	Target
	- Number of people in targeted communities with climate-smart farming solutions implemented	0	At least 1000 people in targeted communities with climate-smart farming solutions implemented
	- Percentage of income increase by source in targeted population households	TBD in targeted population households (income by source in targeted beneficiaries will be determined by a specific socioeconomic survey to be conducted as part of the overall initial baseline survey programmed at the beginning of the program implelmetation -and for which funds have been requested accordingly in the M&E budget)	Target percentage TBD, but at least should reach 20% increase in each household (such percentage will increase more beyond the program life, as the coffee plants begin producing coffee beans after 3 years of being planted)
Output 1.1: Concrete adaptation measures implemented for household water security			
Activities: 1.1.a Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems:	Number of households with improved access to water from water harvest systems installed	0 0	50 households with water harvest systems installed (25 in each target watershed) 100 people trained on the use and maintenance of

Narrative summary	Indicators	Baseline	Target
i. Carry out a diagnostic for system design. ii. Install water harvest systems and train beneficiaries. iii. Monitor and maintenance. iv. Develop a technical document with guidelines to replicate this technology at national level	Number of people trained on the use and maintenance of the WHS Technical document developed and adopted by the Ministry of Environment	0	the WHS, of which at least 50% will include women. 1 technical document produced and adopted by the Ministry of Environment for reference for future replication of this WHS model.
Output 1.2: Pilot climate-smart farming projects implemented			
Activities: 1.2.a Establish riparian reforestation and agroforestry projects with coffee and soil conservation systems at the Caisan river: 20 farms along 6000 lineal meters of streams of the Caisan river (CHVRW). This activity includes identification of farms per results from the Vulnerability Analysis, Farm Management Plan (with identification of species, crops/area zonification, costs); and the design and establishment of gallery forest, as well as the agroforestry systems.	Number of farms with agroforestry projects established Number of people in targeted communities that benefit from climate-smart agroforestry systems implemented	Number of farms with climate smart production systems (and the number of people that benefits from them) is estimated at 0; nonetheless, to confirm this assumption, an overall initial baseline survey has been programmed at the beginning of the program implelmenteation (and for which funds have been requested accordingly in the M&E budget)	At least 20 farms with climate smart agroforestry (shaded coffee mainly) projects succesfully established At least 100 people, of which 50% are women, benefit from the climate smart agroforestry systems implemented at the Caisan River Sub-watershed in CVRW

Narrative summary	Indicators	Baseline	Target
	Lineal meters of riparian reforestation successfully established	TBD (exact area of existing riparian forest in targeted communities will be determined in the general baseline survey).	6000 lineal meters of riparian reforestation successfully established
1.2.b Establish irrigation systems, with efficient and low cost technologies, to enhance agricultural production and increase crops yields. This includes: i. irrigation needs diagnostic; ii. installation of pilot low cost irrigation system, and training; iii. technical assistance to farmers and companies for the implementation of the irrigation system; and monitoring and evaluation. It also includes -at Divalá-, a complement to the irrigation system consisting of an analysis of the water footprint for rice crops, which will allow identification of technological schemes for climate-smart rice production.	Diagnostic for irrigation needs completed Number of hectares of climate resilient irrigation systems established Number of farmers that received technical assistance Document of the analysis of water footprint for rice crops	0 0 0 0	One irrigation needs diagnostic for Cerro Punta and Divalá production areas At least 150 hectares of climate resilient irriguation systems at Cerro Punta and Divalá 80 farmers (gender dissagregated target will be determined after baseline survey is completed; it is anticipated that the majority of local rice farmers are men). One technical document on rice crop water footprint
Output 1.3: Pilot diversified financing and income source models implemented in vulnerable population areas			
Activities:			

Narrative summary	Indicators	Baseline	Target
1.3.a Implementation of agroforestry and soil conservation systems - 200 hectares (mainly shaded coffee with beans) in the upper section of the watershed	Number of farms with FMP (farm management plans)	0	40 farms of approximately 5 hectares each with FMP
	Number of hectares with climate resilient agroforestry and soil conservation systems established	Number of hectares with climate resilient shaded coffee agroforestry systems (and the number of people that benefit from them) is estimated at 0; nonetheless, to confirm this assumption, an overall initial baseline survey has been programmed at the beginning of the program implementation (and for which funds have been requested accordingly in the M&E budget)	200 hectares of agroforestry schemes (mainly shaded coffee with beans)
	Number of people that benefits from the climate resilient shaded coffee agroforestry systems established		At least 200 people benefit from the climate reslilient shaded coffee systems (gender dissagreggated figure will be determined once the baseline survey is completed, and in full compliance with Gender Policy of the Adaptation Fund)
	Percentage of income increase in targeted population households (40 farms)	TBD in targeted population households (income in targeted beneficiaries will be determined by a specific socioeconomic survey to be conducted as part of the overall initial baseline survey programmed at the beginning of the program implementation -and for which funds have been requested accordingly in the M&E budget)	Target percentage TBD, but at least should reach 20% increase in each household (such percentage will increase more beyond the program life, as the coffee plants begin producing coffee beans after 3 years of being planted)

Narrative summary	Indicators	Baseline	Target
1.3.b Creating capacities for operating orchid and “naranjilla” crops, as well as establishing the correspondent commercialization scheme at the Rio Gallito Sub-Watershed. It includes:			
i. training on establishment and management of orchid and “naranjilla” crops;	Number of people trained on establishment and management of orchid and naranjilla crops	TBD in the participatory communitty rapid assessment included as part of the project (although currently there are 14 naranjilla producers and 4 orchid producers)	TBD, but at least will include current 14 naranjilla producers and 4 orchid producers (currently, all involved producers are women), fully trained on crops management and commercialization
ii. design of business plans;	Number of business plans designed	0	2 business plans designed and in operation (one for naranjilla and one for orchids)
iii. development/improvement of seedling nurseries; advice and technical assistance for commercialization.	Marketing agreements with potential buyers	TBD in the participatory communitty rapid assessment included as part of the project	At least 2 market agreements established for naranjilla and 2 market agreements for orchids
Output 1.4 Concrete adaptation measures implemented for sustainable cattle ranching			
Activities: 1.4.a Implement a sustainable cattle ranching project at SMRW, covering cover 600 has.	Number of hectares with sustainable catlle ranching models	0 (during consultation process it was confirmed that there are 1831 hectares of unsustainable cattle ranching farms)	600 hectares with sustainable catlle ranching models established and in operation

Narrative summary	Indicators	Baseline	Target
	Number of FMP developed Number of people that benefits from the climate resilient catlle ranching projects	0 Number of people that benefit from the sustainable cattle ranching projects is estimated at 0; nonetheless, to confirm this assumption, an overall initial baseline survey has been programmed at the beginning of the program implementation (and for which funds have been requested accordingly in the M&E budget)	120 farm management plans (of around 5 hectares each) At least 600 people benefit from the climate reslilient and sustainable cattle ranching projects (gender dissagreggated figure will be determined once the baseline survey is completed, ensuring full compliance with Gender Policy of the Adaptation Fund)
Output 1.5 Enhanced sectorial support through climate financing instruments			
Activities: 1.5.a Conduct a review on current credit products offered to agriculture and energy sectors; including technical recommendations on climate financing instruments.	Study and technical recommendations on climate financial products designed	0	1 study-review on current credit products offered to agriculture and energy sectors; including technical recommendations on climate financing instruments
1.5.b Develop 4 business plans (2 for each watershed) to establish and operate mini-hydro energy projects, including the	Number of business plans developed to establish and operate renewable	0	4 business plans for small scale renewable

Narrative summary	Indicators	Baseline	Target
correspondent farm management plan, informative prospectus to access financing sources for climate change adaptation activities, and technical assistance offered to obtain such financing. Design a technical recommendations document to replicate this experience at national level	energy projects, including the correspondent FMP Number of farmers that receive technical assistance on access financing sources for climate change adaptation activities	 0	generation projects (hydro, solar, etc) 16 farmers, 8 from each of the two target watersheds (gender dissagreggated target will be determined once the baseline survey is completed, ensuring full compliance with Gender Policy of the Adaptation Fund)
1.5.c Socialize the concept of Microfinance, based on ecosystems and climate change adaptation. It includes: i. Development of Microfinance Institutions mapping for both watersheds; ii. Informative/instructional meetings on Microfinance for Ecosystem-based Adaptation (MEbA) with Microfinance Institutions, and identification of those interested/willing to participate in the training and technical assistance, iii. Selection of 2 Microfinance Institutions (one at each	 Number of microfinance institutions mapping document developed Number of microfinance institutions interested/willing to participate in training on MEbA	 0 0	 1 document with microfinance institutions mapping on both watersheds At least 2 microfinance institutions and/or cooperatives

Narrative summary	Indicators	Baseline	Target
watershed) to develop the training and technical assistance to design and offer one finance product	Number of microfinance institutions trained to design climate change oriented finance products	0	2 trained microfinance institutions and/or cooperatives offer two finance products with MEba model
iv. Implement two to four microfinance programmes with MFIs and cooperatives, each managing a portfolio of EBA micro-projects supporting local smallholders and families	Number of microfinance programmes with MFI and cooperatives designed implemented	0	At least 2 microfinance programmes offered by MIFs and/or cooperatives
Outcome 2: Established climate resilient water management instruments with integrated and community based approach	- No. of water security instruments developed for implementation by districts and the national level that respond to climate-induced challenges	0	8 instruments developed and adopted by incumbent regional/national institutions to respond to new conditions resulting from climate variability and change: • One updated SMRW Management Plan, incorporating the climate change dimension • One vulnerability analysis document completed for the CHVRW • Two technical criteria document developed for granting water use concessions and permits for two watersheds

Narrative summary	Indicators	Baseline	Target
	- No. of people benefiting from management instruments designed and approved by incumbent authorities, which allow improved and sustainable access to water resources in a changing climate scenario	Number of people that currently benefit from management instruments designed and approved by incumbent authorities, which allow improved and sustainable access to water resources in a changing climate scenario is estimated at 0	• One technical recommendations document delivered to responsible parties for adjustments needed to improve hydrological cycle at both watersheds • Two water security disctrict plans designed • National map for agriculture and livestock production developed TBD once baseline survey is completed, but will include population from target communities, watersheds (combined population of the CHVRW and SMRW is about 114,000), and the national level (close to 4 million). Gender dissagregated numbers will be determined after the survey, but will incorporate full compliance with Gender Policy of the Adaptation Fund.
Output 2.1:			

Narrative summary	Indicators	Baseline	Target
Analysis for climate change vulnerability done in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds			
Activities: 2.1.a Update SMRW Management Plan, incorporating the climate change dimension. It must include the analysis of current tendencies, future scenarios, potential socioeconomic impacts on the watershed, and duly prioritized adaptation measures.	Update of the document of SMRW management plan Number of people that participated in the update consultation process	0 0	Updated Santa María River Watershed (SMRW) Management Plan including the climate change's dimension At least 200 people participated in the process, ensuring participation of 50% men and 50% women.
2.1.b Analyze vulnerability of the CHVRW, and validate/adjust climate change adaptation measures identified by the Adaptation Program outlined in the watershed Management Plan	Vulnerability analysis document completed for the CHVRW Number of people that participated in the update consultation process	0	Updated- improved CHVRW Management Plan, including analysis of the climate change dimension At least 200 people participated in the process, ensuring participation of 50% men and 50% women.
Output 2.2: Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among			

Narrative summary	Indicators	Baseline	Target
users and increase ecosystem resilience in response to climate-induced stress			
Activities: 2.2.a Identify the hydrological balance and environmental flow for the SMRW, specifically at the Gallito river micro-watershed.	Technical criteria document developed for granting water use concessions and permits for both watersheds	0	2 technical criteria document for granting water use concessions and permits (one for each watershed) developed and validated with the Ministry of Environment and the Ministry of Agriculture
2.2.b Identify the hydrological balance and environmental flow of the CHVRW, specifically at the Caisán river micro-watershed	Number of awareness meetings with local population and responsible parties in the process of granting water use permits	0	10 awareness meetings completed with local population and responsible parties in the process of granting water use permits
2.2.c Develop a technical document with criteria with incumbent authorities to consider during the process of granting water use permits for agriculture and power generation -based on information and findings from the environmental flows analysis and climate data at national level	Number of people that participated in the process of developing the technical document with criteria for granting water use permits for agriculture and power generation	0	Number of participants TBD at the initial survey of the program, but will observe the Gender Policy of the AF
2.2.d Review current concessions on both watersheds, based on the technical document (product 2.2.c), in order to	Technical recommendations document delivered to responsible parties for	0	1 technical document with recommendations for improving or restoring hydrological cycle at both

Narrative summary	Indicators	Baseline	Target
determine recommendations for improving or restoring the water cycle.	adjustments needed to improve hydrological cycle at both watersheds		watersheds, delivered to and validated by the Ministry of Environment and the Ministry of Agriculture
Output 2.3: Increased hydrological security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security			
Activities: 2.3.a Design 2 district plans for water security, incorporating climate information (1 at each watershed, SMRW and CHVRW)	Number of water security disctrict plans designed	0	2 hydrological security district plans designed and adopted by 2 districts of target watersheds
2.3.b Complement current technical analysis to elaborate a new national map for agriculture and livestock production in the country, based on climate and water management data generated by the program	National map for agriculture and livestock production developed	0	1 national map for agriculture and livestock production developed, adopted and widely publicated by the Ministry of Agriculture Development (MIDA)
Outcome 3: Strengthened local and national capacity for monitoring and decision making to reduce and respond to risks associated to climate change	- No. of communities prepared with EWS for floods and drought risks	No. of communities TBD as part of the overall initial baseline survey that has been programmed at the beginning of the program implementation (and for which funds have been	At least 20 communities prepared to respond to exterme weather events by means of the EWS

Narrative summary	Indicators	Baseline	Target
		requested accordingly in the M&E budget)	
	- No. of people trained on EWS to respond to risk (floods and drought) related to extreme weather events	No. of people is 0, but it will be confirmed (TBD) as part of the initial baseline survey	At least 200 people is trained on EWS to respond to risk (floods and drought) related to extreme weather events
	- No. of institutions with access to upgraded hydro-agro meteorological information	1	At least 4 institutions with access to upgraded hydro-agro meteorological information (MiAmbiente, MIDA, SINAPROC, ETESA)
	- Assessment tool developed to determine program´s adaptation measures effectiveness; and number of people trained to use it	0	1 tool developed to determine program´s adaptation measures effectiveness; at least 80 people trained to use the assessment tool
Output 3.1: Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds			
Activities: 3.1.a Design and operation of the National System for Climate Data, by		0	1 National System of 142 stations for Climate Data,

Narrative summary	Indicators	Baseline	Target
upgrading ETESA´s existing network for recording hydro-agro meteorological information from hydrographic watersheds: i. Rapid assessment of current national network status and technical capacities of hydrometeorology personnel ii. Bidding and acquisition of equipment iii. Installation of stations iv. Operation, data generation and calibration	A National System for Climate Data designed and in operation Number and type of targeted institutions with increased capacity to minimize exposure to climate variability risks Number of new stations installed	An incomplete network of hydrometeorological stations that currently provides some climate data 1 target institution (ETESA) with limited capacity to record climate data 72 stations	with upgraded ETESA´s network for recording hydro-agro meteorological information from hydrographic watersheds 4 institutions (ETESA, MiAmbiente, MIDA, SINAPROC) with access to information for decision making to recuce national exposure to climate variability risks 70 new automatic stations installed
Output 3.2: Established an early warning system to identify in advance, the necessary measures in case of hydro-climatic events that could affect food production and power generation			
Activities: 3.2.a Implement the sound warning system at the communities included in the CHVRW early warning system; and complete signposts along communities at risk areas. This EWS is focused on floods: i. Diagnostic	Number of EWS for floods/droughts fully operational Number of communities included in the CHVRW early warning system	One non-operational EWS for floods at the CHVRW and 0 EWS operational at the SMRW Exact number TBD by initial survey	Two fully operational EWS in target watersheds (one of floods and one for floods-droghts) TBD, but at least 10 communities from CHVRW watershed

Narrative summary	Indicators	Baseline	Target
ii. Acquisition and installation of equipment			
iii. Training/workshops and simulations for capacity building in technical staff and community members; as well as calibration of the system´s equipment.	Number of people trained and with built capacitities on the use of the EWS	0	At least 100 people trained on how to reduce risks to extreme weather events by understanting/using the EWS
	Number of staff trained to respond to and mitigate impacts of climate related events	0	At least 20 staff members trained to respond to and mitigate impacts of climate related events
3.2.b Implement an early warning system for floods and droughts at the SMRW. i. Diagnostic	Number of communities included in the SMRW early warning system	Exact number TBD by initial survey	TBD, but at least 10 communities from SMRW watershed
ii. Acquisition and installation of equipment	Number of people trained and with built capacitities on the use of the EWS	0	At least 100 people trained on how to reduce risks to extreme weather events by understanting/using the EWS
iii. Training/workshops and simulations for capacity building in technical staff and community members; as well as calibration of the system´s equipment.	Number of staff trained to respond to and mitigate impacts of climate related events	0	At least 20 staff members trained to respond to and mitigate impacts of climate related events
Output 3.3: The NSCD interfaced and equipped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information			
Activities:			

Narrative summary	Indicators	Baseline	Target
3.3.a Interface and equip the system with joint node, with the Ministry of Agriculture Development, to generate and manage climatic information. It includes capacity building for technical staff (ETESA and MIDA)	Joint node of climatic information established between ETESA and MIDA Number of people trained and with built capacitities on the management of the joint node	0 0	1 operational joint node of climate information established between ETESA and MIDA, generating climate change information At least 20 staff trained and with capacities built to manage joint node and information on climate change
Output 3.4: Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts			
Activities: 3.4.a Design a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and at national level. This includes program inception workshops with public and nongovernmental relevant stakeholders (at least three workshops).	Tool designed to assess efectiveness of climate change adaptation measures at national level Number of workshops with public and nongovernmental stakeholders on the tool design Number of people from relevant stakeholders	0 0 0	1 tool designed to assess efectiveness of climate change adaptation measures at national level At least 3 workshops with public and nongovernmental stakeholders on the tool design

Narrative summary	Indicators	Baseline	Target
	trained and with built capacities to use the assessment tool		At least 80 people trained and with built capacities to use the assessment tool
Outcome 4: Awareness raised and a knowledge exchange platform established to mitigate impacts of climate change related events.	- No. of people aware of target watersheds´ vulnerability analyses - No. of people with strengthened capacities for climate data analysis and processing, for different sectors; and with strengthened capacities on water resources management by incorporating climate change adaptation approach - No. of people reached by workshops on systematization and dissemination of climate changes adaptation experiences nationwide - Statistics of use of the Portal for Climate Change Adaptation in Panama	TBD 0 0 None	TBD, but at least 2000 people from both targeted watersheds At least 150 people At least 500 people nationwide TBD after initial survey
Output 4.1: Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures			
Activities:			

Narrative summary	Indicators	Baseline	Target
4.1 a Technical working sessions with key implementing partners and project staff to define work plan, coordination arrangements and kick off meetings/requirements. This activity also includes the development and facilitation of training sessions with project staff and partners about the nexus approach to water-energy-food security as an option for adaptation to climate change.	Number of training sessions held Pertentage of project staff trained Percentage of key implementing partners trained	0 0 0	2 working sessions with the technical team and key Implementing partners 100% 100%
4.1.b Program inception workshops with public and nongovernmental relevant stakeholders (at least three workshops: two at watershed level and one at national level).	Number of inception workshops with local and national stakeholders to present the approved programme; revisit programme rationale, scope, define shared visions and operational arrangements for programme implementation.	0	At least 2 local workshops, one for each watershed with local stakeholders; and 1 national workshop with government and civil society stakeholders to present the Programme, identify sinergies with other ongoing adaptation efforts/initiatives and define operational and coordination aspects
4.1.c Socialize the SMRW and CHVRW vulnerability analyses to facilitate the implementation of identified adaptation measures	Number of people that participated during socialization of SMRW and CHVRW vulnerability analyses	0	At least 2,000 people in both target watersheds
Output 4.2			
Activities:			

Narrative summary	Indicators	Baseline	Target
4.2.a Offer a Climate Modelling Course with special emphasis on future scenarios impacting food-energy generation activities (at least 45 participants)	Number of people trained on climate modelling and future scenarios impacting food-energy generation activities	0	At least 45 people trained on climate modelling and future scenarios impacting food-energy generation activities
4.2.b Offer an international course on Adaptation to Climate Change: Role of Ecosystem Services (45 participants nationwide, including stakeholders in the two prioritized watersheds)	Number of people trained on adaptation to climate change and the role of ecosystem services	0	At least 45 people trained on adaptation to climate change and the role of ecosystem services
Output 4.3: Strengthened professional capacities on water resources management by incorporating climate change adaptation approach			
Activities: 4.3.a Offer an international course on participatory and integrated watershed management emphasizing conflict management skills	Number of people trained on participatory and integrated watershed management emphasizing conflict management skills	0	At least 40 people trained on participatory and integrated watershed management emphasizing conflict management skills
4.3.b Offer an international course on ecosystem-based adaptation at marine-coastal zones	Number of people trained on ecosystem-based adaptation at marine-coastal zones	0	At least 20 people trained on ecosystem-based adaptation at marine-coastal zones
Output 4.4:			

Narrative summary	Indicators	Baseline	Target
Systematized and disseminated experiences on climate changes adaptation, nationwide			
Activities: 4.4.a Systematized and disseminated experiences on climate changes adaptation, nationwide	Technical and practical document (mapping and analysis of projects / initiatives undertaken) designed and made avaible in print and digital formats Number of news outlets in the local press and media that have covered this dissemination of experiences	0 0	1 document produced in print (500 units) and digital formats, broadly disseminated nationwide At least 6 news outlets in the local press and media that have covered this dissemination of experiences
4.4.b 10 workshops will be held at national level -1 per province- to present the document (4.4.a)	Number of people who attended workshops at each province of the country	0	At least 500 people (50 in each province)
Output 4.5: Portal for Climate Change Adaptation in Panama, implemented: Adaptation knowledge management and communication strategy			
Activities: 4.5.a Communication strategy and systematization of experiences from the program	Systematization document developed	0	1 systematization document produced about

Narrative summary	Indicators	Baseline	Target
			experiences from the program
	Number of people reached by the communication strategy throughout the program	0	TBD after general survey at the beginning of the program implementation
	Number of news outlets in the local press and media that have covered this dissemination of experiences	0	At least 20 news outlets in the local press and media that have covered the program
4.5.b Design and operation of the Portal for Climate Change Adaptation in Panama: i. Design of portal structure and contents. ii. Portal continuous update	Number of visits per month of the portal	0	TBD after the completion of product 4.1.a
	Percentage of favorable comments on usefulness of the portal	0	TBD after the completion of product 4.1.a
4.5.c Compilation and synthesis of materials for different audiences -farmers, institutions, academia, etc.- on adaptation to climate change (knowledge products)	Number of knowledge products generated and made available to different users by the program	0	Not less than 20 products throughout the complete program execution
	Number of people reached by knowledge products from the program	0	TBD after the completion of product 4.1.a
4.5.d Training on the use of the portal for different audiences (farmers, institutions, academia, etc.)	Number of people who benefit from the training on the use of the portal	0	At least 500 people trained on the use of the portal

Narrative summary	Indicators	Baseline	Target
4.5.e Establishment of an advisory technical committee within the Climate Change National Committee to orient the program´s knowledge management process	Advisory technical committee established to orient the knowledge management process Number of decisions made and implemented from advisory technical committee meetings	0 0	1 Advisory technical committee established and operational to orient the knowledge management process TBD after the completion of product 4.1.a
4.5.f Experience exchanges activities at the local level, including at least one international pasantía (guided visit): i. For capacity building on agroforestry, sustainable cattle ranching, and irrigation systems in operation (international); to be carried out at mid-term of proposed projects implementation. ii. For capacity building on the EWS (international). iii. For farmer-to-farmer exchanges at SMRW and ChVRW.	Number of people trained from technical exchanges	0	At least 100 people trained in exchange activities at the local level

F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Alignment of the programs results framework with the Adaptation Fund results framework

Table 55. Alignment of the program results framework with the Adaptation Fund results framework

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
Enhanced climate change resilience for improved food, water, and energy security in target watersheds	- No. of people with improved access to water from water harvest systems implemented (disaggregated by gender) - Percentage of targeted population with climate-smart farming solutions implemented - Income increase by source in targeted population	P Output 1.1 Concrete adaptation measures implemented for household water security	1.1.a Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems: v. Carry out a diagnostic for system design. vi. Install water harvest systems and train beneficiaries. vii. Monitor and maintenance. viii. Develop a technical document with guidelines to replicate this technology at national level	AF Output 6. Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1 No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies 6.1.2 Type of income sources for households generated under climate change scenario	4,326,541
		P Output 1.2 Pilot climate-smart farming projects implemented	1.2.a Establish riparian reforestation and agroforestry projects with coffee and soil conservation systems at the Caisan river: 20 farms along 6000 lineal meters of streams of the Caisan river (CHVRW). This activity includes identification of farms according to results from the Vulnerability Analysis, Farm Management Plan (with identification of species, crops/area zonification, costs); and the design and establishment of gallery forest, as well as the agroforestry systems. 1.2.b Establish irrigation systems, with efficient and low cost technologies, to enhance agricultural production and increase crops yields. This includes: iv. irrigation needs diagnostic;			

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
			v. installation of pilot low cost irrigation system, and training; vi. technical assistance to farmers and companies for the implementation of the irrigation system; and monitoring and evaluation. vii. It also includes -at Divalá-, a complement to the irrigation system consisting of an analysis of the water footprint for rice crops, which will allow identification of technological schemes for climate-smart rice production.			
		P Output 1.3 Pilot diversified financing and income source models implemented in vulnerable population areas	1.3.a Implementation of agroforestry and soil conservationon in 20 farms located in Districts of Renacimiento and establishing reforestarion for protection of watercourses 1.3.b Implement the strategic action of creating capacities for operating orchid and “naranjilla” crops, as well as establishing the correspondent commercialization scheme at CRSM. It includes: iv. training on establishment and management of orchid and “naranjilla” crops; v. design of business plans; vi. development/improvement of seedling nurseries; advice and technical assistance for commercialization.			
		P Output 1.4 Concrete adaptation measures implemented for sustainable cattle	1.4.a Implement a sustainable cattle ranching project at SMRW, covering cover 600 has.			

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
		ranching P Output 1.5 Enhanced sectorial support through climate financing instruments	1.5.a Conduct a review on current credit products offered to agriculture and energy sectors; including technical recommendations on climate financing instruments. 1.5.b Develop 4 business plans (2 for each watershed) to establish and operate mini-hydro energy projects, including the correspondent farm management plan, informative prospectus to access financing sources for climate change adaptation activities, and technical assistance offered to obtain such financing. Design a technical recommendations document to replicate this experience at national level. 1.5.c Socialize the concept of Microfinance, based on ecosystems and climate change adaptation. It includes: v. Development of Microfinance Institutions mapping for both watersheds; vi. Informative/instructional meetings on Microfinance for Ecosystem-based Adaptation (MEbA) with Microfinance Institutions, and identification of those interested/willing to participate in the training and technical assistance, vii. Selection of 2 Microfinance Institutions (one at each watershed) to develop the training and technical assistance in order to design and offer one finance product.			

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
Improved water governance and natural resources management in prioritized watersheds	- No. of water security instruments developed for implementation by districts that respond to climate-induced challenges - No. of people benefiting from management instruments designed and approved by incumbent authorities, which allow improved and sustainable access to water resources in a changing climate scenario	P Output 2.1 Analysis for climate change vulnerability done in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds P Output 2.2 Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress P Output 2.3 Increased hydrological security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the	2.1.a Update SMRW Management Plan, incorporating the climate change dimension. It must include the analysis of current tendencies, future scenarios, potential socioeconomic impacts on the watershed, and duly prioritized adaptation measures. 2.1.b Analyze vulnerability of the CHVRW, and validate/adjust climate change adaptation measures identified by the Adaptation Program outlined in the watershed Management Plan 2.2.a Identify the hydrological balance and environmental flow for the SMRW, specifically at the Gallito river micro-watershed. 2.2.b Identify the hydrological balance and environmental flow of the CHVRW, specifically at the Caisán river micro-watershed 2.2.c Develop a technical document with criteria with incumbent authorities to consider during the process of granting water use permits for agriculture and power generation -based on information and findings from the environmental flows analysis and climate data at national level. 2.2.d Review current concessions on both watersheds, based on the technical document (product 2.2.c), in order to determine recommendations for improving or restoring the water cycle. 2.3.a Design 2 district plans for water security, incorporating climate information (1 at each watershed, SMRW and CHVRW). 2.3.b Complement current technical analysis to elaborate a new national map for agriculture and livestock production in the country, based on	AF Output 4. Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability AF Output 1.1 Risk and vulnerability assessment conducted and updated	4.1.1 No. and type of development sector services modified to respond to new conditions resulting from climate variability and change (by type and scale) 1.1 No of projects/programmes that conduct and update risk and vulnerability assessments (by sector and scale)	515,000

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
		National Plan for Water Security	climate and water management data generated by the program.			
Increased preparedness in target watersheds and reduced risk for disasters among vulnerable communities nationwide Improved access to data for informed, timely decision-making regarding climate variability risks	- No. of communities and population prepared with EWS for floods and drought risks - No. of institutions with access to upgraded hydro-agro meteorological information - Assessment tool developed to determine program´s adaptation measures effectiveness; people trained to use it	P Output 3.1 Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds P Output 3.2 Established an early warning system to identify in advance, the necessary measures in case of hydro-climatic events that could affect food production and power generation	3.1.a Design and operation of the National System for Climate Data, by upgrading ETESA´s existing network for recording hydro-agro meteorological information from hydrographic watersheds: v. Rapid assessment of current national network status and technical capacities of hydrometeorology personnel vi. Bidding and acquisition of equipment vii. Installation of stations viii. Operation, data generation and calibration 3.2.a Implement the sound warning system at the communities included in the CHVRW early warning system; and complete signposts along communities at risk areas. This EWS is focused on floods: iv. Diagnostic v. Acquisition and installation of equipment vi. Training/workshops and simulations for capacity building in technical staff and	AF Output 1.1 Risk and vulnerability assessment conducted and updated AF Output 2. Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	1.2 No. of early warning systems (by scale) and no. of beneficiaries covered 2.1.2 No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector, and scale)	2,801,000

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
			community members; as well as calibration of the system´s equipment. **3.2.b Implement an early warning system for floods and droughts at the SMRW.** iv. Diagnostic v. Acquisition and installation of equipment vi. Training/workshops and simulations for capacity building in technical staff and community members; as well as calibration of the system´s equipment.			
		P Output 3.3 The NSCD interfaced and equipped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information	**3.3.a Interface and equip the system with joint node, with the Ministry of Agriculture Development, to generate and manage climatic information. It includes capacity building for technical staff (ETESA and MIDA)**			
		P Output 3.4 Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts*	**3.4.a Design a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and at national level. This includes program inception workshops with public and nongovernmental relevant stakeholders (at least three workshops).** ***This program will serve MiAmbiente in starting to evaluate progress of other adaptation efforts being implemented in the country.**			

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
Improved institutional capacity, knowledge management, and awareness on climate change adaptation	- No. of people aware of target watersheds´ vulnerability analyses - No. of population participating in adaptation measures (disaggregated by gender) - No. of people with strengthened capacities for climate data analysis and processing, for different sectors (disaggregated by gender) - No. of people with strengthened capacities on water resources management by incorporating climate change adaptation approach (disaggregated by gender) - No. of people reached by systematization and dissemination of climate changes adaptation experiences nationwide - Number of women participating in training events - Number of indigenous women participating in training events	P Output 4.1 Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures P Output 4.2 Strengthened professional capacities for the climate data analysis and processing, for different sectors involved P Output 4.3 Strengthened professional capacities on water resources management by incorporating climate change adaptation approach	4.1 a Technical working sessions with key implementing partners and project staff to define work plan, coordination arrangements and kick off meetings/requirements. This activity also includes the development and facilitation of training sessions with project staff and partners about the nexus approach to water-energy-food security as an option for adaptation to climate change. 4.1.b Program inception workshops with public and nongovernmental relevant stakeholders (at least three workshops: two at watershed level and one at national level). 4.1.c Socialize the SMRW and CHVRW vulnerability analyses to facilitate the implementation of identified adaptation measures 4.2.a Offer a Climate Modelling Course with special emphasis on future scenarios impacting food-energy generation activities (at least 45 participants). 4.2.b Offer an international course on Adaptation to Climate Change: Role of Ecosystem Services (45 participants nationwide, including stakeholders in the two prioritized watersheds). 4.3.a Offer an international course on participatory and integrated watershed management emphasizing conflict management skills (40 participants nationwide, including stakeholders in the two prioritized watersheds). 4.3.b Offer an international course on ecosystem-based adaptation at marine-coastal zones. (20 participants)	AF Output 3. Targeted population groups participating in adaptation and risk reduction awareness activities AF Output 2. Strengthened capacity of national and sub-national centers and networks to respond rapidly to extreme weather events	3.1 No. of news outlets in the local press and media that have covered the topic. 2.1.1 No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender)	754,870

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
	- Statistics of use of the Portal for Climate Change Adaptation in Panama	P Output 4.4 Systematized and disseminated experiences on climate changes adaptation, nationwide	4.4.a Mapping and analysis of projects / initiatives undertaken (documentation and systematization of experience on implemented projects). A technical and practical document that will be available in print and digital format will be developed. 4.4.b 10 workshops will be held at national level -1 per province- to present the document (4.4.a).			
		P Output 4.5 Portal for Climate Change Adaptation in Panama, implemented: Adaptation knowledge management and communication strategy	4.5.a Communication strategy and systematization of experiences from the program. 4.5.b Design and operation of the Portal for Climate Change Adaptation in Panama: iii. Design of portal structure and contents. iv. Portal continuous update and maintenance. 4.5.c Compilation and synthesis of materials for different audiences -farmers, institutions, academia, etc.- on adaptation to climate change (knowledge products). 4.5.d Training on the use of the portal for different audiences (farmers, institutions, academia, etc.). 4.5.e Establishment of an advisory technical committee within the Climate Change National Committee to orient the program´s knowledge management process. 4.5.f Experience exchanges activities at the local level, including at least one international pasantía (guided visit):			

Project Outcome(s)	Project Outcome Indicator(s)	Project Output(s)	Proposed activities	Fund Output	Fund Output Indicator	Grant Amount (USD)
			iv. For capacity building on agroforestry, sustainable cattle ranching, and irrigation systems in operation (international); to be carried out at mid-term of proposed projects implementation. v. For capacity building on the EWS (international). vi. For farmer-to-farmer exchanges at SMRW and ChVRW.			

G. 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

Detailed budget with budget notes

Table 56. Detailed budget with budget notes
BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
1. Increase climate change and variability adaptation capacity in agriculture, livestock, and energy production sectors							
Output 1.1	Concrete adaptation measures implemented for household water security	a) Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems.	97,000	93,500	11,000	201,500	Grant
		Diagnostic	5,000			5,000	
		Installation of water harvesting systems	85,000	85,000		170,000	
		Maintenance of water harvesting systems		5,000	7,000	12,000	
		Systematization of experience and technical guidance for implementing water harvesting as a means of adaptation to CC			4,000	4,000	
		Training on issues of hydrological water cycle + Integrated Water Resources Management (basins), methodology for installing the SCALL (collection system and utilization of rainwater) and basic concepts of climate change.	7,000	3,500		10,500	
		Total	**97,000**	**93,500**	**11,000**	**201,500**	
Output 1.2	Pilot climate-smart farming projects implemented	a) Implementación de los sistemas agroforestales y conservación de suelo en 20 fincas localizadas en el distrito de Renacimiento and establishing reforestation for protection of watercourse. This activity includes identification los sitios en el distrito de Renacimiento (Caisán, Río Sereno, Renacimiento) to results from the Vulnerability Analysis, Farm Management Plan (with identification of species, crops/area zonification, costs) and the design.	424,104	86,221	39,056	549,381	Grant
		Development of Farm Management Plans (PMF) in 20 farms	10,000			10,000	

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
		Implementation of agroforestry and soil conservation in 20 farms / 40 ha (located in the Renacimiento district. Harvesting, marketing, infrastructure (silos, dryers), preparation of cost or production, selling price, profit margin is included, quality control and establishment of business agreements (coffee beans). Includes 2 community promoters	330,010	42,570	23,940	396,520	
		Facilitating access to climate-resistant seeds with 2 demonstration plots (coffee)	30,000	20,000		50,000	Agreement
		Establishment of gallery forests 6,000 seedlings (6,000 linear meters) of streams of the river Caisan (CHVRW) (establishment and maintenance)	43,094	14,151	13,116	70,361	Grant
		Preparation of planting schedule for coffee and rice		5,000		5,000	Agreement
		Training Plan of pest control techniques, shade coffee system	11,000	4,500	2,000	17,500	Grant
		b) Establish irrigation systems, with efficient and low cost technologies, to enhance agricultural production and increase crops yields. This includes: irrigation needs diagnostic; installation of pilot low cost irrigation system; technical assistance to farmers and companies for the implementation of the irrigation system; and monitoring and evaluation. It also includes -at Divalá-, a complement to the irrigation system consisting of an analysis of the water footprint for rice crops, which will allow identification of technological schemes for climate-smart rice production.	149,000	295,000	10,000	454,000	Agreement
		Irrigation needs analysis (consultant / including Sys. Irrigation installation)	10,000			10,000	consultancy
		Installation of low-cost irrigation systems	125,000	250,000		375,000	goods + services
		Maintenance		9,000	10,000	19,000	services
		Technical assistance	9,000	6,000		15,000	Consultancy
		Training Plan (4 workshops and 2 exchanges)	5,000	10,000		15,000	goods + services
		Analysis of the rice water footprint and identification schemes for climate smart rice production		20,000		20,000	Consultancy

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
		Total	**573,104**	**381,221**	**49,056**	**1,003,381**	
Output 1.3	Pilot diversified financing and income source models implemented in vulnerable population areas	a) Implement the strategic action of agroforestry - soil conservation systems	963,010	288,300	161,600	1,412,910	Grant
		Development of Farm Management Plans (FMPs) in 40 farms; It includes soil analysis	10,000			10,000	
		Implementation of agroforestry and soil conservation in 200 ha in CRSM (coffee). It Includes 2 community promoters	947,010	283,800	159,600	1,390,410	
		Training Plan	6,000	4,500	2,000	12,500	
		b) Implement the strategic action of creating capacities for operating orchid and “naranjilla” crops, as well as establishing the correspondent commercialization scheme at CRSM. It includes training on establishment and management of orchid and “naranjilla” crops; design of business plans; development/improvement of seedling nurseries; advice and technical assistance for commercialization.	41,000	16,000	1,500	58,500	Grant
		Development / improvement of nurseries	30,000	10,000		40,000	
		Business plan design	5,000			5,000	
		Training on issues of orchids and naranjilla	3,000			3,000	
		Marketing system		3,000		3,000	
		Technical assistance	3,000	3,000	1,500	7,500	
		Total	**1,004,010**	**304,300**	**163,100**	**1,471,410**	
Output 1.4	Concrete adaptation measures implemented for sustainable cattle ranching	a) Sustainable cattle ranching project implemented at SMRW, covering cover 600 ha	695,000	668,750	114,500	1,478,250	Grant
		Development of PMF (sustainable livestock)	75,000			75,000	
		Implementation. It Includes 2 community promoters	600,000	643,750	80,000	1,323,750	
		Maintenance		5,000	30,000	35,000	
		Training Plan	20,000	20,000	4,500	44,500	
		Total	**695,000**	**668,750**	**114,500**	**1,478,250**	
Output 1.5		a) Review current credit products offered to agriculture and energy sectors.	0	10,000	0	10,000	Grant

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
		Study and technical recommendations on climate financial products		10,000		10,000	
		b) Develop 4 business plans (2 for each watershed) to establish and operate mini-hydro energy projects, including the correspondent farm management plan, informative prospectus to access financing sources for climate change adaptation activities, and technical assistance offered to obtain such financing.	0	67,000	0	67,000	
		Development of business plans and support for mini hydro projects	0	67,000		67,000	
	Enhanced sectorial support through climate financing instruments	c) Socialize the concept of Microfinance, based on ecosystems and climate change adaptation. It includes: Development of Microfinance Institutions mapping for both watersheds; Informative/instructional meetings on Microfinance for Ecosystem-based Adaptation (MEbA) with Microfinance Institutions, and identification of those interested/willing to participate in the training and technical assistance, - Selection of 2 Microfinance Institutions (one at each watershed) to develop the training and technical assistance in order to design and offer one finance product. * To complete this activity, the program will take into consideration the experiences and products developed in the context of the MEbA project at Perú and Colombia.	0	89,000	6,000	95,000	
		Mapping of microfinance institutions in both basins		15,000		15,000	
		MEbA Meetings with microfinance institutions		10,000		10,000	
		Training and Technical Assistance		35,000		35,000	
		Promotion and piloting the MEbA		20,000		20,000	
		M&E		9,000	6,000	15,000	
		Total	**0**	**166,000**	**6,000**	**172,000**	
		TOTAL	**2,369,114**	**1,613,771**	**343,656**	**4,326,541**	
2. Establish climate resilient water management instruments with integrated and community based approach							

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
Output 2.1	Analysis for climate change vulnerability done in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds.	a) Update SMRW Management Plan, incorporating the climate change dimension. It must include the analysis of current tendencies, future scenarios, potential socioeconomic impacts on the watershed, and duly prioritized adaptation measures.	180,000	0	0	180,000	Agreement / Consultancy
		Update RSM Management Plan incorporating the variability of climate change (consulting)	180,000			180,000	
		b) Analyze vulnerability of the CHVRW, and validate/adjust climate change adaptation measures identified by the Adaptation Program outlined in the watershed Management Plan.	100,000	0	0	100,000	Grant
		Vulnerability analysis and validation of measures identified by the adaptation program PM (consulting)	100,000			100,000	
		Total	**280,000**	**0**	**0**	**280,000**	
Output 2.2	Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress	a) Identify the hydrological balance and environmental flow for the SMRW, specifically at the Gallito river microwatershed.	45,000	0	0	45,000	Grant
		Development of water balance and environmental flow - Microcuenca Gallito	45,000			45,000	
		b) Identify the hydrological balance and environmental flow of the CHVRW, specifically at the Caisán river microwatershed.	45,000	0	0	45,000	Grant
		Development of water balance and environmental flow - Subwatershed Caisán	45,000			45,000	
		c) Develop a technical document with criteria to consider during the process of granting water use permits for agriculture and power generation -based on information and findings from the environmental flows analysis.	10,000	15,000	0	25,000	Consultancy
		Document elaboration with technical criteria to consider in the process of awarding water concessions for agriculture and electricity generation based on the analysis of environmental flows and other information exists at national level	10,000	15,000		25,000	

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
		d) Review current concessions on both watersheds, based on the technical document, in order to determine recommendations for improving or restoring the water cycle.	7,000	8,000	0	15,000	
		With the result of the product "c" document elaboration with recommendations to improve or restore the hydrological cycle in both areas of intervention	7,000	8,000		15,000	
		Total	**107,000**	**23,000**	**0**	**130,000**	
Output 2.3	Increased hydrological security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security	a) Design 2 district plans for water security, incorporating climate information (1 at each watershed, SMRW and CHVRW).	10,000	20,000	0	30,000	Agreement / Consultancy
		Design of two (2) district plans (one in each basin) of water security incorporating climate information	10,000	20,000		30,000	
		b) Complement current technical analisys to elaborate a new national map for agriculture and livestock production in the country, based on climate and water management data generated by the program.	15,000	60,000	0	75,000	Consultancy
		Development of national agricultural zoning map with current weather data and water	15,000	60,000		75,000	
		Total	**25,000**	**80,000**	**0**	**105,000**	
		TOTAL	**412,000**	**103,000**	**0**	**515,000**	
3. Strengthened local-national capacity for monitoring and decision making to reduce and respond to risks associated with climate change							
Output 3.1	Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds	a) Design and operation of the National System for Climate Data, by upgrading ETESA´s existing network for recording hydro-agro meteorological information from hydrographic watersheds.	1,390,000	510,000	50,000	1,950,000	Agreement /Goods
		Acquisition and installation of the network of hydro-agro-meteorological stations	1,390,000	510,000	50,000	1,950,000	
		Total	**1,390,000**	**510,000**	**50,000**	**1,950,000**	
Output 3.2	Established an early warning system to identify in advance, the necessary measures in case of hydro-climatic events that could	a) Implement the sound warning system at the communities included in the CHVRW early warning system; and complete signposts along communities at risk areas. This EWS is focused on floods.	0	110,000	5,000	115,000	Agreement / services

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
	affect food production and power generation	Diagnostic of SAT		5,000		5,000	
		Design of an early warning system for flood in the Rio CHV (consulting)		105,000		105,000	
		Maintenance			5,000	5,000	
		b) Implement an early warning system for floods and droughts at the SMRW.	0	170,000	5,000	175,000	
		Design of an early warning system for floods and droughts in the SM River (consulting)		10,000		10,000	
		Acquisition and installation of early warning system		160,000		160,000	
		Maintenance			5,000	5,000	
		c) Workshops and simulations to train technical staff and communities on the early warning system.	0	35,000	16,000	51,000	
		Training and simulations plans		35,000	16,000	51,000	
		Total	**0**	**315,000**	**26,000**	**341,000**	
Output 3.3	The NSCD interfaced and equiped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information	a) Interface and equip the NSCD with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information.	0	380,000	20,000	400,000	Agreement / goods + services
		Acquisition of equipment (computing, printers, etc.)		350,000		350,000	
		Plan training for technicians and producers		30,000	20,000	50,000	
		Total	**0**	**380,000**	**20,000**	**400,000**	
Output 3.4	Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts*	a) Design a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program. This includes program inception workshops with public and nongovernmental relevant stakeholders (at least three workshops). *This program will serve MiAmbiente in starting to evaluate progress of other adaptation efforts being implemented in the country (such as....).	30,000	60,000	20,000	110,000	Agreement /consultancy
		Design and implementation of M & E tool to measure the effectiveness of the adaptation measures to CC with the Program and other national interventions	30,000	60,000	20,000	110,000	

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
		Total	**30,000**	**60,000**	**20,000**	**110,000**	
		TOTAL	**1,420,000**	**1,265,000**	**116,000**	**2,801,000**	
4. Rise awareness and establish a knowledge exchange platform to respond to, and mitigate impacts of climate-related events from local and national scope							
Output 4.1	Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures	a) Technical working sessions with key implementing partners and project staff to define WorkPlan, coordination arrangements and kick off meetings/requirements. These activity also includes the development and facilitation of training sessions with key project staff and partners about the nexus approach to water–energy–food security as an option for adaptation to climate change.	15,000	0	0	15,000	Consultancy
		Working sessions with the technical team and key Implementing partners	15,000			15,000	
		b) Inception workshops with local and national stakeholders to present the approved programme; revisit programme rationale, scope, define shared visions and operational arrangements for programme implementation. At least 2 local workshops, one for each watershed with local stakeholders. One national workshop with government and civil society stakeholders to present the Programme, identify sinergies with other ongoing adaptation efforts/initiatives and define operational and coordination aspects.	34,000	0	0	34,000	Per diem+services
		National Workshop for presentation of the approved program	8,000			8,000	
		Workshops (2) Presentation of the approved program: 1 in each basin	20,000			20,000	
		Program information documents	6,000			6,000	
		c) Socialize the SMRW and the CHVW vulnerability analysis to facilitate the implementation of identified adaptation measures.	132,000	0	0	132,000	
		Socialize vulnerability plans to facilitate the implementation of adaptation measures.	132,000			132,000	Per diem+services
		Total	**181,000**	**0**	**0**	**181,000**	

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
Output 4.2	Strengthened professional capacities for the climate data analysis and processing, for different sectors involved	a) Offer a Climate Modelling Course with special emphasis on future scenarios impacting food-energy generation activities (at least 45 participants).	0	85,000	0	85,000	Grant
		International course on climate modeling with emphasis on future scenarios that affect food and energy generation		85,000		85,000	
		b) Offer an international course on Adaptation to Climate Change: Role of Ecosystem Services (45 participants nationwide, including stakeholders in the two prioritized watersheds).	75,000	0	0	75,000	
		International Course on adaptation to climate change: the role of ecosystem services	75,000			75,000	
		Total	**75,000**	**85,000**	**0**	**160,000**	
Output 4.3	Strengthened professional capacities on water resources management by incorporating climate change adaptation approach	a) Offer an international course on participatory and integrated watershed management emphasizing conflict management skills (40 participants nationwide, including stakeholders in the two prioritized watersheds).	80,000	0	0	80,000	Grant
		International course on watershed management with an emphasis on conflict resolution	80,000			80,000	
		b) Offer an international course on ecosystem-based adaptation at marine-coastal zones. (20 participants)	0	35,000	0	35,000	
		International Course on adaptation to climate change based on marine-coastal ecosystems		35,000		35,000	
		Total	**80,000**	**35,000**	**0**	**115,000**	
Output 4.4	Systematized and disseminated experiences on climate changes adaptation, nationwide	a) Mapping and analysis of projects / initiatives undertaken. A technical and practical document that will be available in print and digital format will be developed.	0	25,000	0	25,000	Grant
		Document development (consulting)		10,000		10,000	
		Document printing		15,000		15,000	
		b) 10 workshops will be held at national level (1 per province) to present the document.	0	0	15,000	15,000	
		Workshops on sharing experiences Program			15,000	15,000	
		Total	**0**	**25,000**	**15,000**	**40,000**	
Output 4.5		a) Communication strategy and systematization of experiences from the program.	90,000	0	0	90,000	Grant

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
	Portal for Climate Change Adaptation in Panama, implemented	Design and implementation of the communication strategy	90,000			90,000	
		b) Design and operation of the Portal for Climate Change Adaptation in Panama.	13,000	4,000	4,000	21,000	
		Portal design and implementation of adaptation to Climate Change in Panama (consulting and licensing portal / Hosting)	13,000			13,000	
		Updating and maintenance		4,000	4,000	8,000	
		c) Compilation and synthesis of materials for different audiences on adaptation to climate change.	5,000	32,000	10,000	47,000	
		Generation of knowledge products and materials development program for different audiences (academy, institutions, producers)	5,000	32,000	10,000	47,000	
		d) Training on the use of the portal for different audiences (producers, institutions, academia, etc.).	10,000	20,000	6,000	36,000	
		Training in use of the site for different audiences (workshops)	10,000	20,000	6,000	36,000	
		e) Establishment of an advisory technical committee within the Climate Change National Committee to orient the program´s knowledge management process.	5,000	3,000	3,000	11,000	Agreement
		Establishment of a technical advisory committee in the National Climate Change Committee to guide the process of knowledge management program includes meetings.	5,000	3,000	3,000	11,000	
		f) Experience exchanges activities at the local level, including at least one international technical guided visit.	0	38,700	15,170	53,870	Goods+services + consultancy
		Exchange activities locally, including at least one technical guided tour. Exchange to accompany the silvopastoral system and system of (international) functional irrigation Exchange early warning system Intercambio para acompañar el sistema silvopastoril y sistema de riego funcional (internacional) Intercambio sistema de alerta temprana		38,700	15,170	53,870	
		Total	**123,000**	**97,700**	**38,170**	**258,870**	
		TOTAL	**459,000**	**242,700**	**53,170**	**754,870**	
		Total Direct Costs	**4,660,114**	**3,224,471**	**512,826**	**8,397,411**	

BUDGET

Output No.	Description	Budget Notes/Activities	Year 1	Year 2	Year 3	Total	Type of expenditure
		Total Costo de Ejecutores (9.5%)	442,711	306,325	48,718	**797,754**	
		Total Cost of the Program (Adaptation Fund)	5,102,825	3,530,796	561,544	**9,195,165**	
		Total NIE (8.4%)	428,637	296,587	47,170	**772,394**	
		GRAND TOTAL				**9,967,559**	

Budget on the implementing entity management fee use

The program will be coordinated by a manager, two project coordinators, an accountant and a technical assistant under the supervision of the executive direction of the NIE. The proposed Budget for the NIE will be used to cover operational costs of the program and also general and administrative costs.

Table 57. Budget on the implementing entity management fee use

OPERATING COST OF THE PROGRAM : US$ 617,506.00		
Expenses (Items)	**Description**	**Cost (US$)**
Assets	• Computer equipment • Office furniture and equipment • Communication and audiovisual equipment	10,000
Staff Expenses	• Operational and administrative management of the program. • Plan, organize, implement, monitor and verify that all the program activities are implemented. • Present operational plans and proposals for approval. • Present progress of the program to the appropriate bodies (National Climate Change Committee, Board of the FN Trustees, Regional institutions, etc.). • Process applications for disbursement. • Monitoring and supporting the missions.	291,012
Operational Work	• Charges for bank transfers to exclusive accounts of each entity for disbursement for the projects in execution and confection of checkbooks. • Consultants for technical support in preparation of reference terms. • Call for projects and consultancy. • Disclosure of progress and results of the program. • Management of information and communication. • Provide technical support as required. • Coordination meetings for the evaluation of proposals for projects and consultancies. • Life and Hospitalization inssurance. • Seminars and training.	56,954
M & E y Audits	• Base Line. • Presentation of the program to implementing institutions. • Trimestral technical and financial monitoring for the projects. • Midterm and final evaluations of the program. • Annual external audits of the program. • Meetings with the National Climate Change Committee, regional institutions, implementing agencies, beneficiaries.	259,540
GENERAL AND ADMINISTRATIVE COSTS: US$ 154,888.00		
Expenses (Items)	**Description**	**Cost (US$)**
Staff Expenses	• Ensure that financial management practices meet the requirements of the Adaptation Fund. • Presentation of financial reports and compliance of procurement. • Accounting support for the program. • Support in identifying suppliers.	54,940

	• Legal support and compliance of audit requirements.	
Administrative Expenses	• General utilities (water, electricity, rent). • Legal advice. • Technology platform maintenance. • General maintenance and repairs. • Stationery and office supplies. • Telephone and facsimile. • Notarial and revenue stamps. • Travel support	99,948
	TOTAL OF THE PROGRAM	**772,394**

Execution cost

Table 58. Budget for execution costs

Expenses (Items)	Adaptation Fund Amount			
	Year 1	Year 2	Year 3	Total
Staffing costs	**120,000**	**109,968**	**60,500**	**290,468**
Office facilities	**10,713**	**7,355**	**7,136**	**25,204**
Equipment	**12,000**	**5,000**		**17,000**
Travel related to project execution	**26,648**	**25,424**	**12,923**	**64,995**
Monitoring and evaluation costs	**120,562**	**142,297**	**107,230**	**370,090**
Workshops and meetings	40,000	50,000	50,499	140,499
Drafting progress reports technical and financial reports	17,648	18,425	11,923	47,996
Audits	36,914	30,708	12,372	79,994
M&E related travel expenses	20,000	15,169	2,436	37,605
Mid term and Final evaluation		19,997	20,000	39,997
Systematization and lessons learned	6,000	7,998	10,000	23,998
Communications	**14,765**	**12,283**	**4,949**	**31,998**
GRAND TOTAL	**303,688**	**301,328**	**192,738**	**797,754**

H. Include a disbursement schedule with time-bound milestones

Detailed budget per year, with time bound milestones

Table 59. Detailed budget per year, with time-bound milestones

Schedule date	Upon Agreement Signature	Year 2	Year 3	Total
	May 2017, tbc	May 2018 (e)	May 2019 (e)	
Direct Cost (USD)	**4,660,114**	**3,234,471**	**512,826**	**8,397,411**
EE Fee (USD)	**442,711**	**306,325**	**48,718**	**797,754**
NIE Fee (USD)	**428,637**	**296,587**	**47,170**	**772,394**
Total	**5,531,462**	**3,827,383**	**608,714**	**9,967,559**

Program Implementation Timetable

Table 60. Program implementation timetable

			Year 1				Year 2				Year 3				
Output / operational	**Activities**		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	
			1	2	3	4	5	6	7	8	9	10	11	12	
Op	**Establish program team; induction to the program**														
Op	**Periodic meetings for program implementation follow up with staff and stakeholders**														
Op	**Program implementation monitoring and evaluation**														
Output 1.1	**Concrete adaptation measures implemented for household water security**														
O 1.1 a	Install at least 50 water harvest systems, 25 in each of the watersheds (SMRW and CHVRW). Train beneficiaries on the installation, use, and maintenance of water harvest systems.														
	i- Diagnostic														
	ii- Installation of water harvest systems														
	iii- Systems maintenance														
	iv- Systematization of experiences and technical guides to implement water harvest system as climate change adaptation measure														
	v- Training on hydrological cycle and IWRM, methodology for water harvest system installation and basic concepts on climate change														
Output 1.2	**Pilot climate-smart farming projects implemented**														

			Year 1				Year 2				Year 3				
Output / operational	**Activities**		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	
			1	2	3	4	5	6	7	8	9	10	11	12	
O 1.2 a	Implement the strategic action of establishing reforestation (for protection of watercourse) and agroforestry - soil conservation systems, at 10 farms along 6000 lineal meters of streams of the Caisan river (CHVRW). This activity includes identification of farms according to results from the Vulnerability Analysis, Farm Management Plan (with identification of species, crops/area zonification, costs); and the design and establishment of gallery forest, as well as the agroforestry systems.														
	i- Ten farm management plans and soil analyses														
	ii- Identify water recharge zones to be restored/protected														
	iii- Implementation of agroforesty and soil conservation systems in ten farms														
	iv- Establish galery forest alogn 6000 lineal meters of streams of the Caisan river (CHVRW)(nurseries, establishment, and maintenance)														
	v- Training plan														
O. 1.2 b	Establish irrigation systems, with efficient and low cost technologies, to enhance agricultural production and increase crops yields. It also includes - at Divalá-, a complement to the irrigation system consisting of an analysis of the water footprint for rice crops, which will allow identification of technological schemes for climate-smart rice production.														
	i- Irrigation needs assessment														
	ii- Installation of pilot low cost irrigation system														
	iii- Maintenance														
	iv- Technical assistance to farmers and companies for implementation of the system														

Output / operational	Activities		Year 1				Year 2				Year 3			
			Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
			1	2	3	4	5	6	7	8	9	10	11	12
	v- Training plan (4 workshops and 2 exchanges)													
	vi- Water footprint analsys for rice crops to identify technological schemes for climate-smart rice production													
Output 1.3	**Pilot diversified financing and income source models implemented in vulnerable population areas**													
O 1.3 a	Implement the strategic action of creating capacities for operating orchid and "naranjilla" crops, as well as establishing the correspondent commercialization scheme at CRSM. It includes training on establishment and management of orchid and "naranjilla" crops; design of business plans; development/improvement of seedling nurseries; advice and technical assistance for commercialization.													
	i- Development / improvements of nurseries													
	ii- Design of business plans													
	iii- Training on orchid and naranjilla crops management													
	iv- Establish commercialization scheme													
	v- Technical assistance													
Output 1.4	**Concrete adaptation measures implemented for sustainable cattle ranching**													
O 1.4 a	Sustainable cattle ranching project implemented at SMRW, covering cover 800 has.													
	i- Develop Farm Management Plans (sustainable cattle ranching)													
	ii- Implementation of technical solutions (catt													
	iii- Maintenance													

			Year 1				Year 2				Year 3			
Output / operational	**Activities**		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
			1	2	3	4	5	6	7	8	9	10	11	12
	iv- Implementation of training plan													
Output 1.5	**Enhanced sectorial support through climate financing instruments**													
O 1.5 a	Review current credit products offered to agriculture and energy sectors.													
	i- Analysis and technical recommendations on climate financing instruments													
O 1.5 c	Socialize the concept of Microfinance, based on ecosystems and climate change adaptation. * To complete this activity, the program will take into consideration the experiences and products developed in the context of the MEbA project at Perú and Colombia.													
	i- Mapping of microfinance institutions on both watersheds													
	ii- Meetings on MEbA with microfinance institutions													
	iii- Training and technical assistance													
	iv- Promotion and establishment of pilot MEbA project													
	v- Monitoring and evaluation													
O 1.5 b	Develop 4 business plans (2 for each watershed) to establish and operate mini-hydro energy projects, including the correspondent farm management plan, informative prospectus to access financing sources for climate change adaptation activities, and technical assistance offered to obtain such financing.													
	i- Develop business plans and deliver technical assistance to obtain financing for mini-hydro energy projects													

			Year 1				Year 2				Year 3			
Output / operational	**Activities**		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
			1	2	3	4	5	6	7	8	9	10	11	12
Output 2.1	**Analysis for climate change vulnerability done in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds**													
O 2.1 a	Update SMRW Management Plan, incorporating the climate change dimension. It must include the analysis of current tendencies, future scenarios, potential socioeconomic impacts on the watershed, and duly prioritized adaptation measures.													
O 2.1 b	Analyze vulnerability of the CHVRW, and validate/adjust climate change adaptation measures identified by the Adaptation Program outlined in the watershed Management Plan.													
Output 2.2	**Developed technical criteria for granting water use concessions and permits in order to reduce/avoid conflicts among users and increase ecosystem resilience in response to climate-induced stress**													
O 2.2 a	Identify the hydrological balance and environmental flow for the SMRW, specifically at the Gallito river microwatershed.													
O 2.2 b	Identify the hydrological balance and environmental flow of the CHVRW, specifically at the Caisán river microwatershed.													
O. 2.2 c	Develop a technical document with criteria to consider during the process of granting water use permits for agriculture and power generation -based on information and findings from the environmental flows analysis and other existing information at national level													
	i. Develop a technical document with criteria to consider during the process of granting water use permits for agriculture and power generation -based on information and findings from the environmental flows analysis and other existing information at national level													

Output / operational	Activities	Year 1				Year 2				Year 3			
		Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10	Q 11	Q 12
O. 2.2 d	Review current concessions on both watersheds, based on the technical document, in order to determine recommendations for improving or restoring the water cycle.												
	i- With results from 2.2.c output, develop a technical document with recommendations to improve/restore water cycle in program intervention areas												
Output 2.3	**Increased hydrological security in prioritized areas at the Chiriquí Viejo and Santa María rivers watersheds, in line with advances of the National Plan for Water Security**												
O 2.3 a	Design 2 district plans for water security, incorporating climate information (1 at each watershed, SMRW and CHVRW).												
O 2.3 b	Complement current technical analisys to elaborate a new national map for agriculture and livestock production in the country, based on climate and water management data generated by the program.												
	i- Develop a national map for agriculture and livestock production with updated data on climate and water management												
Output 3.1	**Designed and in operation the National System for Climate Data (NSCD), by upgrading ETESA´s existing network for recording climatic information from hydrographic watersheds**												
O 3.1 a	Design and operation of the National System for Climate Data, by upgrading ETESA´s existing network for recording hydro-agro meteorological information from hydrographic watersheds.												
	i- Rapid assessment of the current national network, as well as of the capacities in hydrometeorology												
	ii- Acquisition and installation of new network station												
	iii- Operation												

			Year 1				Year 2				Year 3			
Output / operational	**Activities**		Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
			1	2	3	4	5	6	7	8	9	10	11	12
Output 3.2	**Established an early warning system to identify in advance, the necessary measures in case of hydro-climatic events that could affect food production and power generation**													
O 3.2 a	Implement the sound warning system at the communities included in the CHVRW early warning system; and complete signposts along communities at risk areas. This EWS is focused on floods.													
	i- EWS diagnostic													
	ii- Acquisition and installation of the sound early warning system													
	iii- Complete signposts along communities at risk areas													
	iv- Maintenance													
O 3.2 b	Implement an early warning system for floods and droughts at the SMRW.													
	i- Design the EWS for the SMRW for drought and floods													
	ii- Acquisition and installation of the early warning system													
	iii- EWS maintenance													
O 3.2 c	Workshops and simulations to train technical staff and communities on the early warning system.													
	i- Training and simulations plan													
Output 3.3	**The NSCD interfaced and equiped with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information**													
O 3.3 a	Interface and equip the NSCD with a joint node, with the Ministry of Agriculture Development, to generate and manage climatic information.													
	i- Purchase of equipment (computers, printers, etc.)													
	ii- Training Plan for technicians and farmers													

Output / operational	Activities		Year 1				Year 2				Year 3			
			Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
			1	2	3	4	5	6	7	8	9	10	11	12
Output 3.4	**Designed a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program and national efforts***													
3.4 a	Design a monitoring and evaluation tool to assess effectiveness of climate change adaptation measures implemented by the program. This includes program inception workshops with public and nongovernmental relevant stakeholders (at least three workshops). *This program will serve MiAmbiente in starting to evaluate progress of other adaptation efforts being implemented in the country.													
	i- Design and implementation of a monitoring and evaluation system to assess effectiveness of climate change adaptation measures implemented by the program as well as other initiatives at national level													
Output 4.1	**Improved awareness of watersheds vulnerability and participation of population groups in adaptation measures**													
O 4.1 a	Technical working sessions with key implementing partners and project staff to define WorkPlan, coordination arrangements and kick off meetings/requirements. These activity also includes the development and facilitation of training sessions with key project staff and partners about the nexus approach to water–energy–food security as an option for adaptation to climate change													
	i- Working sessions with the program´s technical staff and key implementing partners													
O 4.1 b	Inception workshops with local and national stakeholders to present the approved programme; revisit programme rationale, scope, define shared visions and operational arrangements for programme implementation. At least 2 local workshops, one for each watershed with local stakeholders.													

			Year 1				Year 2				Year 3				
Output / operational	**Activities**		**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
	One national workshop with government and civil society stakeholders to present the Programme, identify sinergies with other ongoing adaptation efforts/initiatives and define operational and coordination aspects.														
	i- National workshop to present approved AF program														
	ii- Workshops (2) to present approved AF program: 1 at each watershed														
	iii- Informative documents about the program														
O 4.1 c	Socialize the SMRW and the CHVW vulnerability analysis to facilitate the implementation of identified adaptation measures.														
	i- Socialize vulnerability analysis to facilitate the implementation of identified adaptation measures														
Output 4.2	**Strengthened professional capacities for the climate data analysis and processing, for different sectors involved**														
O 4.2 a	Offer a Climate Modelling Course with special emphasis on future scenarios impacting food-energy generation activities (at least 45 participants).														
O 4.2 b	Offer an international course on Adaptation to Climate Change: Role of Ecosystem Services (45 participants nationwide, including stakeholders in the two prioritized watersheds).														
Output 4.3	**Strengthened professional capacities on water resources management by incorporating climate change adaptation approach**														
O 4.3 a	Offer an international course on participatory and integrated watershed management emphasizing conflict management skills (40 participants nationwide, including stakeholders in the two prioritized watersheds).														
O 4.3 b	Offer an international course on ecosystem-based adaptation at marine-coastal zones. (20 participants)														

Output / operational	Activities	Year 1				Year 2				Year 3			
		Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q 10	Q 11	Q 12
Output 4.4	**Systematized and disseminated experiences on climate changes adaptation, nationwide**												
O 4.4 a	Mapping and analysis of projects / initiatives undertaken. A technical and practical document that will be available in print and digital format will be developed.												
	i- Development of document												
	ii- Document printing												
O 4.4 b	Ten workshops will be held at national level (1 per province) to present the document.												
	i- Workshops to disseminate experiences from the AF program implemented												
Output 4.5	**Portal for Climate Change Adaptation in Panama, implemented**												
O 4.5 a	Communication strategy and design of a plan for systematization of experiences from the program.												
	i. Design and implement communications strategy												
O 4.5 b	Design and operation (updating and maintenance) of the Portal for Climate Change Adaptation in Panama.												
	i- Design and implement the Portal for Climate Change Adaptation in Panama												
	ii- Update and maintenance												
O 4.5 c	Compilation and synthesis of materials for different audiences on adaptation to climate change												
	i- Develop knowledge products from the program; and compilation and synthesis of materials for different audiences on adaptation to climate change												

			Year 1				Year 2				Year 3				
Output / operational	**Activities**		**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	**Q**	
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
O 4.5 d	Training on the use of the portal for different audiences (producers, institutions, academia, etc.).														
	i- Training for different audiences on the use of portal														
O 4.5 e	Establishment of an advisory technical committee within the Climate Change National Committee to orient the program´s knowledge management process.														
	i- Establishment of an advisory technical committee within the Climate Change National Committee to orient the program´s knowledge management process.														
O 4.5 f	Experience exchanges activities at the local level, including at least one international technical guided visit:														
	i- Exchange for agriculture-cattle raising-pasture-forestry / and irrigation systems ii- Exchange for EWS iii- Farmer-to-farmer exchange at SMRW and ChVRW														

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

A. Record of endorsement on behalf of the government [39]

Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:

Emililio Sempris, Deputy Minister, Ministry of Environment of Panama	Date*: 09/January1/2017*

[39] 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.

B. Implementing Entity certification

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address

<table>
<tr><td colspan="2">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, such as: Government's Strategic Plan 2015-2019, Panama's National Integrated Water Resources Management Plan 2010-2030, National Plan for Water Security 2015-2030, National Communications to the UNFCCC, Energy Plan 2015-2050, and the National Pact for Agriculture; and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy and the Gender Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</td></tr>
<tr><td colspan="2">Name & Signature
Implementing Entity Coordinator
Rosa Montañez
  </td></tr>
<tr><td>Date: January 09th, 2016</td><td>Tel. and email: (507) 232-7615
rmontanez@naturapanama.org
info@naturapanama.org</td></tr>
<tr><td colspan="2">Project Contact Person: Rosa Montanez / Vilna Cuellar</td></tr>
<tr><td colspan="2">Tel. And Email: (507) 232-7615 vcuellar@naturapanama.org</td></tr>
</table>

ANNEXES

ANNEX 1 . ENDORSEMENT LETTERS

ADAPTATION FUND

MiAMBIENTE

Carta de Endoso del Gobierno

05 de enero de 2017
DV -001-2017

Para: El Fondo de Adaptación
c/o Secretaría del Fondo de Adaptación
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Asunto: apoyo a la propuesta de programa titulada **'Adaptación al Cambio Climático por Medio de la Gestión Integrada del Agua en Panamá'**

En mi calidad de Autoridad Nacional Designada de Panamá para el Fondo de Adaptación, confirmo que, la propuesta de programa previamente mencionada va acorde con las prioridades del gobierno nacional de implementar actividades de adaptación para reducir riesgos e impactos adversos del cambio climático en Panamá.

Por consiguiente, me complace reiterar el apoyo a dicha propuesta de programa presentada al Fondo de Adaptación. De aprobarse la misma será implementada por Fundación Natura y ejecutada por el Ministerio de Ambiente, en coordinación con el Ministerio de Desarrollo Agropecuario y la Empresa de Transmisión Eléctrica S.A. (ETESA).

Atentamente,

Emilio Sempris
Viceministro de Ambiente

República de Panamá
Despacho del Viceministro
Ministerio de Ambiente

ES/FW/MA/rla

C.c Licda. Rosa Montañez – Directora de la Fundación Natura.

ADAPTATION FUND

MiAMBIENTE

Carta de Endose del Gobierno

1 de agosto de 2016
DV 044-2016

Para: El Fondo de Adaptación
c/o Secretaría del Fondo de Adaptación
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Asunto: apoyo a la propuesta de programa titulada **'Adaptación al cambio climático por medio de la gestión integrada del agua en Panamá'**

En mi calidad de Autoridad Nacional Designada de Panamá para el fondo de adaptación, confirmo que, la propuesta de programa previamente mencionada va acorde con las prioridades del gobierno nacional de implementar actividades de adaptación para reducir riesgos e impactos adversos del cambio climático en Panamá.

Por consiguiente, me complace apoyar dicha propuesta de programa con el apoyo del Fondo de Adaptación. De aprobarse la misma será implementada por Fundación Natura y ejecutada por el Ministerio de Ambiente, en coordinación con el Ministerio de Desarrollo Agropecuario y la Empresa de Transmisión Eléctrica S.A. (ETESA).

Atentamente,

Emilio Sempris
Viceministro de Ambiente

REPÚBLICA DE PANAMÁ
DESPACHO DEL VICEMINISTRO
MINISTERIO DE AMBIENTE

ES/FW/RL/rl

C.c Licda. Rosa Montañez – Directora de la Fundación Natura.

Fundación para la Conservación de los Recursos Naturales

MINISTERIO DE AMBIENTE
UNIDAD DE CAMBIO CLIMÁTICO
Recibido: Fecha: 11/8/16

Panamá, 7 de abril de 2016
FN-DE-062

MINISTERIO DE AMBIENTE
RECIBIDO
POR:
FECHA: 11/4/16
Secretaria General

S.E.
Licda. Mirei Endara
Ministra
Ministerio de Ambiente
En Su Despacho

Respetada Ministra,

Por este medio le comunicamos que el Fondo de Adaptación aprobó el concepto de propuesta titulado "*Adaptación al cambio climático a través de manejo integrado del agua en Panamá*", presentado el 11 de enero del presente año por la Fundación Natura, en su calidad de Agencia Nacional Implementadora de Panamá para el Fondo de Adaptación. Adjuntamos nota Ref: 2016/15 del 28 de marzo con la decisión del Fondo de Adaptación, con base en la cual estamos procediendo a elaborar la propuesta completa y el proceso de consulta ampliado a fin de presentar la versión final en el ciclo de abril.

Por otra parte, le informamos que el concepto ya fue presentado y acogido por el Comité de Cambio Climático de Panamá y cuenta a la fecha con el aval y aportes técnicos por parte del Ministerio de Desarrollo Agropecuario (MIDA), la Empresa de Transmisión Eléctrica S.A. (ETESA) y el Sistema Nacional de Protección Civil (SINAPROC).

En las semanas próximas se estarán realizando las consultas a nivel local y con otros actores claves, mismas que se están coordinando con en conjunto con la contraparte designada por el Ministerio de Ambiente.

Atentamente,

Rosa I. Montañez G.
Directora Ejecutiva

C.c. Licdo. Emilio Sempris- Viceministro de Ambiente-Ministerio de Ambiente.
Ing. Rosilena Lindo – Unidad de Cambio Climático – Ministerio de Ambiente.
Licdo. René López- Unidad de Cambio Climático -Ministerio de Ambiente.

Adj. Nota y observaciones. Ref: 2016/15- Adaption Fund.
Concepto de propuesta presentado el 11 de enero de 2016.

MINISTERIO DE AMBIENTE
RECIBIDO
POR:
FECHA: 8/4/16
Secretaria General

ADAPTATION FUND

MINISTERIO DE AMBIENTE

Carta de Endose del Gobierno

15 de abril de 2016
DM-0952-2016

Para: El Fondo de Adaptación
c/o Secretaría del Fondo de Adaptación
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Asunto: Apoyo a la propuesta del programa titulada ´**Adaptación al cambio climático por medio de la gestión integrada del agua en Panamá.**´

En mi calidad de autoridad nacional designada de Panamá para el Fondo de Adaptación confirmo que la propuesta de programa previamente mencionada va acorde con las prioridades del gobierno nacional de la implementación de las actividades de adaptación, para reducir riegos e impactos adversos del cambio climático en Panamá

Por consiguiente, me complace apoyar dicha propuesta de programa con el apoyo del Fondo de Adaptación. De aprobarse, la misma será implementada por Fundación Natura y ejecutada por el Ministerio de Ambiente, en coordinación con el Ministerio de Desarrollo Agropecuario (MIDA) y la Empresa de Transmisión Eléctrica S.A. (ETESA).

Atentamente,

Emilio Sempris
Viceministro de Ambiente

REPÚBLICA DE PANAMÁ
DESPACHO DEL VICEMINISTRO
MINISTERIO DE AMBIENTE

ES/FW/LV/jm

C.c. Licda. Rosa Montañez – Directora de la Fundación Natura

ADAPTATION FUND

MINISTERIO DE AMBIENTE

Carta de Endose del Gobierno

01 de febrero de 2016
DM-0184-2016

Para: El Fondo de Adaptación
c/o Secretaria del Fondo de Adaptación
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Asunto: Apoyo a la propuesta de programa titulada **'Adaptación al cambio climático por medio de la gestión integrada del agua en Panamá'**

En mi calidad de Autoridad Nacional Designada de Panamá para el Fondo de Adaptación, confirmo que, la propuesta de programa previamente mencionada, va acorde con las prioridades del gobierno nacional de implementar actividades de adaptación para reducir riesgos e impactos adversos del cambio climático en Panamá.

Por consiguiente, me complace apoyar dicha propuesta de programa con el apoyo del Fondo de Adaptación. De aprobarse la misma será implementada por Fundación Natura y ejecutada por el Ministerio de Ambiente, en coordinación con el Ministerio de Agricultura y la Empresa de Transmisión Eléctrica S.A. (ETESA).

Atentamente,

Emilio Sempris
Viceministro de Ambiente

REPÚBLICA DE PANAMÁ
DESPACHO DEL VICEMINISTRO
MINISTERIO DE AMBIENTE

ES/FW/RL/MI

C.c Licda. Rosa Montañez – Directora de la Fundación Natura.

REPÚBLICA DE PANAMÁ

Ministerio de Desarrollo Agropecuario
Despacho del Ministro

Panamá, 5 de febrero de 2016
DM-0656-2016

Señores
FUNDACIÓN NATURA/FONDO DE ADAPTACIÓN
E. S. D.

Estimados Señores:

Por este medio expresamos, que el Ministerio de Desarrollo Agropecuario (MIDA) en su planificación institucional ha priorizado la incorporación de la dimensión de cambio climático en todos los programas que lleva adelante la institución. Esto contempla el diseño e implementación de medidas a nivel nacional, para enfrentar la sequía, que afecta negativamente al sector agropecuario; la participación activa del MIDA en el Comité Nacional de Cambio Climático de Panamá y en la elaboración del Plan Nacional de Seguridad Hídrica; la definición de una hoja de ruta, para fortalecer nuestra Unidad Ambiental transformándola en una Unidad de Cambio Climático, Gestión de Riesgo y Gestión Ambiental, entre otras acciones.

Desde 2014, hemos efectuado consultas a nivel nacional para identificar líneas y acciones estratégicas para avanzar hacia una agricultura climáticamente inteligente. En este contexto, hemos participado con insumos en el proceso de elaboración de la propuesta "Adaptación al cambio climático a través del manejo integrado del agua en Panamá" para el Fondo de Adaptación, que incluye componentes específicos de adaptación para el sector agropecuario en áreas vulnerables, tanto en el área del Arco Seco Cuenca del Río Santa María, como en la Provincia de Chiriquí, Cuenca del Río Chiriquí Viejo, ambas áreas claves para la producción y la seguridad alimentaria nacional.

Las líneas de acción propuestas que se han presentado al Fondo de Adaptación están alineadas con las prioridades institucionales. La coordinación y complementariedad entre las actividades del Programa de Adaptación y las del Ministerio, será clave para fortalecer la resiliencia climática del sector productivo agropecuario nacional.

Atentamente,

REPÚBLICA DE PANAMÁ
DESPACHO DEL MINISTRO
MINISTERIO DE DESARROLLO AGROPECUARIO

JORGE ARANGO ARIAS
Ministro

JAA/gm

Panamá, Altos de Curundu, calle Manuel E. Melo, edificio 576
Apartado Postal 5390 Zona 5, Panamá. Página Web: www.mida.gob.pa
Teléfonos: (507) 507-0600, 507-0606 Fax: (507) 232-5045

MINISTERIO DE GOBIERNO
SISTEMA NACIONAL DE PROTECCIÓN CIVIL
DIRECCION GENERAL

Panamá, 8 de abril de 2016
SINAPROC-CTI-50

Señores
Fundación Natura / Fondo de Adaptación
E. S. D.

Estimados Señores:

El Sistema Nacional de Protección Civil (SINAPROC), entidad nacional responsable de planificar, investigar, dirigir, supervisar y organizar las políticas y acciones dirigidas a determinar la peligrosidad que puedan causar los desastres naturales y antropogénicos, ha incluido la dimensión de cambio climático como un eje fundamental de la institución. Esto se evidencia en la Política Nacional de Gestión Integral de Riesgo que tiene como uno de sus ejes articuladores el de Ambiente y Cambio Climático, a través de la armonización del marco de políticas y estrategias en riesgo-agua-ambiente y la incorporación del enfoque de gestión de riesgos en el cambio climático. Así, desde 2011 se ha priorizado el "fortalecer los sistemas de alerta temprana y ampliar la cobertura en áreas prioritarias (objetivo operativo 3.4) y fortalecer las capacidades para la planificación de la adaptación al cambio climático con criterios de reducción de riesgos de desastres (objetivo operativo 4.2.)

En este contexto, los esfuerzos que se realicen para fortalecer y ampliar los sistemas de alerta temprana de sequía e inundaciones en áreas vulnerables al cambio climático, como lo son las cuencas del Río Chiriquí Viejo y el Río Santa María, son altamente necesarios y están alineados con las acciones que lleva adelante nuestra institución.

El apoyo del Fondo de Adaptación para ampliar los sistemas de alerta temprana existentes, a través de un programa de adaptación al cambio climático mediante el manejo integrado del agua, sería un apoyo significativo a los esfuerzos que realizan las instituciones panameñas que conforman la Plataforma Nacional de Gestión de Riesgo, para disminuir la vulnerabilidad y aumentar la resiliencia ante el cambio climático a nivel nacional y local.

Atentamente,

JOSÉ DONDERIS MIRANDA
Director General

EMPRESA DE TRANSMISION ELECTRICA, S.A.

ETE-DHM-013-2016
17 de febrero de 2016

Señores
Fundación Natura
Fondo de Adaptación
E. S. D.

Estimados Señores:

Por este medio expresamos que la Empresa de Transmisión Eléctrica, S. A. (ETESA), a través de la Dirección de Hidrometeorología, responsable de manejar y operar la red de estaciones meteorológicas existentes en la República de Panamá, ha priorizado en su planificación institucional el fortalecimiento y ampliación de la red de estaciones meteorológicas para cubrir todo el territorio nacional y fortalecer la capacidad de generación de datos hidrometeorológicos y climáticos, especialmente en áreas de alta vulnerabilidad climática, entre las que se cuentan las cuencas de los ríos Chiriquí Viejo y Santa María, entre otras.

En este sentido, ETESA ya ha iniciado el proceso de ampliación y fortalecimiento de la red, con la adquisición de 30 estaciones meteorológicas tipo A de transmisión satelital. En el marco de esta planificación institucional, tenemos debidamente identificados y cuantificados los requerimientos adicionales para la consolidación de la red.

Con el propósito de avanzar en dicha consolidación de la red, ETESA ha participado con insumos técnicos en el proceso de elaboración de la propuesta "Adaptación al cambio climático a través del manejo integrado del agua en Panamá" para el Fondo de Adaptación, que incluye un componente específico para el diseño y operación de un sistema nacional de datos climáticos, fortaleciendo la red actual de hidrometeorología manejada por ETESA.

La coordinación y complementariedad entre las actividades de ese Programa de Adaptación y las acciones de ETESA, será clave para fortalecer la capacidad de generación y procesamiento de data climática y con ello proveer información técnica-científica para apoyar la toma de decisiones del sector público y privado en un contexto de cambio climático.

Atentamente,

EDILBERTO B. ESQUIVEL MARCONI
Director de Hidrometeorología

Edificio Sun Tower Mall, Piso 3.
Teléfonos: 501-3800, 501-3900 – Fax: 501-3506 - CND: 230-8100 - Tumba Muerto: 501-8900.
Apartado Postal 0816-01552 - Panamá, República de Panamá.

FUNDACIÓN PARA EL DESARROLLO INTEGRAL COMUNITARIO Y
CONSERVACIÓN DE LOS ECOSISTEMAS EN PANAMÁ
(FUNDICCEP)
Cerro Punta, Chiriquí, República de Panamá * Teléfono – Fax (507) 771-2171
Email: fundiccep@cwpanama.net / amisconde@cwpanama.net

Chiriquí - Panamá, 5 de febrero de 2016.

Señores
Fundación Natura / Fondo de Adaptación
E. S. D.

Estimados señores:

La Fundación para el Desarrollo Integral, Comunitario y Conservación de los Ecosistemas de Panamá (FUNDICCEP), organización que lidera programas ambientales de conservación y protección de áreas protegidas, acciones sociales y comunitarias para promover el desarrollo sostenible, participó activamente como implementador, facilitador y actor en el proceso de elaboración, consulta y validación del plan de conservación (PCA) de la subcuenca del río Caisán en la cuenca del río Chiriquí Viejo.

Al respecto, evidenciamos que a la fecha las condiciones de amenaza y presiones a la cuenca del Río Chiriquí Viejo, incluyendo aspectos asociados a los efectos de cambio climático, las amenazas por los desarrollos hidroeléctricos múltiples y otros usos del agua, se mantienen en la actualidad, poniendo en riesgo la integridad del ecosistema y las comunidades. En este contexto, la posibilidad que acciones de conservación y manejo identificadas en el PCA para la subcuenca de Caisán y en el Plan de Manejo de la Cuenca del Río Chiriquí Viejo, sean implementadas con apoyo de recursos del Fondo de Adaptación a través de la propuesta de un programa de adaptación al cambio climático mediante el manejo integrado del agua, es una oportunidad para consolidar esfuerzos actuales de conservación y uso sostenible de los recursos, para los cuales lamentablemente no se cuenta actualmente con recursos financieros, humanos y equipamiento suficiente.

Consideramos que establecer la conservación y restauración del ecosistema boscoso que protege las fuentes de agua, el fomento de proyectos pilotos productivos entre los agricultores y ganaderos, el desarrollar investigación científica y monitoreo y así como intensificar las acciones de sensibilización, son medidas necesarias para adaptarse y mitigar los efectos del cambio climático que se siguen considerando como altamente prioritarias.

Nuestra organización es un actor local en la Cuenca del Río Chiriquí Viejo, que reitera su interés y apoyo a los esfuerzos de manejo de recursos naturales y adaptación al cambio climático, en particular las acciones que se incluyan en el concepto de un programa de adaptación al cambio climático mediante el manejo integrado del agua. Por tanto, expresamos nuestro interés de participar en la fase ampliada de formulación de la propuesta completa del proyecto y la posterior implementación en el campo, liderado por la Fundación Natura como entidad nacional implementadora ante el Fondo de Adaptación.

Atentamente,

Damaris Sánchez
Directora de Proyectos

Santa Fe, 5 de Febrero de 2016.
APNSF-002-16.

SEÑORES
FUNDACIÓN NATURA / FONDO DE ADAPTACIÓN
PRESENTE.-

Estimados señores:

La Asociación Amigos del Parque Nacional Santa Fe (AMIPARQUE), grupo ambientalista que vela por la promoción, conservación y el manejo adecuado del Parque Nacional Santa Fe y la cuenca alta del río Santa María, participó activamente como actor externo en el proceso de elaboración del plan de conservación (PCA) de la microcuenca del río Gallito en la cuenca alta del río Santa María. Además de participar en dicho proceso, colaboramos en la implementación de un Programa de Educación Ambiental que se realizó en el contexto del proceso del PCA.

Las condiciones de amenaza y presiones a la microcuenca que se identificaron, incluyendo los temas de cambio climático y amenazas por los desarrollos hidroeléctricos, se mantienen en la actualidad, poniendo en riesgo la integridad del ecosistema y las comunidades. En este contexto, la posibilidad que acciones de conservación y manejo identificadas en el PCA de la microcuenca Gallito y en el Plan de Manejo de la Cuenca del río Santa María, sean implementadas con apoyo de recursos del fondo de adaptación a través de la propuesta de un programa de adaptación al cambio climático mediante el manejo integrado del agua, es una oportunidad para consolidar los esfuerzos actuales de conservación y uso sostenible de los recursos, para los cuales lamentablemente no se cuenta actualmente con recursos financieros, humanos y equipamiento suficiente.

Consideramos que "la necesidad de intensificar las acciones de sensibilización sobre las medidas necesarias para adaptarse y mitigar los efectos del cambio climático", estrategia N° 1 del PCA, se considera altamente prioritaria, porque las comunidades locales carecen de acceso a información.

Nuestra organización como actor local en la Cuenca del Río Santa María, reitera su apoyo a los esfuerzos de manejo de recursos naturales y adaptación al cambio climático, en particular las acciones que se incluyan en el concepto de un programa de adaptación al cambio climático mediante el manejo integrado del agua, y expresamos nuestro interés de participar en la fase ampliada de formulación de la propuesta completa del proyecto y la posterior implementación de las actividades en el campo, liderado por la Fundación Natura como entidad nacional implementadora ante el Fondo de Adaptación.

Atentamente,

HORTENCIO PALMA BLANCO
PRESIDENTE Y REPRESENTANTE LEGAL

Amiparque, Santa Fe de Veraguas, República de Panamá. Oficina: Local comercial # 5, Terminal de Transporte de Santa Fe. Mobile: 00507-67211152, email: info@amiparque.org, web: www.amiparque.org

Panamá, 05 de mayo del 2016
G+FD-073-2016

Señores
Fundación NATURA / Fondo de Adaptación
E. S. D.

Respetados Señores:

Tengo el placer de dirigirme a ustedes para hacer de su conocimiento nuestro respaldo al programa que ha diseñado la Fundación Natura y que está presentando a la consideración del Fondo de Adaptación, denominado **Adaptación al Cambio Climático a través del Manejo Integrado del Recurso Hídrico en Panamá**.

Al haber participado de un proceso de consulta sobre el programa propuesto, hemos tenido la oportunidad de aportar nuestra visión sobre la situación actual ante los riesgos y la vulnerabilidad de nuestras cuencas hidrográficas de Chiriquí Viejo y Santa María, así como la pertinencia de las soluciones propuestas.

Consideramos atinado el enfoque de gestión del agua como centro de los esfuerzos de adaptación al cambio climático, que se ha propuesto, y creemos que las actividades planteadas responden al estado actual y permitirán prepararnos, tanto al nivel local como regional y nacional, con mejores respuestas e información para la toma de decisiones.

En del **Grupo para la Educación y Manejo Ambiental Sostenible (GEMAS)**, estaremos a la disposición de ustedes para colaborar desde nuestro ámbito de acción, a fin de lograr establecer una gestión del agua climáticamente resiliente. Ello facilitará la mejora de la seguridad alimentaria y energética a nivel nacional, a través de un enfoque integrado y de base comunitaria en las cuencas hidrográficas de los ríos antes señalados.

Atentamente,

Atentamente,

Ima Avila
Coordinadora

Edificio Tucuncari 19, Apto. 3,
Calle 65, San Francisco,
Panamá, Rep. Panamá

Apdo postal 0832-0974 W.T.C.
Panamá, Panamá.

Telefax: (507) 270-0933

E-mail:
igemas@cwpanama.net

Panamá City, August 29, 2016

Mrs. Rosa Montañez
Executive Director
Fundación Natura Panamá
Present.

Dear Mrs. Montañez:

By way of this letter, I express WETLANDS INTERNATIONAL's interest in participating as executing entity of the Adaptation Programme that your organization is presenting to the Adaptation Fund.

Wetlands International is a global not-for-profit organization dedicated to the conservation and restoration of wetlands as a source of water that supports all forms of life. In Panama, Fundacion Wetlands International is established as a subsidiary of Stichting Wetlands International (Netherlands), registered as a private, non-profit foundation before the Ministry of Government of the Republic of Panama (RUC 1856612-1-33190).

Wetlands such as rivers, streams, swamps, lakes, and estuaries play a critical role in supplying and regulating the quantity and quality of water. Water risks to society, including scarcity, droughts and floods, are increasing around the world. Wetlands International has accumulated extensive technical expertise in water management issues, particularly implementing innovative approaches such as integrated risk management, the building with nature model and the development of financial mechanisms to support adaptation efforts. To this end, the organization has global programmes for Water Resources Management and Climate Adaptation and Risk Reduction, which provide technical assistance to our global network of associated offices, including the Panama office.

Based in this global and local experience, we present our interest in supporting the implementation of specific activities of the Adaptation Programme, particularly in the following thematic areas:

1. Adaptation knowledge sharing and capacity building through a suite of specialized courses and learning exchange trips in adaptation and water resources management; systematization of adaptation experience, outreach and communications activity, including web based tools (web pages, blogs, communities of practice, social media "redes sociales"). Wetlands International has a long trajectory of providing specialized training services and outreach to different audiences, as a cross cutting strategy of all our projects. Particularly in Panama, the organization is responsible for the design and implementation of the communications and capacity-building component of the project for the protection of mangroves as carbon reserves in Panama. This experience provides solid ground to build upon existing adaptation knowledge initiatives and improve adaptive capacity through knowledge sharing and training.

2. Adaptation climate finance, particularly through promoting the use of microfinance sector to support small-scale producers in designing and implementing adaptation measures.
   mainstream adaptation in order to decrease their investment risk and develop new credit products to support adaptation action at the farm level. Wetlands international has extensive experience working with the microfinance sector in Asia to increase communities' capacities to manage risk associated to climate and non-climate threats.

3. Capacity building in adaptation and integrated risk management at the local level, through engaging local authorities and communities in planning processes, through municipal plans using specific tools, such as the Eco-Criteria developed by Wetlands International, with implementation experiences in different regions, including Central America.

For more information about the strategic intent and organizational highlights, please visit: www.wetlands.org. Should you need additional information regarding Wetlands International's experience in the areas mentioned above, we will be glad to provide it upon request.

Best regards,

Jane Madgwick

Jane Madgwick
CEO
Wetlands International

ORGANISMO INTERNACIONAL REGIONAL DE SANIDAD AGROPECUARIA
* MÉXICO * GUATEMALA * BELICE * EL SALVADOR * HONDURAS * NICARAGUA * COSTA RICA * PANAMÁ * REPÚBLICA DOMINICANA *
Representación OIRSA Panamá

Panamá, 31 de agosto de 2016
Nota Nº 670-256-16

Señores
Fundación Natura / Fondo de Adaptación
Presente.-

Estimados Señores:

Por este medio expresamos que el Organismo Internacional Regional de Sanidad Agropecuaria (OIRSA) en su planificación estratégica ha priorizado la incorporación de la dimensión de cambio climático en los programas que lleva adelante la institución.

Las líneas de acción propuestas en el Programa de País, que se han presentan al Fondo de Adaptación específicamente el Componente 3 están alineadas con nuestras prioridades institucionales. La coordinación y complementariedad entre las actividades de ese Programa de Adaptación y las acciones del Ministerio de Desarrollo Agropecuario y OIRSA, será clave para fortalecer la resiliencia climática del sector productivo agropecuario nacional.

El apoyo del Fondo de Adaptación para fortalecer el Sistema Nacional de Meteorología para toma de decisiones es un apoyo significativo a los esfuerzos que realizan instituciones que conforman la Plataforma Nacional de Gestión de Riesgo, para disminuir la vulnerabilidad y aumentar la resiliencia ante el cambio climático a nivel nacional.

Por consiguiente, nos complace apoyar la propuesta de país *Adaptación al cambio climático por medio de la gestión integrada del agua en Panamá* con el apoyo del Fondo de Adaptación.

Atentamente,

Filiberto Fragg S., DVM, MSc
Representante OIRSA - Panamá

ORGANISMO INTERNACIONAL REGIONAL SANIDAD AGROPECUARIA
OIRSA
Representación
Panamá
Centroamérica
México y Panamá

1953-2015
Seis décadas salvaguardando la sanidad agropecuaria regional

Área Social de Chiriquí,
Calle Hocker, Casa 1012 A-
B,
Panamá
Tel: (507) 317-0901
Fax: (507) 317-0900
E-Mail: oirsa@oirsa.org

ANNEX 2

GENERAL CONSULTATION REPORT
NATURA Foundation

List of stakeholders consulted throughout the process

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
CUENCA DEL RÍO CHIRIQUÍ VIEJO					
Jorge E. Gaitán	M.E.D.C.A	Local organization	Río sereno	x	
M. Quintero	A. P.A.C.O.M	Local organization	Monte Lirio	x	
Félix Pitty	A.D.P.A.E.L.A.	Local organization	Piedra de candela	x	
Luis Miguel L.	Junta de Desarrollo	Local organization	Cerro punta	x	
Santiago Morales	Ministerio de Desarrollo Agropecuario	Local organization	Unidad Ambiental	x	
Jasson Elizondro	C.S.R	Local organization	Río sereno	x	
Karian Araúz	C.S.R	Local organization	Río sereno		x
Jhonathan Gonzalez	FUNDICCAP	NGO	Caisán		x
Iris Caballero	Productor	Local organization	Caisán		x
Rossana Thill C.	Productor	Local organization	Caisán		x

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Denis Lezcano	Productor	Local organization	Caisán		x
Olmedo Lezcano	Productor	Local organization	Caisán	x	
Carmencita Tedmanmacintyre	Codetis aguas alianza P.	Local organization	Boquete		x
Victor Fuente	Caña blanca arriba	Local organization	Caña blanca arriba	x	
Flora Amado	ASAELA	NGO	Las Nubes		x
Ana Sánchez	AMIPILA	NGO	Guadalupe		x
Olga Sánchez	ASAELA	NGO	Las Nubes		x
Vilma Samudio	Cruz Roja	Public institution	Concepción		x
Lidio Saldaña	Volcán	Local organization	Volcán	x	
Daniela Pitty	Asepon	Local organization	Palma Real		x
Dario Sánchez	Caisán	Local organization	Guabito	x	
Edward Araúz	ARROCRO	Local organization	Guabito	x	
Estelmira Serrano	Familiar	Private organization	Pacora		x
Fidelina Araúz	Asociación de productores Orgánico	Local organization	Campo Alegre		x
Edilberto Gómez	APAAC	NGO	Altamion	x	
Luis Sánchez	AMIPILA	NGO	Guadalupe	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Diogenes Pitti	Junta Administradora de Acueducto Rural (JAAR)	Local organization	Cerro punta	x	
Marcos Villareal	Ministerio de Obras Públicas	Public institution	David	x	
Rosendo Botello	Productor	Local organization	Río sereno	x	
Noemí Del Pitty	Ministerio de Educación	Public institution	Río sereno		x
Valia Sousa	Ministerio de Ambiente	Public institution	Sede Panamá		x
Kevin Wing	Ministerio de Ambiente	Public institution	Sede Panamá	x	
María Quiel	Productor	Local organization	Caisán		x
Margarita Saldaña	Productor	Local organization	Caisán		x
Ariel Contrera	Productor	Local organization	Punta de piedra	x	
Mirta Benítez	Ministerio de Ambiente	Public institution	VCC		x
Javier Moreno	Productor	Local organization	Guabito	x	
Isabel De Lezcano	Productor	Local organization	Centro		x
Elidio Bonilla	Comité de M.	Local organization	Santa Rita	x	
Luis A. Montes	FUNDICCEP	NGO	David	x	
Damaris Sánchez	FUNDICCEP	NGO	Cerro Punta		x
Edilma C.	Ministerio de Educación	Public institution	Río sereno		x
Lelinet Miranda	Productor	Local organization	Caisán		x

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Trinidad Sánchez	Productor	Local organization	Caisán		x
Alcibíades Saldaña	Productor	Local organization	Caisán	x	
Oris Contreras	Ministerio de Desarrollo Agropecuario	Public institution	Volcán		x
Nodier Díaz	VSRR	Local organization	Alanje	x	
Roman Gutierrez	Alcaldia de Bugaba	Local Government	Bugaba	x	
Javier Grajales	Junta Comunal	Local Government	San Andrés	x	
Fulvio Morell	Productor	Local organization	San Andrés	x	
CUENCA DEL RÍO SANTA MARÍA					
Elizabeth Moreno	Grupo Ambiental AMURAN	Local organization	París		x
Raquel Pascasio	Grupo Ambiental AMURAN	Local organization	París		x
María Mendoza	Grupo Ambiental AMURAN	Local organization	París		x
Boris Espinosa	Ministerio de Desarrollo Agropecuario	Public institution	Santiago	x	
Adic Dalia Hernández	Asociación de Bochela	Local organization	Santa Fe		x
Bolívar González	Ministerio de Desarrollo Agropecuario / Unidad Ambiental	Public institution	David	x	
Sixto Quiros	Nueva Visión	Local organization	Santa Fe	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Francisco Pineda	Cooperativa la esperanza de la Campos de Santa Fe	Local organization	Santa Fe	x	
María Pinzón	Grupo Ecológicos las Macanas GEMAS	Local organization	El Rincón Santa Marta		x
Ceviliano Aguilar	Fundación Héctor Gallego	Local organization	Santa Fe	x	
Victor González	Productor	Local organization	Piura	x	
Yelenis Hernández	Productor	Local organization	Piura		x
Fideligna Guevara	Asociación de productores Agrop. 5 de Julio El Alto	Local organization	El Alto		x
Digno González	Asociación de productores Agrop. 5 de Julio El Alto	Local organization	El Alto	x	
Jacinto Peña	Fundación Héctor Gallego	Local organization	Santa Fé	x	
Luciano Rodriguez	Productor	Local organization	Santa Fé	x	
Purifica María Hernández	Productor	Local organization	El Alto		x
Juan Rodriguez	Productor	Local organization	Piedra Moler	x	
Faustino Hernández	Productor	Local organization	Piedra Moler	x	
Leoncio Mendoza	REDI	Local organization	Las Mendoza	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Jairo Alfaro	Ministerio de Desarrollo Agropecuario/ Agricultura	Public institution	Santiago	x	
Francisco Días	Ministerio de Desarrollo Agropecuario/ Herrera	Public institution	Herrera	x	
Enrique Rodriguez	Ministerio de Desarrollo Agropecuario/ Santa Fe	Public institution	Santa Fe	x	
Victoriano Concepción	Ministerio de Desarrollo Agropecuario/ Santa Fe	Public institution	Santa Fé	x	
Yocelin Gonzalez	Municipio de Nata	Local Government	Nata		x
Leopoldo González	ASOPROS	Local organization	Santa Fé	x	
Lázaro Rodriguez	Coopiturismo	Local organization	Santa Fé	x	
Tadeo Rodriguez	Piura	Local organization	El Alto	x	
Hortencio Palma	Amiparque	NGO	Santa Fe	x	
Gisela Quintero	Ministerio de Ambiente /Chitre	Public institution	Chitré		x
Franklin González	Independiente	Private organization	Chitré	x	
Rogelio C.	Municipio de Calobre	Local Government	Calobre	x	
Mirta Benítez	Ministerio de Ambientee/Unidad Cambio Climático	Local Government	Panamá		x
Eduardo Villa	Ministerio de Ambiente/Santiago	Public institution	Veraguas	x	

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Hernán Hernández	Ministerio de Ambiente/Santa Fé	Public institution	Veraguas	x	
Arguimiro Arosemena	APASAN	NGO	El Alto	x	
María Castillo	Grupo Ambiental AMURAN	Local organization	París		x
Sonia Vega	Grupo Ambiental AMURAN	Local organization	París		x
Florencia Ortiz	Grupo Ambiental AMURAN	Local organization	París		x
Israel Torres	Mi Ambiente /Central	Public institution	Panama	x	
Rolando Ruiloba	Mi Ambiente /Santiago	Public institution	Santiago	x	
Zobeida Herrera	Asociada Coop.		Santa Fé		x
José Rodríguez	APASAN	NGO	Santa Fé	x	
Paula	Productor	Local organization	El Alto de Cruz		x
Eduardo Manel Salas	Productor	Local organization	El Juncal	x	
David Medina	Productor	Local organization	Piedra Moler	x	
Eugenio Hernández	Productor	Local organization	Piura	x	
Ulises Rodríguez	Productor	Local organization	Piura	x	
Benilda Rodríguez	Productor	Local organization	Fondura		x
Alonso Rodríguez	APASAN	Local organization	Piedra Moler	x	
Ofelia Tenorio	Productor	Local organization	Piedra Moler		x

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Rosario Rodríguez	Productor	Local organization	Piura		x
Javier González	Ministerio de Ambiente	Public institution	Santiago	x	
Maykel Marín	Banco de Desarrollo Agropecuario	Public institution	Santiago		x
M. Castillo		Private organization	Santa Fé		x
Edwin Hernández	Ministerio de Desarrollo Agropecuario / Secretaría Técnica	Public institution	Santiago	x	
Diego Pérez	Ministerio de Ambiente	Public institution	Mitre	x	
Raul Higuera	Macanas	Local organization	Ocú	x	
Eusebio López	Ministerio de Ambiente	Public institution	Chitré	x	
Victor Pérez	INAGROPEC S.A.	Private organization	Chitré	x	
Virginia Jimenez	Indigenous	No Applicable	Muela		x
Danilo Gonzalez	Indigenous	No Applicable	Palmar	x	
Mauricio Jimenez	Indigenous	No Applicable	Bermejo	x	
Petra Jimenez	Indigenous	No Applicable	Bermejo		x
Yaquelin Carpintero	Indigenous	No Applicable	Alto Piedra, Santa Fé		x
Nuestra Santos	Indigenous	No Applicable	Alto Piedra, Santa Fé		x

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Ariel Carpintero	Indigenous	No Applicable	Alto Piedra, Santa Fé	x	
Joel Sibala	Indigenous	No Applicable	Quebrada Mamey	x	
Arlen Palma	Indigenous	No Applicable	Quebrada Mamey		x
Silvia Bernaza	Indigenous	No Applicable	Quebrada Mamey		x
Cornelio Sibala	Indigenous	No Applicable	Quebrada Mamey	x	
Eusebio Rodríguez	Indigenous	No Applicable	Nuela	x	
Mercedes	Indigenous	No Applicable	Nuela		x
Meli Carpintero	Indigenous	No Applicable	Santa Fé		x
Marcimiliano Santo	Indigenous	No Applicable	Santa Fé	x	
Tiofila Virola	Indigenous	No Applicable	Santa Fé		x
Lucresia Carpintiro	Indigenous	No Applicable	Santa Fé		x
Luciana Carpintero	Indigenous	No Applicable	Santa Fé		x
Oderay Flores	Indigenous	No Applicable	Santa Fé		x
Pedro Urriola	Indigenous	No Applicable	Santa Fé	x	
Elvia Virola	Indigenous	No Applicable	Las Lajas		x
Ana Flores	Indigenous	No Applicable	Las Lajas		x
Zoneida Herrera	Indigenous	No Applicable	Santa Fé		x

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Camila Peralta	Indigenous	No Applicable	Pantano		x
Lionel Rodríguez	Indigenous	No Applicable	Girotes	x	
Rubén Rodríguez	Ministerio de Desarrollo Agropecuario / Agencia de Santa Fé	Public institution	Santa Fé	x	
NACIONAL					
Tomasa Hernández	A.M.A. Panamá	NGO	Nacional	x	
Elvin Britton	Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)	NGO	Nacional	x	
Antonio Clemente	Fundación MARVIVA	NGO	Nacional	x	
Luiggi Franceschi	Fundación Panamá	NGO	Nacional	x	
Ricardo Wong	Fundación para la Protección del Mar PROMAR	NGO	Nacional	x	
Mirta Benítez	Ministerio de Ambiente	NGO	Nacional		x
Sandy P. Mosquera	Fundación Cuidad del saber	NGO	Nacional	x	
Ramiro A.	Vende Urbano	NGO	Nacional	x	
Carpaijsander	Wetlands International	NGO	Nacional	x	
Harley Mitechell	Grupo Asesor de Emprendedores Ambientales /Abogados	NGO	Nacional	x	
Yarabi Vega	Parque Natural Metropolitano	NGO	Nacional		x

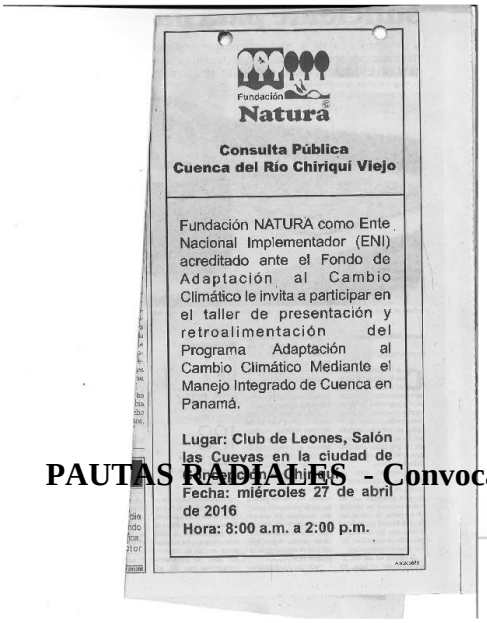
Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Beatma Schmitt	Programa de Pequeñas Doaciones-GEF	NGO	Nacional		x
Hlif Linnetvel	Bosques del Mundo	NGO	Nacional	x	
Daniel Holness	Centro de Estudios y Acción Social Panameño	NGO	Nacional	x	
Arturo Dominica	Centro Regional para el Hemisferio Occidental	NGO	Nacional	x	
María Soledad Porcell	Centro de Incidencia Ambiental	NGO	Nacional		x
Pilar López	Hidrometeorología/Empresa de Transmisión Eléctrica,S. A	Public institution	Nacional		x
Diego González	Hidrometeorología/Empresa de Transmisión Eléctrica,S. A	Public institution	Nacional	x	
Edilberto Esquivel	Hidrometeorología/Empresa de Transmisión Eléctrica,S. A	Public institution	Nacional	x	
René López	Ministerio de Ambiente	Public institution	Nacional	x	
Yira Campos	Sistemas Nacional de Protección Civil (Dirección de Prevención y Mitigación de Desastres)	Public institution	Nacional		x
Rafael Bonilla	Sistemas Nacional de Protección Civil	Public institution	Nacional	x	
Juan Carlos Rivas	Sistemas Nacional de Protección Civil	Public institution	Nacional	x	
Lorena Vargas	Sistemas Nacional de Protección Civil	Public institution	Nacional		x

Local Actor	Organization / Institution	Type of organization	Geographical Scope	Gender	
				M	F
Tomás Vásquez	Instituto de Investigaciones Agropecuarias de Panamá / Gerencia Recursos Forestales	Public institution	Nacional	x	
Casilda Saavedra	Universidad Tecnológica de Panamá	Academy	Nacional		x
Liz Montilla	Autoridad de los Recursos Acuáticos de Panamá	Public institution	Nacional		x
Graciela Martiz	Ministerio de Desarrollo Agropecuario	Public institution	Nacional		x
Luz Graciela Cruz	Secretaría Nacional de Ciencia y Tecnología	Public institution	Nacional		x
Judith Vargas	Minsiterio de Desarrollo Agropecuario	Public institution	Nacional		x
Virgilio Salazar	Minsiterio de Desarrollo Agropecuario	Public institution	Nacional	x	
Eric De Ycaza	Instituto de Acueductos y Alcantarillados Nacionales	Public institution	Nacional	x	
Héctor Rodríguez	Secretaria de Energía / Ministerio de la Presidencia	Public institution	Nacional	x	

2. Retroalimentación de propuesta con actores claves

2.1 Convocatoria pública

PUBLICACIÓN EN PERIÓDICOS



Fundación Natura

Consulta Pública
Cuenca del Río Chiriquí Viejo

Fundación NATURA como Ente Nacional Implementador (ENI) acreditado ante el Fondo de Adaptación al Cambio Climático le invita a participar en el taller de presentación y retroalimentación del Programa Adaptación al Cambio Climático Mediante el Manejo Integrado de Cuenca en Panamá.

Lugar: Club de Leones, Salón las Cuevas en la ciudad de
Fecha: miércoles 27 de abril de 2016
Hora: 8:00 a.m. a 2:00 p.m.

Fundación Natura

CONSULTA PÚBLICA
CUENCA DEL RÍO SANTA MARÍA

Fundación NATURA como Ente Nacional Implementador (ENI) acreditado ante el Fondo de Adaptación al Cambio Climático le invita a participar en el taller de presentación y retroalimentación del programa Adaptación al *Cambio Climático a través del Manejo Integrado del Recurso Hídrico en Panamá.*

PAUTAS RADIALES - Convocatoria pública para consulta (retroalimentación)

CORPORACION MEDCOM PANAMA,S.A.
REPORTE DE REVISION
DE ORDENES DE PUBLICIDAD

Página: 1
Fecha: 06/05/2016
Hora: 12:02:54
Rep: rcom10_10_3

Programa	Esp.	Horario	Día	Producto/Versión	Duración
Orden No 819	Agencia: KAROLYN DIAZ			Cliente: FUNDACION NATURA	
Día: 26-04-2016					
RADIOGRAFÍA	N	08:21 AM		FUNDACION NATURA 26 ABRIL	00:44
1 Cuña(s)					
Día: 27-04-2016					
RADIOGRAFÍA	N	07:56 AM		FUNDACION 27 Y 28	00:43
1 Cuña(s)					
Día: 28-04-2016					
RADIOGRAFÍA	N	07:26 AM		FUNDACION 27 Y 28	00:43
1 Cuña(s)					
3 Cuña(s) en total					

ENVÍO DE INVITACIONES POR CORREO ELECTRÓNICO

FONDO DE ADAPTACIÓN

CONVOCATORIA PÚBLICA

Fundación NATURA como Ente Nacional Implementador (ENI) acreditado ante el Fondo de Adaptación al Cambio Climático invita a instituciones de gobierno nivel regional, organizaciones de sociedad civil, productores de las cuencas del río Chiriquí Viejo y río Santa María, grupos comunitarios y centros de conocimiento y universidades a participar en el taller de presentación y retroalimentación del Programa **Adaptación al *Cambio Climático a través del Manejo Integrado del Recurso Hídrico en Panamá.***

- **Cuenca del Río Chiriquí Viejo**

  Lugar: Salón La Cueva del Club de Leones, Concepción Chiriquí

  Fecha: Miércoles 27 de abril de 2016

  Hora: 8:00 a.m. a 2:00 p.m.

- **Cuenca del Río Santa María**

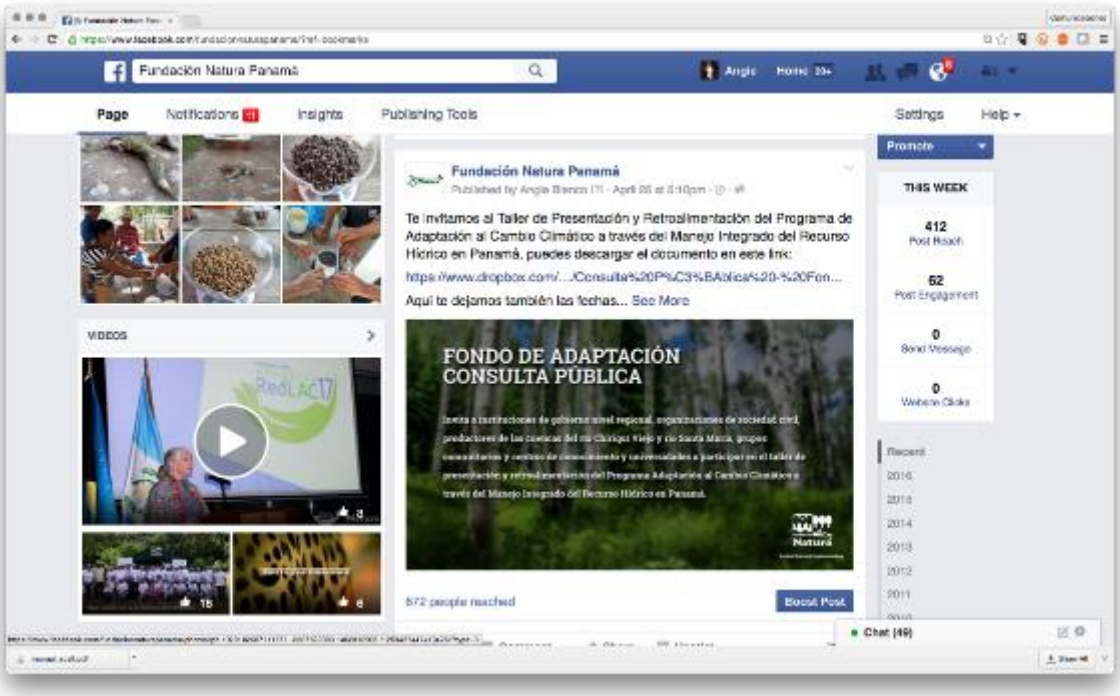
  Lugar: Salón Las Olas del Hotel Mykonos, Santiago

  Fecha: Viernes 29 de abril de 2016

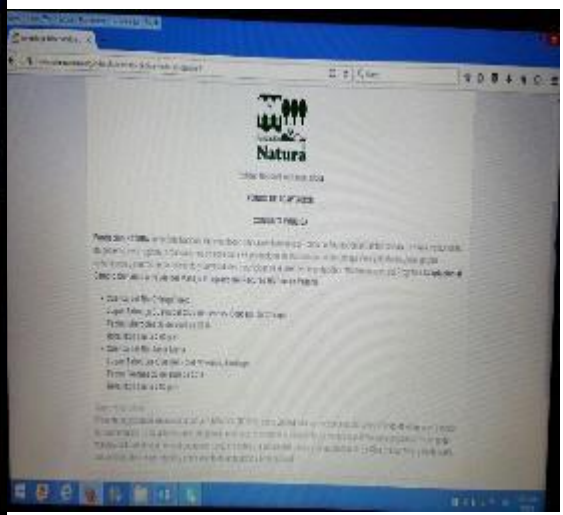
  Hora: 8:00 a.m. a 2:00 p.m.

Objetivo del taller
Presentar la propuesta desarrollada por la FUNDACION NATURA, como Entidad Nacional Implementadora, ante el Fondo de Adaptación y recibir retroalimentación de los actores clave, que permita enriquecer y fortalecer el documento, de manera que el Programa propuesto responda de manera contundente a los retos de adaptación ante el cambio y la variabilidad climática en las cuencas de los Ríos Chiriquí Viejo y Santa María, así como fortalecer capacidades y conocimiento de adaptación a nivel nacional.

SCREEN SHOT



Página web Fundación NATURA



Notas

Fundación para la Conservación de los Recursos Naturales

Panamá, 18 de abril de 2016.
FN/GTFCA -006

Ingeniero
Manuel Castillo
Presidente
Asociación de Ganaderos Veragüenses
ANAGAN
E. S. D.

Estimado Ingeniero Castillo:

Fundación NATURA como Ente Nacional Implementador (ENI), acreditado ante el Fondo de Adaptación al Cambio Climático le invita a participar en el taller de presentación y retroalimentación del *Programa Adaptación al Cambio Climático Mediante el Manejo Integrado de Cuenca en Panamá* que ha sido presentado como propuesta de país ante el Fondo de Adaptación.

Para Fundación Natura es relevante establecer una estrecha colaboración con los actores responsables del manejo y gestión en la Cuenca del Río Santa María, por lo cual esperamos su participación para el taller antes mencionado, el **viernes, 29 de abril de 2016 de 8:00 a.m. a 4:00 p.m. en el salón Las Olas del Hotel Mykonos, Santiago**. Estamos invitando a instituciones y organizaciones relacionadas al tema del programa, así como autoridades locales y miembros de los grupos comunitarios.

Agradecemos hacer extensiva esta invitación a los socios de ANAGAN del área que forman parte de la Cuenca del río Santa María (Santa Fe, San Francisco, Cañazas, Calobre, Atalaya y Santiago), una vez que son actores relevantes del Programa de Adaptación al Cambio Climático. Igualmente le solicitamos, de ser posible, nos envíe los nombre y No. de celulares o correo electrónico de los miembros a fin de confirmar las participaciones.

Para confirmar su asistencia por favor comunicarse a los teléfonos: 232-7615/16 y al email: rcalderon@naturapanama.org

Agradeciéndole de antemano su participación.

Atentamente,

Vilma Cuéllar
Gerente de Fondos

18/04/16

Tels.: (507) 232-7615, 7616, 6177-7450 • Fax: (507) 232-7613 • E-mail: info@naturapanama.org
Apartado 0816-09922, Panamá, República de Panamá • www.naturapanama.org

2.2 Metodología utilizada en los talleres de consulta pública (retroalimentación de propuesta)

TALLER DE CONSULTA
"ADAPTACION AL CAMBIO CLIMÁTICO A TRAVÉS DEL MANEJO INTEGRADO DEL AGUA EN PANAMA"

PROPUESTA PRESENTADA AL FONDO DE ADAPTACIÓN

Objetivo del taller

Presentar la propuesta desarrollada por la FUNDACION NATURA, como Entidad Nacional Implementadora, ante el Fondo de Adaptación y recibir retroalimentación de los actores clave, que permita enriquecer y fortalecer el documento, de manera que el Programa propuesto responda de manera contundente a los retos de adaptación ante el cambio y la variabilidad climática en las cuencas de los Ríos Chiriquí Viejo y Santa María, así como fortalecer capacidades y conocimiento de adaptación a nivel nacional.

Participantes

- Personal de Fundación Natura
- Representantes de Ministerio de Ambiente y Ministerio de Desarrollo Agropecuario
- Instituciones de gobierno nivel regional
- Organizaciones de sociedad civil
- Productores de las cuencas y áreas de intervención del proyecto
- Grupos comunitarios
- Centros de conocimiento y universidades

Resultados esperados

- Público y actores claves informados sobre la propuesta, su fundamento, lógica de intervención, alcance y actividades.
- Se reciben reacciones, sugerencias y aportes para fortalecer el documento de cara a su presentación ante el FA

Metodología

El taller tendrá una lógica participativa y de interacción, a fin de facilitar el diálogo informado entre los participantes, con base en la información sobre la Propuesta que presentará la Fundación Natura. Para ello el taller contará con un primer momento de presentaciones de parte del equipo de proyecto liderado por Fundación Natura, el MiAmbiente y el MIDA, seguido de espacios de plenaria para recibir las reacciones y aportes de los participantes. Igualmente se contará con un tiempo de trabajo en mesas por grupos de actores, para ir en más detalle sobre aspectos específicos de la propuesta y abordar preguntas o sugerencias específicas de parte de los asistentes.

Durante los momentos de plenaria se utilizará un moderador para orientar la discusión y se contará con material impreso para documentar los aprtes que se reciban. En los trabajos en grupo, se utilizará la técnica de elegir un moderador y un relator para cada mesa, de manera que los aportes de cada grupo queden debidamente documentados para uso posterior por parte del equipo de proyecto.

El taller tendrá 5 horas de duración, incluyendo las sesiones de presentación, plenaria y trabajo grupal. Los aportes que se recojan serán documentados y considerados posteriormente por Fundación Natura para efectos de su incorporación en el documento final. La actividad y sus resultados quedarán documentados mediante un informe de taller y anexos que incluyen las listas de participantes, resumen fotográfico y material utilizado.

Anexos

Formatos de preguntas para trabajo en mesas.

Anexo 1.

Propuesta de mecanismo de contacto permanente con actores clave y presentación de sugerencias al Programa

Metodología

- Se hace una breve presentación del esquema en la mesa
- Luego se genera una lluvia de ideas para recibir las reacciones del grupo. Se utiliza rotafolio
- Las ideas se agrupan en categorías y luego se van "votando". Se utilizan post it de color
- Se hace una síntesis de los aportes recibidos

Anexo 2.

Taller en CRCHV
Retroalimentación sobre zonas de intervención propuestas a nivel de cuenca para actividades 1.(1 (cosecha de agua), 1.2a (bosques de galería y agroforestería en R. Caisán); 1.2b (sistema de irrigación en Cerro Punta y Divalá);

Taller en CRSM

Retroalimentación sobre zonas de intervención propuestas a nivel de cuenca para actividades 1.(1 (cosecha de agua), 1.3 (diversificación de ingresos a través de naranjilla y orquídeas); 1.4 (SASP en 800 ha en CR Sta. María).

Metodología.

- Se trabajará con un mapa a escala de las áreas de intervención en la mesa para delimitación geográfica y con una lista de criterios para identificar localidades específicas y condiciones clave a considerar.

- Se presentan las áreas de intervención con las actividades sugeridas.
- Se abre a debate y una persona del equipo de proyecto modera, mientras que otra toma nota de los aportes
- En lo posible, se delimitan las áreas y localidades sugeridas en el mapa

Anexo 3

Consulta sobre intervenciones similares o relacionadas que estén bajo implementación en las 2 áreas del proyecto.

El objetivo es validar información sobre alcances de las actividades de otros programas bajo implementación, para incorporar en el análisis de costo beneficio de la propuesta y a ampliar la respuesta a la observación sobre relación del programa con otros procesos actuales.

Metodología:

- Se presentan brevemente los programas instiutcioales de que se tiene conocimiento que están en implementación en el área, relacionados con manejo de recursos, adaptación, gestión hídrica/ energética, y similares, si hubiere.
- Se abre a diálogo para recibir información adicional sobre dichos programas y se toma nota de los aportes
- Posteriormente con esta información se tomará contacto con los actores que se identifiquen para validar información, si fuese conducente.

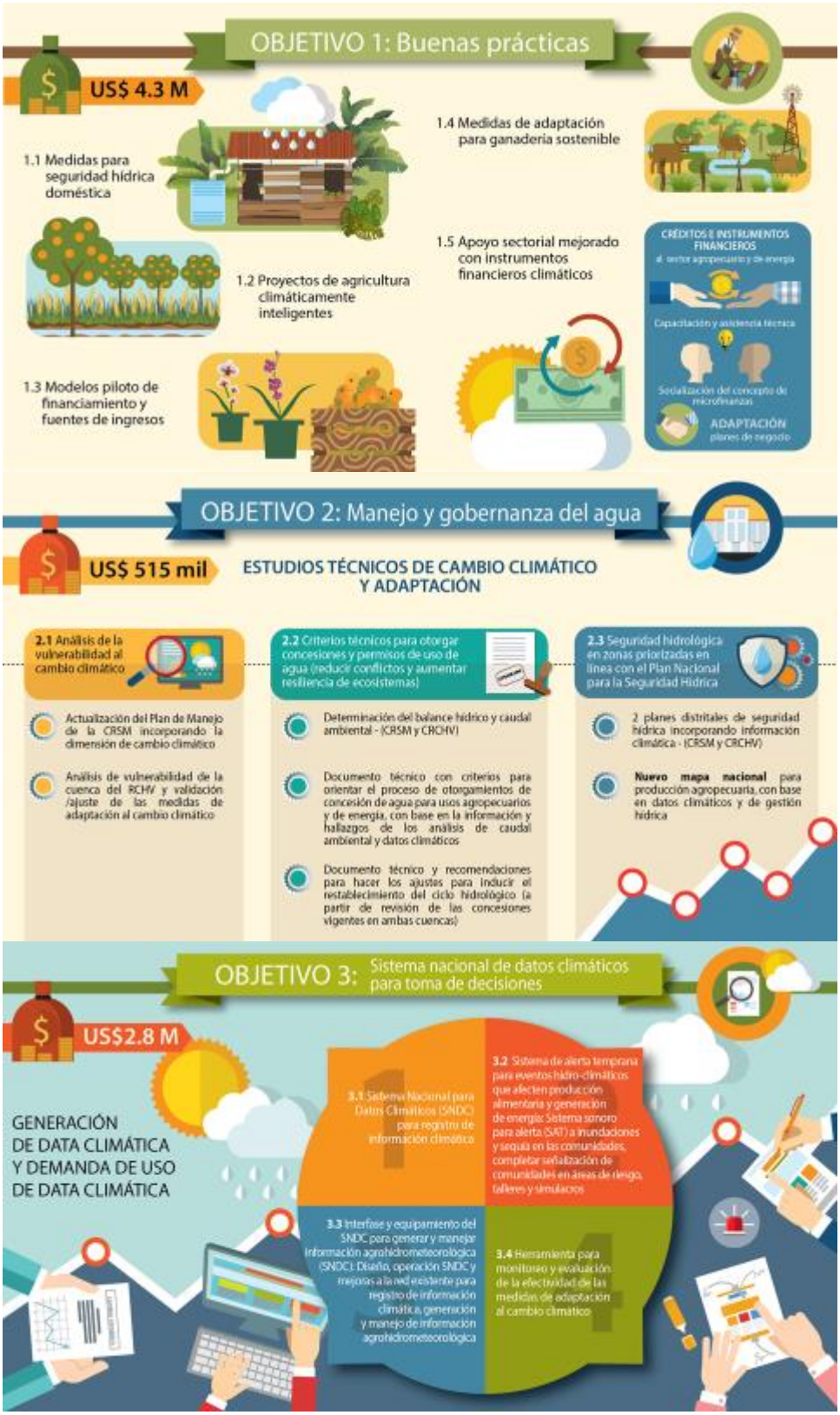
2.3 Presentación en talleres de consultas públicas (retroalimentación)


ESCENARIO ACTUAL
PANAMÁ
PAÍS IMPULSADO POR AGUA
CAMBIO CLIMÁTICO
ALIMENTOS
ENERGÍA
NEXO
AGRICULTURA
CLIMA
PROPUESTA ALINEADA CON POLÍTICAS PÚBLICAS
MOMENTUM ÚNICO
SINERGIA
MITIGACIÓN Y ADAPTACIÓN
ECOSISTEMAS
DESARROLLO
POLÍTICAS PÚBLICAS
PROPUESTA
Plan Nacional de Gestión Integrada de Recursos Hídricos 2010-2030
Proceso de elaboración del Plan Nacional para la Seguridad Hídrica
Plan Energético Nacional 2015-2050
Pacto Nacional por el Agro
ESFUERZOS DE ADAPTACIÓN
RESPUESTA AL ESCENARIO ACTUAL
GESTIÓN DEL AGUA
Promover la resiliencia climática
Reducir la vulnerabilidad
SEGURIDAD HÍDRICA
ENERGÍA
SEGURIDAD ALIMENTARIA
ADAPTACIÓN AL CAMBIO CLIMÁTICO

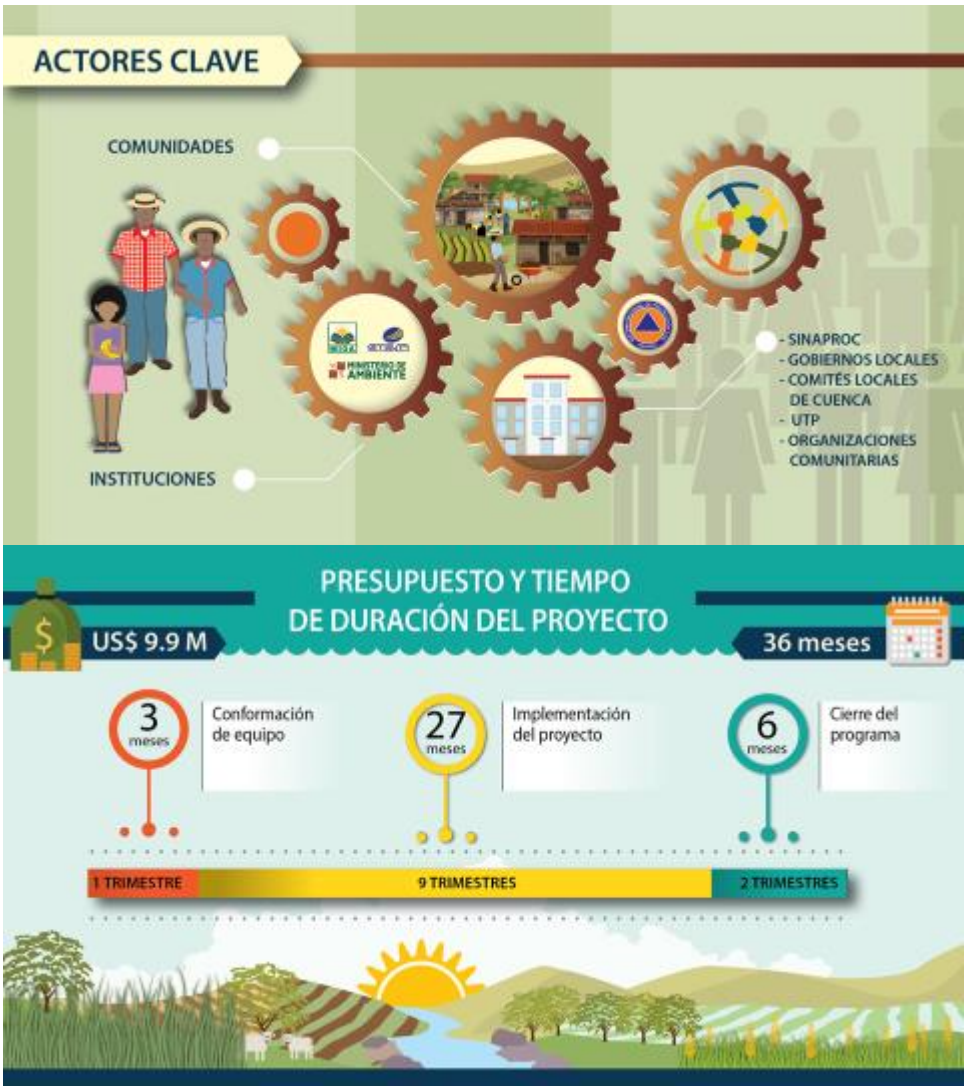

ÁREAS DE INTERVENCIÓN
CUENCAS DE LOS RÍOS SANTA MARÍA Y CHIRIQUÍ VIEJO
LAS CUENCAS SE PRIORIZARON POR:
Condición de su recurso hídrico
Importancia a nivel nacional para la producción energética y de alimentos
Existencia de conflictos entre usos del agua
COMUNIDAD
SUBCUENCAS Y MICROCUENCAS
CUENCAS RÍOS SANTA MARÍA Y CHIRIQUÍ VIEJO
NIVEL NACIONAL


ÁREAS DE INTERVENCIÓN
• Cosecha de agua;
• Sistema de Alerta Temprana (SAT)
• Pilotos de planes distritales de seguridad hídrica
• Microfinanzas para AbE.
Cuenca de Río Santa María
Sistemas agrosilvopastoriles (SASP)
Cuenca de Río Chiriquí Viejo
Sub-cuenca Caisán
Cosecha de agua, bosques de galería y agroforestería
Cerro Punta y Divalá
Sistema de irrigación, arroz
Microcuenca Gallito
Diversificación de ingresos a través de:
Orquídea
Naranjilla

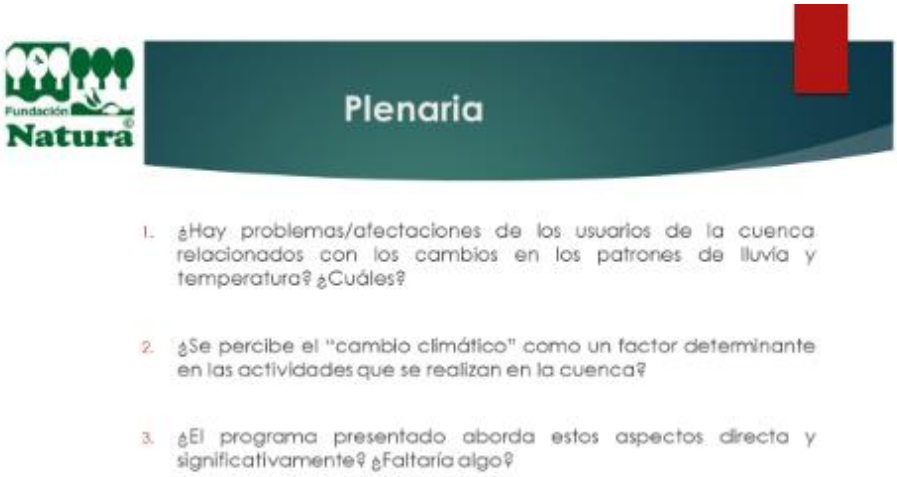

OBJETIVOS
OBJETIVO GENERAL:
Manejo climáticamente resiliente del agua para la ADAPTACIÓN
OBJETIVO 1:
Buenas prácticas
OBJETIVO 2:
Manejo y gobernanza del agua
OBJETIVO 3:
Sistema nacional de datos climáticos para toma de decisiones
OBJETIVO 4:
Gestión de conocimiento: Conocimiento para la adaptación


OBJETIVO 1: Buenas prácticas
US$ 4.3 M
1.1 Medidas para seguridad hídrica doméstica
1.2 Proyectos de agricultura climáticamente inteligentes
1.3 Modelos piloto de financiamiento y fuentes de ingresos
1.4 Medidas de adaptación para ganaderia sostenible
1.5 Apoyo sectorial mejorado con instrumentos financieros climáticos
CRÉDITOS E INSTRUMENTOS FINANCIEROS
Capacitación y asistencia técnica
Sensibilización del concepto de microfinanzas
ADAPTACIÓN
planes de negocio
OBJETIVO 2: Manejo y gobernanza del agua
US$ 515 mil
ESTUDIOS TÉCNICOS DE CAMBIO CLIMÁTICO Y ADAPTACIÓN
2.1 Análisis de la vulnerabilidad al cambio climático
Actualización del Plan de Manejo de la CRSM incorporando la dimensión de cambio climático
Análisis de vulnerabilidad de la cuenca del RCHV y validación /ajuste de las medidas de adaptación al cambio climático
2.2 Criterios técnicos para otorgar concesiones y permisos de uso de agua (reducir conflictos y aumentar resiliencia de ecosistemas)
Determinación del balance hídrico y caudal ambiental - (CRSM y CRCHV)
Documento técnico con criterios para orientar el proceso de otorgamientos de concesión de agua para usos agropecuarios y de energía, con base en la información y hallazgos de los análisis de caudal ambiental y datos climáticos
Documento técnico y recomendaciones para hacer los ajustes para inducir el restablecimiento del ciclo hidrológico (a partir de revisión de las concesiones vigentes en ambas cuencas)
2.3 Seguridad hidrológica en zonas priorizadas en línea con el Plan Nacional para la Seguridad Hídrica
2 planes distritales de seguridad hídrica incorporando información climática - (CRSM y CRCHV)
Nuevo mapa nacional para producción agropecuaria, con base en datos climáticos y de gestión hídrica
OBJETIVO 3: Sistema nacional de datos climáticos para toma de decisiones
US$2.8 M
GENERACIÓN DE DATA CLIMÁTICA Y DEMANDA DE USO DE DATA CLIMÁTICA
3.1 Sistema Nacional para Datos Climáticos (SNDC) para registro de información climática
3.2 Sistema de alerta temprana para eventos hidro-climáticos que afecten producción alimentaria y generación de energía: Sistema sonoro para alerta (SAT) a inundaciones y sequía en las comunidades, completar señalización de comunidades en áreas de riesgo, talleres y simulacros
3.3 Interfase y equipamiento del SNDC para generar y manejar información agrohidrometeorológica (SNDC): Diseño, operación SNDC y mejoras a la red existente para registro de información climática, generación y manejo de información agrohidrometeorológica
3.4 Herramienta para monitoreo y evaluación de la efectividad de las medidas de adaptación al cambio climático


OBJETIVO 4: Gestión de conocimiento
US$766 mil
DEMOCRATIZACIÓN
DEL CONOCIMIENTO DE ADAPTACIÓN
4.1 Capacitación al equipo del proyecto (crear capacidad de transformación de datos y transmitir para uso de la gente) y socializar la información de los análisis de vulnerabilidad
4.2 y 4.3 Capacitación especializada (genera conocimiento específico) + (interfase con UTP para alimentar cambio de currícula generando conocimiento a largo plazo)
4.4 Mapeo de iniciativas de adaptación y divulgación de experiencia del programa
4.5 Sistematización y diseminación de la experiencia y portal de adaptación


ACTORES CLAVE
COMUNIDADES
INSTITUCIONES
- SINAPROC
- GOBIERNOS LOCALES
- COMITÉS LOCALES DE CUENCA
- UTP
- ORGANIZACIONES COMUNITARIAS
PRESUPUESTO Y TIEMPO
DE DURACIÓN DEL PROYECTO
US$ 9.9 M
36 meses
3 meses
Conformación de equipo
27 meses
Implementación del proyecto
6 meses
Cierre del programa
1 TRIMESTRE
9 TRIMESTRES
2 TRIMESTRES

A.Work in group with sector not indigenous



B. Work in group with sector indigenous

The methodology used was present the questions with photographs to understand better.

Pregunta 1

a) Que opinan ustedes acerca del proyecto?

- **Diversificación de cultivos y nuevas variedades** (se crean oportunidades de mercadeo generando ingresos al productor, se ayuda a incrementar la seguridad alimentaria de la comunidad).

- Implementación de **nuevas tecnologías** (para secado del café y otros cultivos ayuda a conservar la calidad del producto y conservar la cosecha).

- **Buenas prácticas en el manejo del cultivo** (fertilidad de los suelos y plantas, manejo de sombra en los cultivos, manejo de plagas y enfermedades).

- **Conservación de suelos** (obras que contribuyen a mejorar la infiltración del agua (cosecha de agua) y a reducir la erosión (barreras vivas, muertas, acequias) esto ayuda al riego de los cultivos).

- **Fortalecimiento de capacidades** y destrezas técnicas en los beneficiarios del proyecto (conocimientos técnicos y procesos que hacen que las familias se empoderen y participen activamente de las actividades de la finca).
  - creación de negocios verdes (ofertando bien y servicios, que generan impacto ambiental positivo y además incorporan buenas prácticas ambientales, sociales y económicas).

Cosecha de Agua

Comarca Ngöbe Bugle

Escuela Bona A. de Aguilar, Coclé

Preguntas 2

a) A que se dedican? Trabajan la tierra?
b) Creen ustedes que las actividades que vamos a desarrollar con el proyecto afectan el medio ambiente?
c) Cómo ustedes utilizan los recursos que están en el bosque tales como las plantas, los animales, el agua, las rocas y el fuego (recursos naturales) para cubrir sus necesidades diarias (medios de vida) y sostener sus costumbres espirituales.

Preguntas 4

a) ¿Cuál es la mejor forma de promover la participación de las mujeres en este programa?
b) Cuál es la mejor forma de reunirlos para los encuentros de rendición de cuenta trimestrales (sitio más conveniente -más accesible a todos-, fecha más conveniente -fines de semana o día entre semana)

2.4 Minutes

UNIDAD DE CAMBIO CLIMÁTICO
Reunión Fondo de Adaptación
Adaptación al Cambio Climático a través de Manejo Integrado del Recurso Hídrico en Panamá

Día: 4 de abril de 2016
Lugar: Salón de reuniones de la Unidad de Cambio Climático /Ministerio de Ambiente

Participantes CONACCP:

IDIAP - 1 representante	ARAP - 1 representante
MIDA - 3 representantes	ETESA - 2 representantes
UTP - 1 representante	IDAAN - 1 representante
SNE - 1 representante	MIAMBIENTE - 1 representante
SINAPROC - 3 representantes	

Fundación NATURA - 3 representantes

ANTECEDENTES
Fundación NATURA, a través de la Licda. Rosa Montañez, detalla el gran esfuerzo incurrido para elaborar una propuesta de proyecto de país, bajo unos estándares muy estrictos hacia la escogencia de una agencia implementadora.

Tan pronto se logra el aval, se da inicio a la estructuración de la propuesta, que descanso bajo la responsabilidad de Fundación NATURA – Rosa Montañez, Vina Cuellar y Mayte González. En la elaboración de la propuesta se han sumado otros actores como MIDA, ETESA, MIAMBIENTE, entre otros.

La propuesta fue presentada en inglés, pero posteriormente se va a traducir, de igual manera se definirá un calendario de consulta en campo para validar la propuesta con los actores con los que se trabajara.

El proceso para la elaboración de la propuesta implica:

Año		Acción
2015	Abril	Se da el contacto entre F. NATURA y MIAMBIENTE sobre áreas de interés institucional para la propuesta.
	Julio	Participación en taller con Fondos Ambientales del Fondo de Adaptación (FA) para inducción de elaboración de propuestas y F. NATURA arma equipo de trabajo para desarrollo de la propuesta.
2016	Enero	Se envió la primera nota de concepto al FA.
	Febrero	Recepción de observaciones y solicitud de ajuste del FA. Posteriormente envío de nota de concepto ajustada.
	Marzo	Notificación formal de concepto aprobado por el FA y se recibe nota con comentarios a 2da versión ajustada
	Abril 11	Fecha límite de presentación de propuesta completa para ciclo de aprobación de Abril-Julio

La acreditación se dio en abril de 2015 y se dan las conversaciones con MIAMBIENTE (Punto Focal) y se revisó el contenido de la propuesta. En junio de 2015 se participó en una reunión sobre trainning, para hacer y presentar la propuesta. Había líneas conceptuales gruesas y se estaba elaborando un bosquejo de propuesta hasta que fue evolucionando con el Plan de Seguridad Hídrica y Plan de Energético.

En enero de 2016, se tenía que presentar el 1er plan de propuesta. La cartera de proyectos se fue acortando y el mismo fondo se ha enfocado en lo que se puedo o no financiar.

El 11 de abril se debe entregar la propuesta completa, es un reto y hay una segunda opción hasta agosto y de lo contrario se corre todo el proceso hasta 2017. Se debe evidenciar todo de manera física de lo que se está haciendo.

OBJETIVO
Generar un manejo resiliente del agua para la seguridad del manejo de los ríos Chiriquí Viejo y Santa María – microcuencas. Se ha tomado en cuenta aquellos rubros donde se está tenido problemas de producción, generación y demanda.

Cronograma de la validación entre los grupos de trabajo en cada cuenca hidrográfica:
Calendario:
4 abril – CONACCP
6 abril – MIDA regionales y SINAPROC
7 y 8 abril representantes de Comité de cuencas de Chiriquí Viejo y Santa María
11 envió inicial de propuesta completa.
27 abril presentación final de documento al CONACCP.

APORTES Y COMENTARIOS:

ETESA - reconocimiento hacia lo que se ha logrado hasta el momento. Disponibilidad de parte de la dirección para apoyar. Ya se está trabajando en los requerimientos de los sensores. Diego Gonzalez será el punto focal de ETESA.
La Licda. Mayte G. establece que se requiere de 2 a 5 pág., que describan los requerimientos para los sensores agropecuarios. Se debe incluir el criterio de adicionalidad climática, para especificar el riesgo y respuesta climática.

Compromiso de entregar la información el jueves 7 de abril, por parte del Ing. Diego Gonzalez.

UTP – La propuesta original ha cambiado y no se ve el punto de investigación que resulta de suma importancia desde el punto de vistas de la universidad, más aún cuando se requiere llevar esto a otras partes del país. La parte de capacidad en fundamental, para que se vea como se hará sostenible el proyecto hacia el futuro y poder brindar espacio a la UTP en el involucramiento de la capacitación y fortalecer las universidades.

¿Cuál es el periodo de vida del proyecto?
F. NATURA, especifica, tres (3) años de vida del proyecto.

¿Gobernanza? No se ve reflejado indicadores hacia este punto.
¿Cuáles serían las micro cuencas identificadas?
F. NATURA. En cuanto a micro cuencas se han identificado: Caizan en río Chiriquí Viejo y Gallito en río Santa María.

Mayte G. – la sostenibilidad de los procesos será muy bien recibido para ver el posesionando a los beneficiados y profundizar. La gobernanza se enmarca en elaborar un documento técnico que ofrezca orientaciones técnicas para las concesiones y respetar e incorporar la variabilidad climática. Esto se enmarca en varios procesos y esto no debe duplicar sino complementar los procesos ya en camino.

MIDA – debe haber concordancia en la gestión del agua por parte de todas las partes involucradas.

SENACYT – se debe establecer los criterios para identificar cuando es vulnerabilidad climática. Se ha hecho investigaciones en relación a estas cuencas (en SENACYT) y las mismas se deben retomar y ver si se pude poner en seguimiento y que quede establecido que debe hacer por parte de cada integrante.

En relación a la participación de personas conscientes, definir cuáles son los cambios de comportamiento, el nivel de participación, los mecanismo de participación y difusión para separarlos de lo que significa sensibilización. Se debe tomar en cuenta otros actores no sólo los comités de cuencas, que indique participación y consulta. De igual manera establecer un match entre los objetivos, indicadores y productos.

Mayte – sobre el "concientometro", se debe hacer un match entre los indicadores del Fondo.

IDIAP – Se ha mejorado la propuesta. Sin embargo, existe una interrogante acerca de la selección de las cuencas, ¿Por qué no el Río La Villa?. Lo fundamental es iniciar y accesar los fondos y hacer algo.
Vale la pena tomar en cuenta el tema de las semillas mejoradas resistentes al cambio climático y en biogenética

F. NATURA – para la selección de las cuencas del río Chiriquí Viejo y Santa María, se ha tomado en cuenta la selección elementos de energía, producción de alimentos y agua. Además cuentas con planes de manejo y creación de comités de cuenca.

SNE – Dando continuidad a lo planteado por IDIAP, en torno a la escogencia de la cuenca del río La Villa, los criterios que se tomaron para la escogencia de las cuencas, en cuanto a producción de energía y producción de alimentos, sin embargo se habla de criterios para la intervención en cuanto a población vulnerable de abastecimiento de agua y la vulnerabilidad de ellos por no poder abastecerse del recurso hídrico.

¿A futuro se podrá incluir esta cuenca más adelante?

F. NATURA - la propuesta fue revisada muy detalladamente y se fue muy estricto hacia donde se enfoca la propuesta. No permite incluir más allá. La Villa no tenía el componente energético, en estas cuencas hay data, hay elementos muy estrictos y selectivos. La cuenca del río La Villa requiere de una política nacional.

Mayte – Si hay una cuenca critica es La Villa sobre la cual se viene trabajando y se pone como punto generar productos que se pueden replicar en otras cuencas. Uno de los productos es algo que permita medir si hay adaptación.

Rene – la propuestas va de la mano con el Plan Hídrico Nacional y se ha trabajado con el Plan Energético Nacional y ellos cuentan con procesos de consulta.

Reunión Fondo de Adaptación
Adaptación al Cambio Climático a través de Manejo Integrado del Recurso Hídrico en Panamá

Día: 8 de abril de 2016
Lugar: Salón de reuniones de SINAPROC

Participantes:

SINAPROC - 3 representantes
MIAMBIENTE - 2 representante
Fundación NATURA - 2 representantes

Objetivo de la reunión:
Presentar al equipo de SINAPROC el Concepto de Proyecto que fue presentado al Fondo de Adaptación como propuesta de país.
Desarrollo de la Reunión:
La Directora de Fundación NATURA presenta el concepto de la propuesta que fue enviada al Fondo de Adaptación indicando que se han realizado varias reuniones con el equipo designado por el Ministerio de Ambiente y del Ministerio de Desarrollo Agropecuario. La propuesta tiene como objetivo generar un manejo resiliente del agua para la seguridad del manejo de los ríos Chiriquí Viejo y Santa María. Luego de realizar los análisis se decidió trabajar con el nexo seguridad alimentaria, seguridad hídrica y energía.
Se ha tomado en cuenta aquellos rubros donde se está tenido problemas de producción, generación y demanda causados por el cambio climático.
El equipo de SINAPROC manifestó un compromiso de apoyar la propuesta a través de la emisión de la nota de aval, por parte del Director de SINAPROC.

Indicó SINAPROC que no se cuenta con la cantidad de funcionarios que se demanda y esto limita el accionar hacia ciertos sectores o acciones, sin embargo existe el interés en participar en la propuesta del FA.

Se explicó que desconocen si el SAT en la cuenca del río Chiriquí Viejo está funcionando e indicaron que en la cuenca del río Santa María no hay un SAT. Manifestaron que s importante instalar el SAT de sequía y que en Panamá no existe hasta el momento.
Resulta importante definir los tipos de estaciones de alerta temprana que se requieren, sofisticadas o automatizadas o las más básicas, que permiten una comunicación sencilla entre comunidades.

Compromiso de parte de SINAPROC de entregar los requerimientos de equipo y recursos humano necesarios para la instalación de los sistemas de alerta temprana para ingresar a la propuesta.

Se adjunta listado de asistencia.

Fundación NATURA
Reunión Fondo de Adaptación
Adaptación al Cambio Climático a través de Manejo Integrado del Recurso Hídrico en Panamá

Día: 5 de mayo de 2016
Lugar: Salón de reuniones del Parque Metropolitano

Participantes: ONG

Nombre	**Organización /Institución**
Tomasa Hernández	A.M.A. Panamá
Elvin Britton	CATIE
Antonio Clemente	MARVIVA
Luiggi Franceschi	Fundación Panamá
Ricardo Wong	PROMAR
Mirta Benítez	Mi Ambiente
Sandy P. Mosquera	Fundación Ciudad del Saber
Ramiro A.	Vende Urbano
Carpaijsander	Wetend
Harley Mitechell	GAEA /Abogados
Yarabi Vega	Parque Natural Metropolitano
Beatma Schmitt	PPP-GEF
Hlif Linnetvel	Bosques del mundo
Daniel Holness	CEASPA
Arturo Dominica	CREHO
María Soledad Porcell	CIAM

Objetivo de la reunión:
Presentar a las organizaciones no gubernamentales la propuesta del Programa para retroalimentación de la misma.
Desarrollo de la Reunión:
La Sra. Rosa Montañez, Directora de Fundación NATURA hizo la presentación de la propuesta utilizando las infografías utilizadas en las consultas con el apoyo de Vilna Cuéllar y Mayte González quienes explicaron los resultados de las consultas con los actores locales en las cuencas del río Chiriquí Viejo y Santa María.
Una vez concluida la presentación los participantes iniciaron con preguntas y comentarios:

- Mitchell

Criterios de otorgamientos de permisos; le pareció bueno el concepto.
Ley de agua en la asamblea; puede haber un cambio en la ley con este programa. Caudal ambiental.

Recomendaciones para restauración de ciclo hidrológico; fue solicitado por las comunidades? No pero se cree es conveniente incluirlo ya que MiAmbiente no tiene respaldo para toma de decisiones.
Tienen sustento jurídico y es oportuno. Se paga por las revisiones de las concesiones de agua.
Recomendar toda intervención debe tender a restablecer el recurso hídrico.

Felicita a la Fundación NATURA por la propuesta de país presentada e indica que la ve muy bien articulada.

- Britton

Considera que los planes distritales de seguridad hídrica: o medidas de seguridad hídrica que se presentan en la propuesta pudiesen incorporarse a los planes de desarrollo que existen para mejorarlos o actualizarlos.
Se indicó por parte del equipo de NATURA que se tenía que ir a las comunidades y verificar si existían y/o los conocían. Si existen definitivamente que se utilizaran.

CATIE trabaja con "centro clima", se puede ver este sistema . ETESA también participa. Debe bajar a los productores; se puede intercambiar información con el equipo que está elaborando la propuesta. Las plataformas avanzadas se pueden incorporar en la implementación. Tejer alianzas.

Puede haber cambios si el menú aumenta una vez iniciado el programa. Algunos elementos podrían tener variaciones pero no se espera que sean de Fondo. Lo que se propuso es trabajar con medidas robustas de adaptación y adaptación basado en ecosistemas.

Institucionalidad=sostenibilidad no solo de los actores ONG sino de los comités de cuenca y subcuenca. En el fortalecimiento de los comités? Son actores y socios permanentes en todo el proceso, interlocutores permanentes.. se están articulando, hay diferentes esquemas.

Herramienta de monitoreo quién la va a administrar; Fundación Natura? Fundación Natura tiene el compromiso de asimilar ese componente. Se genera la capacidad especializada y se puede traspasar a MiAmbiente. El Comité de Cambio Climático sugirió que hubiese fortalecimiento.

- Francesshi

Cómo salió la microcuenca de Gallito? Se seleccionó tomando en cuenta las variabilidad climática, tomando como referencia las planificaciones previas. Un ejercicio inicial de un primer concepto de proyecto que identificaba varias zonas entre estas Chiriquí Viejo y Santa María y que existieran los nexos de recurso hídrico-seguridad alimentaria-energía. Con nivel asociativo.

Como participaran o apoyaran las ONG. Para la implementación se realizaran convocatorias; se harán convocatorias para proyectos como ha trabajado NATURA.

Otras cuencas se podrían potenciar para el proyecto? Había que escoger área donde se pudiese tener resultados en los 36 meses y todos los criterios del Fondo de Adaptación. Hay cuencas más conflictivas pero transformar una cuenca en el período es riesgosa y se tienen que lograr que funcione con los recursos y tiempo aprobado.
Se tomó en cuenta las cuencas prioritarias del país y estas estaban entre las 5 del país.

- Ramiro:

Que tipos y métodos se utilizaran para cosecha de agua? No solo es de infraestructura gris sino que debe haber protección de la fuente. Se trabajara de acuerdo al Scall (MiAmbiente) hasta consumo humano: captura con cisternas y embalses. Se podría trabajar también con micronegocios.

Tanto Mayte González (consultora) como Vilna Cuéllar (Gerente de Fondos/Natura) presentaron resultados de las consultas públicas realizadas.

Fundación NATURA
Reunión Fondo de Adaptación
Adaptación al Cambio Climático a través de Manejo Integrado del Recurso Hídrico en Panamá

Día: 6 de mayo de 2016
Lugar: Hotel Wyndham Panama Albrook Mall

Participantes: Comité Nacional de Cambio Climático
Lista de Participantes adjunta; 21 participantes

Objetivo de la reunión:
Presentar al Comité Nacional de Cambio Climático la propuesta completa con la retroalimentación de las consultas públicas realizadas en la cuenca del río Chiriquí Viejo y río Santa María.

Desarrollo de la Reunión:
La Sra. Rosa Montañez, Directora de Fundación NATURA hizo la presentación de la propuesta utilizando las infografías utilizadas en las consultas y explicó los resultados de las consultas con los actores locales en las cuencas del río Chiriquí Viejo y Santa María con el apoyo de Vilna Cuéllar.
Una vez concluida la presentación los participantes iniciaron con preguntas y comentarios:
Cual fue el muestreo? Procedimiento de cómo se dio la consulta, ha habido alguna retroalimentación.

No se ve la sub-actividad sobre energía. Cómo se incorpora el tema energético? Se ha incluido un posible modelos? Hay varias alternativas entre estas están los paneles solares, mini-hidros para uso en fincas pero no es para hidroeléctricas.

En el 2do. punto en planeamiento energético: ETESA tiene unos modelos para proyectar uso de las hidroeléctricas del país. Tienen un módulo de manejo de agua. Dirección de planeamiento se debe incluir esa unidad además de hidrometeorología.

Se incluyen las Juntas Administradoras de Acueductos Rurales (JAAR)? Se invitaron a la consulta pública y participaron en los talleres. Estas juntas son muy importantes ya que conocen todo lo relacionado con el abastecimiento de agua en sus comunidades además de que se preocupan por conservar las fuentes hídricas.

Se debe incorporar las buenas prácticas para el sistema hídrico que tiene que ver con el despacho.

Manejo de agua: hay que trabajar con el comité de seguridad hídrica. Se indicó que se fueron a las consultas para el plan de seguridad hídrica y en la elaboración de la propuesta fue un documento de consulta permanente porque se trabajó con planificaciones ya establecidas.

Santa María: en Santá Fe hay una minihidroeléctrica. No se va a trabajar en esta?
Donde se establecerán las mini-hidroeléctricas? El lugar va a depender luego que se inicie

Bosque de galería: se van a establecer bosques de galería? Sí, inicialmente se trabajaría solo en la cuenca del río Chiriquí Viejo pero en la consulta pública solicitaron que se incluyera en la cuenca del río Santa María. Para esto se disminuyó las hectáreas silvopastoriles de 800 a 600 para incluir con sistemas agroforestales 200 ha en la cuenca del río Santa María.

Tener en cuenta las JAAR, es necesario el mantenimiento de las microcuenca para la seguridad alimentaria.

Análisis del proyecto, se tomó en cuenta la experiencia del IDAAN y ACP.? Se ha contado con insumos de la ACP tomando los niveles de éxito? IDAAN, no se ha involucrado pero si se ha considerado las normas Copanit, para las colectas de agua. En el caso de la ACP tenemos experiencia en esta cuenca y si se ha tomado en cuenta lecciones aprendidas y proyectos de éxito.

Fase de implementación: se requerirá un equipo legal? Por ejemplo para reforestación en áreas privadas? Las áreas de galería son patrimonio del estado así que no debe haber problemas. Se tiene presencia en la zona por lo cual no anticipamos que va a ver un tema de resistencia y poco interés sino por el contrario. Natura tiene experiencia trabajando con productores y organizaciones de base comunitaria por lo cual se implementaran estas metodologías.

Cuenca alta Chiriquí Viejo: hay ganadería y agricultura como inicia esto? Hay procesos andando por lo cual no debe haber problemas. Lo que se está adicionando es el factor de cambio climático. Lo que hay que dosificar es la expectativa de los locales porque los presupuestos no alcanzan para todos.

Marco legal, cuando al propietario se le exige que siembre. Se trabajara con los planes de manejo que se elaboraran participativamente con los productores.

Se puede incluir hortalizas para producción de manera sostenible? Este es un programa de cambio climático por lo cual se escogieron los rubros que en esas cuencas son más vulnerables al cambio climático. Se han identificados rubros de alto impacto y que tengan vinculación al cambio climático: ganadería, arroz

Es importante que los actores locales puedan mejorar y aportar para el cambio.

CONADES hizo un estudio donde aporto cuales deberían ser las áreas de producción; también ordenamiento territorial. Se puede verificar.

Porque no en otras áreas? Hay que focalizar y es importante que no se tengan iniciativas de otros procesos que puedan ser réplicas de los productos del programa por eso está la variable de cambio climático. Por el tiempo no se podría tener impactos en áreas muy degradadas.

Se consulta por parte de NATURA si alguno de los participantes sabe de algún documento que tenga escenarios de cambio climático en las dos cuencas seleccionadas. La economía de cambio climático CEPAL, verificar si tiene escenarios. No es seguro porque debe ser macro y no por cuencas.

Fundación NATURA / Propuesta Fondo de Adaptación al Cambio Climático						
Ayuda Memoria						
Reunión de Coordinación Fundación Natura y Ministerio de Desarrollo Agropecuario Veraguas						
Información General						
Fecha:	03 junio 2016	*Hora:*	8:00 a.m.	*Hasta:*	6:00 p.m.	*Local:* Oficina MIDA en Santiago, Oficina Agencia del MIDA en Santa Fe y Oficina Cooperativa en Santa Fe
Presidida por:	Vilna Cuéllar / Gerente de los Fondos TFCA					

Participantes	Institución/ Organización
Raúl Ortiz	MIDA Santiago
Jairo Alfaro	MIDA Santiago
Victoriano Concepción	MIDA Santa Fe
Fredy Concepción	Cooperativa La Esperanza de los Campesinos Santa Fe
Leonel Toribio	Cooperativa La Esperanza de los Campesinos Santa Fe
Vilna Cuéllar	Gerente TFCA Fundación Natura
Amarilis Rodríguez	Coordinador de Proyectos Fundación Natura

Objetivo de la Reunión

- Obtener información detallada de la producción de café y ganadera en el área de la CHRSanta María.

Desarrollo de la Reunión:

En seguimiento a la propuesta de país presentada por Fundación Natura como Ente Nacional Implementador (ENI) acreditado ante el Fondo de Adaptación al Cambio Climático se realiza gira a la provincia de Veraguas para la obtención de información detallada para los productos de producción (agroforestería y ganadería) colocados en la propuesta para la cuenca del río Santa María.
La gira tenía planificado realizar reunión con personal técnico del Ministerio de Desarrollo Agropecuario de Santiago y Santa Fe así como reunión con socios estratégicos del sitio productivo en Santa Fe de Veraguas (Cooperativa La Esperanza de los Campesinos Santa Fe).

Resultados:

- Con Técnicos del Departamento Agrícola del MIDA de Santiago se realizó la reunión donde se obtuvo información general de la producción de café en el área de Veraguas, la estadística de las organizaciones existentes en el área de Santa Fe e indicaron que existe una baja producción debido a las variabilidades climáticas acentuada por el Fenómeno del Niño que se están dando en la región. Se han incrementado las plagas tanto para los cultivos como para el ganado.
- Una vez finalizada la reunión en el MIDA de Santiago nos trasladamos a Santa Fe para reunirnos con el personal del MIDA –Agencia de Santa Fe quienes entregaron la estadística sobre los productores de café existentes en el área.
- De igual forma se aprovechó para realizar reunión con los técnicos de la Cooperativa La Esperanza de los Campesinos la cual es una entidad que apoya y adquiere el café que se produce en el área. Se entregó a NATURA información detallada de sus socios que se dedican a la producción de café en la zona indicando las especies que están utilizando. Igualmente manifestaron que tienen una baja producción, aproximadamente 3 a 4 qq/hectárea debido a la sequía y plagas que atacan al café. También indicaron que los productores son pequeños productores que no tienen recursos para adaptar sus fincas al cambio climático pero que hay grandes productores que con la adopción de buenas prácticas han mejorado su producción entre 40 a 50 qq/hectárea.
- En Santa Fe también se visitó los viveros de orquídeas que se encuentran en el área los cuales son una alternativa económica en el sector.

Pendientes:

Descripción	Responsable	Fecha	Seguimiento
1. Información de la producción ganadera en el área de la CHRSMaría	Boris Espinosa /MIDA Santiago	09 de junio 2016	Pendiente
2. Información de la producción de café en el área de Santa Fe en Veraguas	Victoriano Concepción /MIDA Santa Fe	09 de junio 2016	ok

Elaborado por:

Amarilis Rodríguez
Coordinadora de Proyectos FN

Fundación NATURA						
Ayuda Memoria N° 1						
Reunión de Coordinación						**Programa: Fondo de Adaptación**
Información General:						
Fecha:	20/7/2016	Hora:	8:30 a.m.	Hasta	11:30	Local: Regional del MI.D.A. David.
Presidida por:	Licda. Vilna Cuéllar					

Participantes	Institución/ Organización
Rolando Guerrero	Director Regional – MI.D.A. Chiriquí
Ricardo Chavarria	MI.D.A. – Secretario Técnico
José Victoria	MI.D.A. – Coord. de Programa
Franklin Concepción	MI.D.A. – Coord. Agrícola
Vilna Cuellar	Fund. Natura – Gerente de Programas
Leonel Montes	Fund. Natura – Coordinador de Programas
Mirta Benitez	Mi Ambiente – Unidad Ambiental

Tema tratado en la reunión:

Presentación y evolución del Programa.
Alianzas estratégicas en beneficios del Programa.
Identificación de áreas de producción de arroz y oportunidades para la implementación de sistemas de alerta temprana.
Diagnóstico genérico sobre los sistemas de producción de arroz empleados en la provincia.
Oportunidades para la implementación de modernos sistemas de irrigación en arroz.
Análisis estadístico de volúmenes de producción y cultivos priorizados para la provincia de Chiriquí.
Evaluación de las necesidades del organismo regente del sector agropecuario.

Desarrollo de la Reunión:

Presentación y evolución del Programa

La reunión tuvo inicio con una presentación del concepto que respalda al Programa, y liderada por la Licda. Vilna Cuellar quien ejerce el cargo de representante de la Fundación Natura ante el organismo financiador del potencial Programa.

En la presentación se logró abordar los avances que a la fecha se han generado con el proceso de validación del Programa ante el Fondo de Adaptación.

En esta etapa, se subrayó la importancia de un trabajo no solo coordinado sino también eficiente para cumplir con los tiempos establecidos previamente en la planificación del Programa.

Se hizo mucho énfasis en el periodo de diseño, conformación de equipo técnico y de implementación del Programa; en la cual se concluyó que pese a que los objetivos planteados con el Programa son cortos, el trabajo efectivo, eficiente y oportuno se posiciona como un accionar necesario para garantizar el cumplimiento de los objetivos fijados con el Programa.

A medida que se avanzaba en el proceso explicativo del Programa, se logró abordar de manera puntual el presupuesto económico contemplado para cada componente del propio Programa.

Alianzas estratégicas en beneficios del Programa

Se aprovechó la presente reunión para profundizar en los avances que se habían logrado en materia de generar una alianza estratégica entre organismos gubernamentales y no gubernamentales para la efectiva implementación del Programa. En este punto se identificó claramente que se debe de realizar nuevos esfuerzos estratégicos para conservar y hacer avanzar los procesos previamente establecidos.

Por su parte, los representantes del MI.D.A. presentes en la reunión, manifestaron el alto interés en continuar participando con el Programa, pero sí hicieron énfasis en la necesidad que existe de formalizar mediante un mecanismo legal el apoyo concreto que brindará el MI.D.A. para con el Programa. Se indicó por parte de NATURA que el anterior Ministro había remitido nota indicando que las acciones propuestas que se han presentan al Fondo de Adaptación están alineadas con las prioridades institucionales. La coordinación y complementariedad entre las actividades de ese Programa de Adaptación y las acciones del Ministerio, será clave para fortalecer la resiliencia climática del sector productivo agropecuario nacional.

Identificación de áreas de producción de arroz y oportunidades para la implementación de sistemas de alerta temprana.

Este componente fue desarrollado por los técnicos del MI.D.A. presente en la reunión. Como conclusión se identificaron que en la parte baja de la cuenca del río Chiriquí Viejo, se encuentran concentrados los productores de arroz a secano, reunidos en el área de Divalá, Gómez y Esquicito.

En este punto, los técnicos especialistas del MI.D.A. hicieron énfasis en el tamaño de los actuales productores de arroz existentes en la región productora del importante grano a nivel nacional; los cuales se posicionan en medianos productores de arroz, cultivando un hectareaje mínimo de 5 ha.

Se aprovechó este dato para generar un alto en el interés de realizar los sistemas de irrigación en el área de Divalá; l MI.D.A. apuntó a que si existen recursos se trabaje también en el área de Gómez y Esquicito, áreas en las cuales se concentran también pequeños productores.

Al abordar este punto de la reunión, se aprovechó para validar los potenciales puntos en los cuales se instalaran estaciones hidrológicas en conjunto con el personal de Mi Ambiente. Por parte del MI.D.A. se hizo énfasis en la viabilidad de emplear la red existente de agencias distritales, para la instalación de los nuevos equipos agrohidrometeorológicos. Otro importante punto que se logró enfatizar en este componente, fue la necesidad de hacer que los equipos agrohidrometereológicos dispongan de la tecnología efectiva para la oportuna toma de decisiones.

Al finalizar el ejercicio, se identificó que el área de Divalá y el área de Caisán disponen de las condiciones necesarias para la instalación y operación de sistemas agrohidrometereológicos para la provincia. A modo de resumen, el MI.D.A. igual hizo mención, a los intereses que posee la Asociación de Productores de Renacimiento (A.P.RE.) en disponer de una estación de este tipo para su oportuna toma de decisiones.

En cuanto a los sistemas de irrigación se logró concluir que trabajar con pequeños productores agrícolas, empleando tecnologías de punta (eficiencia energética), trabajando con sistemas de captación de agua, contemplando los grados de pendientes y apuntando hacia el fortalecimiento de la seguridad alimentaria se resumen como importantes aristas a abordar desde el accionar del Programa.

Análisis estadístico de volúmenes de producción y cultivos priorizados para la provincia de Chiriquí

Al finalizar la reunión se enfatizó en las necesidades que poseían los gestores del Programa en la obtención de datos estadísticos para la sustentación de las actividades a ejecutar en la zona. En este sentido, se levantó una importante sinergia con el Depto. de Planificación del MI.D.A., los cuales suministraron importantes datos relacionados con los volúmenes de producción, áreas de producción, tecnologías de producción, daños generados por el cambio climático, estudios de las cuencas del río Bambito, recomendaciones para los sistemas de irrigación en el área de Barú entre otros importantes documentos.

Evaluación de las necesidades del organismo regente del sector agropecuario.

El representante del MI.D.A. en la provincia de Chiriquí, Ing. Rolando Guerrero, aprovecho la visita de la Fundación Natura, para solicitar apoyo en equipos informáticos y papelería con la intención de que los técnicos del organismo realicen una oportuna y eficiente gestión en pro de los beneficiarios del Programa.

Un importante tema que se conversó en la reunión, se concentró en las necesidades de formación de capacidades, primeramente en el equipo de técnicos requeridos para brindar la asistencia técnica del Programa, así como las requeridas por los beneficiarios. Entre los temas sugeridos por los técnicos del MI.D.A. se lograron identificar los siguientes:

- Formulación, gestión y administración (técnica y económica) de sistemas de producción de arroz irrigado.
- Elaboración y planificación de sistemas de riego y drenajes aptos para el cultivo de arroz irrigado.
- Prestación de asesoría para la implementación de buenas prácticas agrícolas.
- Inserción sostenible en el mercado, a partir de la producción de arroz irrigado.

Pendientes:

Descripción	Responsable	Fecha	Observaciones
Estadísticas de cultivo de arroz (áreas de producción, rendimiento, tecnologías, variedades).	MI.D.A.	21/07/2016	ok
Especificaciones técnicas para el establecimiento del cultivo de arroz bajo irrigación.	MI.D.A.	21/07/2016	ok
Calendario de actividades para el cultivo de arroz en la región.	MI.D.A.	21/07/2016	pendiente
Costos de producción.		21/07/2016	ok

Suministrar áreas en la cual se puedan instalar las estaciones metereológicas (área de candela, río sereno). Para la parte baja, el MI.D.A. sugiere que se instale en el mismo Divalá. Se sugiere en el tramo medio, instalar en el área de Caisán Centro/Plaza.		21/07/2016	La zona tiene mucha influencia de vientos en el verano. En todas las áreas propuestas se tiene presencia del MIDA, no solo para el área de Divalá.
Ley de agua (concesión de agua).	Mi Ambiente		
Afectaciones en los cultivos por de sequias por sequias e inundaciones, vientos en la región.	MI.D.A.	21/07/2016	Parcialmente entregado

Panamá, 29 de julio de 2016

Elaborada por:
Leonel Montes Mendoza

Fundación NATURA / Propuesta Fondo de Adaptación al Cambio Climático						
Ayuda Memoria						
Reunión de Coordinación Fundación Natura, Ministerio de Desarrollo Agropecuario Veraguas, Instituto de Investigación Agropecuaria						
Información General						
Fecha:	21 julio 2016	Hora:	8:00 a.m.	***Hasta :***	4:00 p.m.	***Local:*** Oficina MIDA en Herrera, Oficina IDIAP Los Santos, Oficina de Universidad Tecnológica de Panamá, Regional de Azuero
Presidida por:	Vilna Cuéllar / Gerente de los Fondos TFCA					

Participantes	*Institución/ Organización*
Erick Corro	Director Regional, MIDA Herrera
Juan Bosco	Departamento de Ganadería, MIDA Herrera
Francisco Díaz	Unidad Ambiental, MIDA Herrera
Antonio Rodríguez	Estadística Agropecuaria, MIDA Herrera
Veidi Osorio	Planificación Agropecuaria, MIDA Herrera
Jorge Ramos	Sanidad Vegetal, MIDA Herrera
Manuel Ruíz	Ingeniería, MIDA Herrera
Ellis Colombia	Directora Regional, IDIAP Los Santos
Sujey Bustamante	Técnico, IDIAP Los Santos
Geremías Dominguez	Investigador, IDIAP Los Santos
Eliseo Batista	Investigador, IDIAP Los Santos
Magdalena Duran	Rectora, UTP Azuero
Vilna Cuéllar	Gerente TFCA Fundación Natura
Yenni González	Coordinador de Proyectos Fundación Natura

Objetivo de la Reunión

- Obtener información detallada de la producción Ganadera en el área de la Cuenca del río Santa María

Desarrollo de la Reunión:

En seguimiento a la propuesta de país presentada por Fundación Natura como Ente Nacional Implementador acreditado ante el Fondo de Adaptación al Cambio Climático se realiza gira a la provincia de Herrera para la obtención de información detallada sobre producción ganadería en la cuenca del río Santa María.

En esta gira se realizaron dos (2) reuniones con instituciones gubernamentales (MIDA, IDIAP) y con una institución académica (Universidad Tecnológica de Panamá, Regional de Azuero)

Resultados:

En la presentación con las instituciones del sector se logró abordar los avances que a la fecha se tienen con el proceso de validación del Programa. Se indicó que por parte del MIDA se tiene el aval del Ministro del MIDA para ser parte del Programa como Entidad Ejecutora para las dos áreas donde se ejecutaran los proyectos.

Se enfatizó en la importancia de cumplir con el periodo de diseño, conformación de equipo técnico y de implementación del Programa; en la cual se concluyó que pese a que los objetivos planteados con el Programa son cortos, el trabajo efectivo, eficiente y oportuno se posiciona como un accionar necesario para garantizar el cumplimiento de los objetivos fijados con el Programa.

1. **Ministerio de Desarrollo Agropecuario (MIDA)**
    - Con personal del MIDA de Herrera se realizó la reunión donde participaron los técnicos de ganadería; se obtuvo información general de la producción ganadera del área, y las áreas donde se debe desarrollar los sistemas silvopastoriles.
    - Con los Técnicos se procedió al intercambio de información basada en la cantidad de hectáreas y productores ganaderos con los que se pueden desarrollar los sistemas silvopastoriles.
    - Se verificaron las áreas que deben ser incluidas en el proyecto para desarrollar sistemas silvopastoriles ya que existen áreas inundables en la región que no pueden ser utilizadas para sistemas silvopastoriles.
    - Por parte del Departamento de Ingeniería se presentaron diferentes equipos de sistemas solar para bombeo de agua y cuál es el más recomendable para la región. Se entregaron documentos.
    - Los departamentos de Estadística y Planificación agropecuaria presentaron información sobre los efectos del cambio climático en la región.
    - Por parte del Departamento de Sanidad Vegetal el intercambio se centró en las necesidades de los productores a adaptarse al cambio climático ya que esta región se ha visto afectada severamente. Indicó que no se cuenta con información meteorológica ni análisis que puedan apoyar al productor y las instituciones agropecuarias para la toma de decisión.

2. **Instituto de Investigación Agropecuaria (IDIAP)**
    - En reunión con la Directora del IDIAP de Azuero, nos indica que según afectaciones del cambio climático las lluvias son más espaciada, lo que trae como consecuencia una alta incidencia de plagas tanto en pastos como en cultivos tradicionales de la región. El pasto fue altamente afectado por la langosta, lo que ha llevado consigo a desarrollar silos de heno y camote para la suplementación de los animales.
    - La Ingeniera Bustamante y su equipo informó sobre los sistemas de alerta temprana instalados en la provincia de Herrera y Los Santos. Han sido de ayuda pero indicó que los mismos deben mejorarse como también capacitar a las comunidades para que puedan utilizar dichos sistemas. Indicó que los mismos se encuentran instalados

en áreas alejadas del Programa. Manifestó que la UTP, Regional de Azuero está trabajando en un sistema de alerta para plagas.

- La Directora indicó que están anuente a participar en el Programa; se tiene algún avance pero necesitan más apoyo.
- El equipo participante de la reunión entregó información sobre los avances que se tiene en el tema de cambio climático.

3. Universidad Tecnológica de Panamá, Regional de Azuero

- Con la Directora de la UTP se le explicó los objetivos de la propuesta presentada al Fondo de Adaptación.
- Se solicitó reunión con el equipo que está trabajando en el programa SAT para plagas en cultivos.

Pendientes:

Descripción	Responsable	Fecha	Seguimiento
1. Información de la producción ganadera en el área de la CHRS María	Juan Bosco – Francisco Díaz/MIDA Herrera	21 de julio 2016	Información entregada
2. Información de la producción Ganadera del sector	Ellis Colombia/ IDIAP Los Santos	21 de julio 2016	Información entregada

Elaborada por: Yenni González
Coordinadora de Proyectos FN

Fundación NATURA / Propuesta Fondo de Adaptación al Cambio Climático						
Ayuda Memoria						
Reunión de Coordinación Fundación Natura, Universidad Tecnológica de Panamá, Regional de Azuero						
Información General						
Fecha:	22 julio 2016	Hora:	10:00 a.m.	Hasta:	12:00 m.d.	Local: Oficina de Universidad Tecnológica de Panamá, Regional de Azuero
Presidida por:	Vilna Cuéllar / Gerente de los Fondos TFCA					
Participantes	Institución/ Organización					
Secundino Villarreal	Coordinador Facultad Ciencia y tecnología, UTP Azuero					
Aristides Villarreal	Asistente Recursos Informáticos					
Ricardo Montenegro	Asistente de Investigación					
Juan Gutiérrez	Estudiante					
Eny Serrano	Docente, Facultad de Ingeniería Civil					
Yenni González	Coordinador de Proyectos Fundación Natura					

Objetivo de la Reunión
Obtener información sobre el sistema de Alerta Temprana

Desarrollo de la Reunión:
En seguimiento a la propuesta de país presentada por Fundación Natura al Fondo de Adaptación al Cambio Climático se realizó reunión con el equipo técnico de la Universidad Tecnológica de Panamá, Regional de Azuero que diseñaron el Sistema de Alerta Temprano para plagas

Resultados:
Se explicó los objetivos del programa y se les indicó que hay un producto en el cual se debe implementar un sistema de alerta temprana (inundación y sequía) para las áreas de incidencia del programa dentro de la cuenca del río Chiriquí Viejo y Santa María.

Se solicitó explicaran el trabajo que se está realizando en la universidad sobre el tema.

A continuación, los resultados de la reunión:

- El Profesor Secundino Villarreal explicó que un grupo de profesores y estudiantes desarrollaron un Sistema de Alerta Temprana para plagas en cultivos y que actualmente están en proceso de patentar el SAT en el Ministerio de Comercio e Industrias.
- Que el mismo puede adaptarse a lo propuesto en el Programa presentado al Fondo de Adaptación; sin embargo, necesitarían recursos para hacer las adecuaciones necesarias.
- Por parte de NATURA se les explicó que el Programa tiene un período corto de implementación por lo cual se requiere que el mismo este adecuado en los primeros seis meses del Programa para poder implementarlo en caso se realice el convenio con la UTP como ente ejecutor. También se explicó que el mismo podría incluirse en el nodo que se instalará en el MIDA una vez se realicen las pruebas y se verifique su efectividad.
- Solicitaron que una vez la propuesta sea aprobada se realice una reunión con el equipo de la UTP,MIDA y ETESA para coordinar acciones.

Pendientes:

Descripción	Responsable	Fecha	Seguimiento
Detalles del SAT	Severino Villarreal	22 julio, 2016	Pendiente

Elaborada por:
Yenni González
Coordinadora de Proyectos FN

NATURA Foundation
PARTICIPATION REPORT FOR EVENTS/MEETINGS

General Information of event/meeting	
Name of the Event/Meeting:	Public Query Workshop regarding Adaptation Fund - Indigenous
Place:	La Esperanza de Los Campesinos Santa Fe – Veraguas Cooperative
Date:	November 24, 2016
NATURA Participants:	Amarilis Rodríguez, Vilna Cuéllar
Other Participants:	See attendance list

1. ORDER OF THE DAY / AGENDA

November 24, 2016

Public Query Workshop with beneficiaries, especially from the indigenous population of the communities surrounding the area of Santa Fe.

- Present the country proposal of the Adaptation to Climate Change Program through the Integrated Basin Management in Panama that has been conducted by the NATURA Foundation as an Implementing National Entity, accredited as a proposal to the Adaptation Fund.
- Interventions by: Lic. Vilna Cuéllar, Amarilis Rodríguez from NATURA Foundation and guest beneficiaries.
- Teamwork by the workshop participants to answer the questions made by NATURA Foundation.

2. MAIN ASPECTS OF THE EVENT'S DEVELOPMENT– Summary

- A presentation of the proposal was made to the participants of the communities and institutions present.
- The presentation was developed in a participatory manner and with images of the work that was done in the area to make it more understandable among the participants.
- The participants were organized into 3 groups to answer the questions that allowed them to know more about the activities that they are engaged in, how they saw the project and if it were to be implemented, which would be the activities or needs that they would want to address.
- 26 people participated (16 women and 10 men) from 8 communities (Muela, Palmar, Bermejo, Santa Fe, Quebrada Mamey, La Laja, Pantano, Girotes).

3. EVENT'S RECOMMENDATIONS OR CONCLUSIONS

- The indigenous population of the communities surrounding the area of Santa Fe actively participated in the work groups.
- The participation was mainly of indigenous women.

- The majority indicated that women should be trained to strengthen them.
- There have been changes in the agricultural cycle, increase of plagues and diseases, dry rivers and before there was more production, now it costs more to produce. Also the migration of the settlers to the urban areas in search of work.

4. ASPECTS REQUIRING FOLLOW UP BY THE FOUNDATION

Keep the participants informed of the results obtained from the presentation of the proposal to the Adaptation Fund.

Note:
Attached:

- Attendance List
- Detailed list by group with the answers to each of the questions asked.
- Event photos
- Event presentation
- Photographic report of the portfolios with the work done by the participants.

Workshop Results – Santa Fé Indigenous

Question	Group 1	Group 2	Group 3
	Group Members: Silvia, Petra, Luciana, Meli, Mercedes, Eusebio, Jaqueline	Group Members: Cornelio, Lucia, Oderiai, Lionel, Pedro, Danilo, Virginia	Group Members: Rubén Rodríguez, Arlen Palma, Joel Sibala, Marcimiliano Santo, Tiofilo Virola, Camila Peralta, Ana Flores, Elvia Virola, Nuestro Santo, Ariel Carpintero, Mauricio Jiménez
Question 1			
a)What do you think about the project?	• The coffee project is important • Other crops: yam, cassava, palm, beans, plantain, coriander, chili peppers, green beans, corn and helps take care of the forest.	• We want to but we don't have land to work on • Sounds good but we live far away from Luis River • Very nice project but I'm all alone and don't work as much • I don't have land • I have land but I live far away; we are willing to help out if the project comes around • The project is great but I live far away	• We consider that the project can help us improve our quality of life. It could help us have an economic income, better nutrition, better education creating skills to improve and learn activities.

Question	Group 1	Group 2	Group 3
		• I work from home but at my house I have parcels to cultivate cabbage, tomato, celery, banana • Luis River: coriander, chili pepper, celery, spinach, oregano • Palm: tomato, celery, cabbage, onion, carrot	
Question 2			
a) **What do you do? Do you work the land?**	• Housewife and takes care of her farm • Take care of farm, work for the family • The home garden, housewife • Plant coffee, pixvae,…, yam • Yes, I plant coffee and vegetables	• Day laborer • Construction • Agriculture • Housewife, student	• It's dedicated to the agriculture in cultivation of banana, pixvae, cassava, yam, etc. • Citrics, coffee, cane, beans • Eventually we can find any type of job for subsistence or basic needs, others can study part time, some women can be housewives
b) **Do you think that the activities that we are going to carry out with the project will affect the environment?**	• No. Because we learn to harvest water. • We take care of the trees, • Help improve the soil • Improves our farm • Improves the environment	• Beneficial because it doesn't consume chemicals • It helps us survive and take care of the environment • It doesn't affect the environment	• We consider that the project doesn't affect the environment, and it helps improve the soil's fertility
c) **How do you utilize the resources that are in the forest like the plants, animals, water, rocks and fire (natural resources) to cover the daily needs (livelihoods) and sustain their spiritual customs?**	• "Caraña" is a tree that we found in the forest for medicine and we use the achiote to paint • "Pita" to wash the "chácara". • "Jilar" palm to make the hat and "chácara" • "Yuquillo" to paint the "chácara", "majagua" • Ink leaf for the hats • "Hombre grande" tree for medicine • "Bejuco" to make baskets and motets • "Chutra" for medicine • "Oscaño" is found on the mountain	• The water from the river for drinking, washing, bathing, and to water the plants • We hunt animals to eat and for selling • Plants for medicine, sowing "chácara" and hats, wood •	• We use the forest's resources for medicine, houses, handicrafts, clothing, boats, food. • For food: "caraña", "chutra", "hombre grande", "alcarreto", cocoa tree, lemon verbena • For houses: palm, motet, pixvae, "jilar" palm, "majagua" • For Handicrafts: "bateo", ink leaf • For food: "hiraca", fern, mushrooms, birds, reptiles, guava. • Clothing: "Ñumi", hammock • Medicinal Roots: "mastranto", coriander root, garlic clove, ginger.

Question	Group 1	Group 2	Group 3
	• Real palm to make houses • Reforest with native trees ("bateo", "sigua", "camaroncillo", cedar, "el gorgaran", "el criollo") • Painted rabbit, iguana, "paisana", peacock, "tapuca", parrot and macaw – we need to take care of all of these animals and use them for food		
Question 3			
a) What changes have you observed in the agriculture (past-today)	• In the past, we planted without soil fertilizer but the land was good, the seeds were healthy, now you have to fertilize the land in order for it to grow better. • The weather was fresh and the ground was healthy, now it contains plagues. In the past, it was easier to elaborate soil fertilizers for better results because there was more production, now it costs more to produce.	• Changes in the agricultural heating cycle: in the past we would plant in April and May, now we have to plant in June and July • Plagues: increase in oranges, coffee, beans, yam, soursop, tomato • Increase of tractors and drill heads • Very hot, poor wind • Change in weather	• We have noticed small changes in the agriculture from the past to the present. Production has diminished due to the migration of people to urban areas, searching for a better lifestyle and also because of the lack of incentives from the state and institutions.
b) Are there issues related to changes in rainfall and temperature patterns? Which are they?	• Yes: Now there is more drought than in the past. In the past we would plant in May and June, nowadays we plant in November and December because of the climate change due to changes in temperature. • Other issues that we have are the plagues and crop diseases, the river has dried up more, due to the climate change. •	• Increase in temperature. • Rainfall was in April and May, now it's in July.	• Appearance of plagues and diseases that are difficult to control because of the constant rainfall. Excessive soil washing, more erosions, less production. • Excess of constantly elevated temperatures or low temperatures that affect the cultivation and constant rainfall affects because of excess of water.
c) What are your needs in relation to	• We need the support of some agriculture program	• Improve agricultural practices, water tank, improved seeds and dryers.	• Continuous technical training. • Economic resources. • New kinds of certified seeds.

Question	Group 1	Group 2	Group 3
agriculture in your communities?	that can help support our community. • Trainings, how to take care of the environment and how to face climate change.		• Transportation, in case the mobilization of the products to the markets is needed. • Production routes. • New crop techniques. • Training to create sustainable farms. • Marketing • Basic grains and tubers. • Irrigation systems, both gravity and drip. • Storage • Tools and fertilizers. • Must be a simple system for application and maintenance that can be used for different environments. That can be adapted to the entire farm's system. • Should be utilized for all uses, but some can be established for very specific uses. • Environmental: places or communities where they require or have water shortages. • Social and economic: poor people, farmers and people with responsibilities can maintain the established systems in good conditions. • In the upper basin it would be very useful to install demonstrative systems of multi-process reservoirs to help improve the availability of water for the households and agricultural activities. • In the midsection with reservoir tanks for demonstrative activities • In the urban area (middle basin) we can install demonstrative systems for water harvesting, for car washing and agricultural activities.

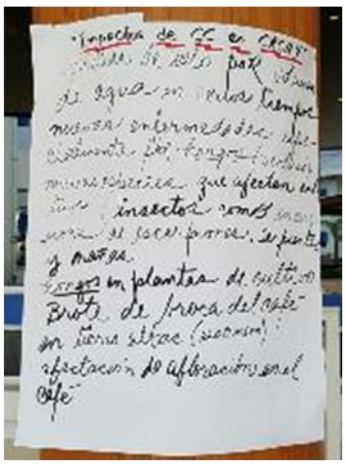
Question	Group 1	Group 2	Group 3
			• If systems for domestic use are installed, provide exchange of experience, dictated or guided by the beneficiaries.
Question 4			
a) What is the best way to promote the participation of women in this program?	• In trainings amongst the best or form groups of women to learn better. • Training is the best for women • Home garden.	• Meetings to explain, organize in groups, work as a family, trainings to learn how to cultivate.	• To train them integrally, to raise awareness in the execution of the project
b) What is the best way to get them together for quarterly accountability meetings (most convenient place - most accessible for everyone - most convenient date - weekends or weekday)	• Most convenient places, most convenient dates (weekend or weekday) • Send out a message but everyone doesn't have a radio, best to visit Veraguas • Most convenient in "Santa Fe". • Weekend (Saturday).	• Meet in "Santa Fe" on Sundays at 8:00 a.m. • Announce one week before the meeting.	• Meet in the community house, cooperative, fair grounds or court. • On weekends would be convenient, like on a Saturday or Sunday. Communicate in advance via radio messages or direct written notes.

Taller de consulta Pública – Cuenca del río Chiriquí Viejo (27 abril, 2016)



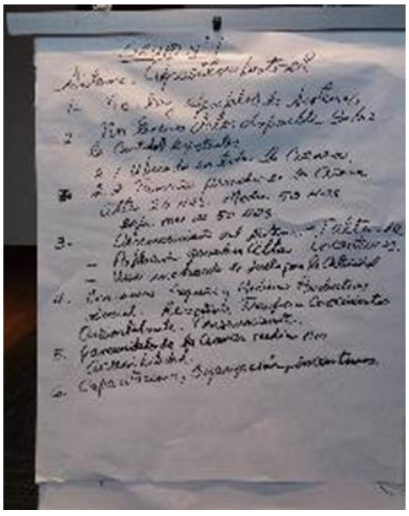


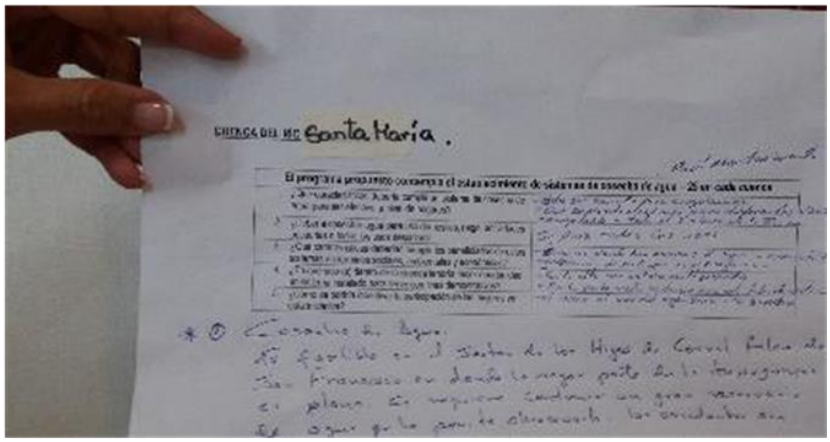






Taller de consulta Pública – Cuenca del río Santa María (29 abril, 2016)





Reunión Comité de Cambio Climático / Miembros con incidencia directa en el Programa (4 de abril, 2016)

Reunión con SINAPROC (8 abril, 2016)

Reunión con ONG (5 mayo, 2016)

Reunión Comité Nacional de Cambio Climático (6 de mayo, 2016

Reunión con Director y técnico de la Dirección Nacional de Agricultura /MIDA, Veraguas (3 junio, 2016)

Reunión con técnicos de Cooperativa La Esperanza de los Campesinos de Santa Fé (3 junio, 2016)

Reunión con técnicos de MiAmbiente, MIDA y ETESA (12 julio, 2016)

Reunión con técnicos Dirección Nacional de Riego / MIDA (julio, 2016)

Reunión con Directores del MIDA, Regional de Chiriquí (20 julio, 2016)

Reunión con equipo del MIDA, Regional de Herrera (21 julio, 2016)

Reunión con equipo del IDIAP, Los Santos (21 julio, 2016)

Reunión con equipo de la Universidad Tecnológica de Panamá, Regional de Azuero (22 julio,2016)

Taller de Consulta Pública Indígenas – Santa Fé (24 noviembre, 2016)

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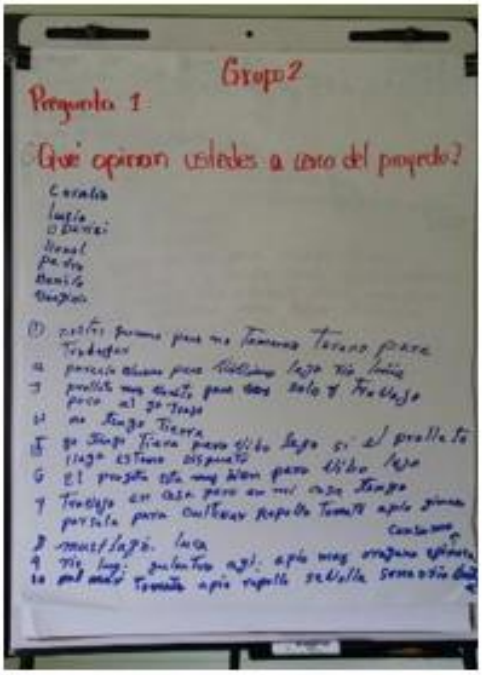
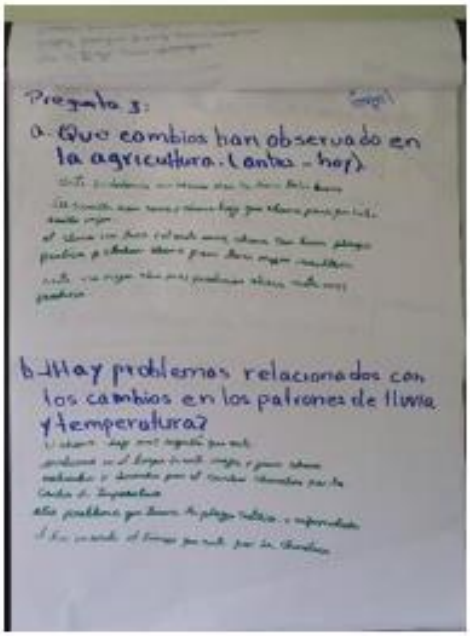

Grupo 2
Pregunta 1:
Qué opinan ustedes a cerca del proyecto?


Pregunta 3:
a. Que cambios han observado en la agricultura. (antes - hoy)
b. Hay problemas relacionados con los cambios en los patrones de lluvia y temperatura?

ANNEX 3

CONSULTATION REPORT WITH INDIGENOUS INHABITANTS LIVING IN PROGRAM'S TARGET AREA

NATURA Foundation
PARTICIPATION REPORT FOR EVENTS/MEETINGS

General Information of event/meeting	
Name of the Event/Meeting:	Public Query Workshop regarding Adaptation Fund
Place:	La Esperanza de Los Campesinos Santa Fe – Veraguas Cooperative
Date:	November 24, 2016
NATURA Participants:	Amarilis Rodríguez, Vilna Cuéllar
Other Participants:	See attendance list

1. ORDER OF THE DAY / AGENDA

November 24, 2016

Public Query Workshop with beneficiaries, especially from the indigenous population of the communities surrounding the area of Santa Fe.

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- Interventions by: Lic. Vilna Cuéllar, Amarilis Rodríguez from NATURA Foundation and guest beneficiaries.
- Teamwork by the workshop participants to answer the questions made by NATURA Foundation.

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- The presentation was developed in a participatory manner and with images of the work that was done in the area to make it more understandable among the participants.
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- 26 people participated (16 women and 10 men) from 8 communities (Muela, Palmar, Bermejo, Santa Fe, Quebrada Mamey, La Laja, Pantano, Girotes).

6. EVENT'S RECOMMENDATIONS OR CONCLUSIONS

- The indigenous population of the communities surrounding the area of Santa Fe actively participated in the work groups.
- The participation was mainly of indigenous women.
- The majority indicated that women should be trained to strengthen them.
- There have been changes in the agricultural cycle, increase of plagues and diseases, dry rivers and before there was more production, now it costs more to produce. Also the migration of the settlers to the urban areas in search of work.

7. ASPECTS REQUIRING FOLLOW UP BY THE FOUNDATION

Keep the participants informed of the results obtained from the presentation of the proposal to the Adaptation Fund.

Note:
Attached:

- Attendance List
- Detailed list by group with the answers to each of the questions asked.
- Event photos
- Event presentation
- Photographic report of the portfolios with the work done by the participants.

Date of submission of the Report:	December 07, 2016
Delivered by:	Amarilis Rodríguez
Received by:	Vilna Cuéllar

Workshop Results – Santa Fé Indigenous

Question	Group 1	Group 2	Group 3
	Group Members: Silvia, Petra, Luciana, Meli, Mercedes, Eusebio, Jaqueline	Group Members: Cornelio, Lucia, Oderiai, Lionel, Pedro, Danilo, Virginia	Group Members: Rubén Rodríguez, Arlen Palma, Joel Sibala, Marcimiliano Santo, Tiofilo Virola, Camila Peralta, Ana Flores, Elvia Virola, Nuestro Santo, Ariel Carpintero, Mauricio Jiménez
Question 1			
a) What do you think about the project?	• The coffee project is important • Other crops: yam, cassava, palm, beans, plantain, coriander, chili peppers, green beans, corn and helps take care of the forest.	• We want to but we don't have land to work on • Sounds good but we live far away from Luis River • Very nice project but I'm all alone and don't work as much • I don't have land • I have land but I live far away; we are willing to help out if the project comes around • The project is great but I live far away • I work from home but at my house I have parcels to cultivate cabbage, tomato, celery, banana • Luis River: coriander, chili pepper, celery, spinach, oregano • Palm: tomato, celery, cabbage, onion, carrot	• We consider that the project can help us improve our quality of life. It could help us have an economic income, better nutrition, better education creating skills to improve and learn activities.
Question 2			
d) What do you do? Do you work the land?	• Housewife and takes care of her farm • Take care of farm, work for the family • The home garden, housewife • Plant coffee, pixvae,…, yam • Yes, I plant coffee and vegetables	• Day laborer • Construction • Agriculture • Housewife, student •	• It's dedicated to the agriculture in cultivation of banana, pixvae, cassava, yam, etc. • Citrics, coffee, cane, beans • Eventually we can find any type of job for subsistence or basic needs, others can study part time, some women can be housewives

Question	Group 1	Group 2	Group 3
e) **Do you think that the activities that we are going to carry out with the project will affect the environment?**	• No. Because we learn to harvest water. • We take care of the trees, • Help improve the soil • Improves our farm • Improves the environment	• Beneficial because it doesn't consume chemicals • It helps us survive and take care of the environment • It doesn't affect the environment •	• We consider that the project doesn't affect the environment, and it helps improve the soil's fertility
f) How do you utilize the resources that are in the forest like the plants, animals, water, rocks and fire (natural resources) to cover the daily needs (livelihoods) and sustain their spiritual customs?	• "Caraña" is a tree that we found in the forest for medicine and we use the achiote to paint • "Pita" to wash the "chácara". • "Jilar" palm to make the hat and "chácara" • "Yuquillo" to paint the "chácara", "majagua" • Ink leaf for the hats • "Hombre grande" tree for medicine • "Bejuco" to make baskets and motets • "Chutra" for medicine • "Oscaño" is found on the mountain • Real palm to make houses • Reforest with native trees ("bateo", "sigua", "camaroncillo", cedar, "el gorgaran", "el criollo") • Painted rabbit, iguana, "paisana", peacock, "tapuca", parrot and macaw – we need to take care of all of these animals and use them for food	• The water from the river for drinking, washing, bathing, and to water the plants • We hunt animals to eat and for selling • Plants for medicine, sowing "chácara" and hats, wood •	• We use the forest's resources for medicine, houses, handicrafts, clothing, boats, food. • For food: "caraña", "chutra", "hombre grande", "alcarreto", cocoa tree, lemon verbena • For houses: palm, motet, pixvae, "jilar" palm, "majagua" • For Handicrafts: "bateo", ink leaf • For food: "hiraca", fern, mushrooms, birds, reptiles, guava. • Clothing: "Ñumi", hammock • Medicinal Roots: "mastranto", coriander root, garlic clove, ginger.
Question 3			
d) What changes have you observed in the agriculture (past-today)	• In the past, we planted without soil fertilizer but the land was good, the seeds were healthy, now you have to fertilize the land in order for it to grow better.	• Changes in the agricultural heating cycle: in the past we would plant in April and May, now we have to plant in June and July • Plagues: increase in oranges, coffee, beans, yam, soursop, tomato • Increase of tractors and drill heads	• We have noticed small changes in the agriculture from the past to the present. Production has diminished due to the migration of people to urban areas, searching for a better lifestyle and also

Question	Group 1	Group 2	Group 3
	• The weather was fresh and the ground was healthy, now it contains plagues. In the past, it was easier to elaborate soil fertilizers for better results because there was more production, now it costs more to produce.	• Very hot, poor wind • Change in weather	because of the lack of incentives from the state and institutions.
e) Are there issues related to changes in rainfall and temperature patterns? Which are they?	• Yes: Now there is more drought than in the past. In the past we would plant in May and June, nowadays we plant in November and December because of the climate change due to changes in temperature. • Other issues that we have are the plagues and crop diseases, the river has dried up more, due to the climate change. •	• Increase in temperature. • Rainfall was in April and May, now it's in July.	• Appearance of plagues and diseases that are difficult to control because of the constant rainfall. Excessive soil washing, more erosions, less production. • Excess of constantly elevated temperatures or low temperatures that affect the cultivation and constant rainfall affects because of excess of water.
f) What are your needs in relation to agriculture in your communities?	• We need the support of some agriculture program that can help support our community. • Trainings, how to take care of the environment and how to face climate change.	• Improve agricultural practices, water tank, improved seeds and dryers.	• Continuous technical training. • Economic resources. • New kinds of certified seeds. • Transportation, in case the mobilization of the products to the markets is needed. • Production routes. • New crop techniques. • Training to create sustainable farms. • Marketing • Basic grains and tubers. • Irrigation systems, both gravity and drip. • Storage • Tools and fertilizers. • Must be a simple system for application and maintenance that can be used for different

Question	Group 1	Group 2	Group 3
			environments. That can be adapted to the entire farm's system. • Should be utilized for all uses, but some can be established for very specific uses. • Environmental: places or communities where they require or have water shortages. • Social and economic: poor people, farmers and people with responsibilities can maintain the established systems in good conditions. • In the upper basin it would be very useful to install demonstrative systems of multi-process reservoirs to help improve the availability of water for the households and agricultural activities. • In the midsection with reservoir tanks for demonstrative activities • In the urban area (middle basin) we can install demonstrative systems for water harvesting, for car washing and agricultural activities. • If systems for domestic use are installed, provide exchange of experience, dictated or guided by the beneficiaries.
Question 4			
c) What is the best way to promote the participation of women in this program?	• In trainings amongst the best or form groups of women to learn better. • Training is the best for women • Home garden.	• Meetings to explain, organize in groups, work as a family, trainings to learn how to cultivate.	• To train them integrally, to raise awareness in the execution of the project
d) What is the best way to get them together for	• Most convenient places, most convenient dates (weekend or weekday)	• Meet in "Santa Fe" on Sundays at 8:00 a.m. • Announce one week before the meeting.	• Meet in the community house, cooperative, fair grounds or court.

Question	Group 1	Group 2	Group 3
quarterly accountability meetings (most convenient place - most accessible for everyone - most convenient date - weekends or weekday)	• Send out a message but everyone doesn't have a radio, best to visit Veraguas • Most convenient in "Santa Fe". • Weekend (Saturday).		• On weekends would be convenient, like on a Saturday or Sunday. Communicate in advance via radio messages or direct written notes.