REQUEST FOR PROGRAMME FUNDING FROM 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 Programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final 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
Email: secretariat@adaptation-fund.org

ADAPTATION FUND

DATE OF RECEIPT:

ADAPTATION FUND PROGRAMME ID:

(For Adaptation Fund Board Secretariat Use Only)

PROGRAMME PROPOSAL

PART I: PROGRAMME INFORMATION

PROGRAMME CATEGORY:	**REGULAR SIZE**
COUNTRY/IES:	**COSTA RICA**
SECTOR/S:	**WATER RESOURCE-COASTLINES AND AGRICULTURE**
TITLE OF PROGRAMME:	**REDUCING THE VULNERABILITY BY FOCUSING ON CRITICAL SECTORS (AGRICULTURE, WATER RESOURCES, AND COASTLINES) IN ORDER TO REDUCE THE NEGATIVE IMPACTS OF CLIMATE CHANGE AND IMPROVE THE RESILIENCE OF THESE SECTORS**
TYPE OF IMPLEMENTING ENTITY:	**NATIONAL IMPLEMENTING ENTITY**
IMPLEMENTING ENTITY:	**FUNDECOOPERACIÓN PARA EL DESARROLLO SOSTENIBLE**
EXECUTING ENTITY/IES:	**NATIONAL MINISTRY OF ENVIRONMENT AND ENERGY (MINAE), MINISTRY OF AGRICULTURE (MAG), NATIONAL SERVICE OF GROUNDWATER, IRRIGATION AND DRAINAGE (SENARA), ENGINEERS PROFESSIONAL ASSOCIATION.**

AMOUNT OF FINANCING REQUESTED: **US$ 9.97 MILLION** (in U.S Dollars Equivalent)

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PROGRAMME BACKGROUND AND CONTEXT:

Provide brief information on the problem the proposed programme is aiming to solve. Outline relevant climate change scenarios according to best available scientific information. Outline the economic social, development and environmental context in which the programme would operate.

1. Country Context

1. Costa Rica is particularly vulnerable to extreme weather events. The country *"is located on a multi-hazard scenario such as Central America; it is affected with variable recurrence by seismic and volcanic phenomena. It is also seasonally and frequently affected by hydrometeorological situations*." (Alfaro Maykall, 2011)

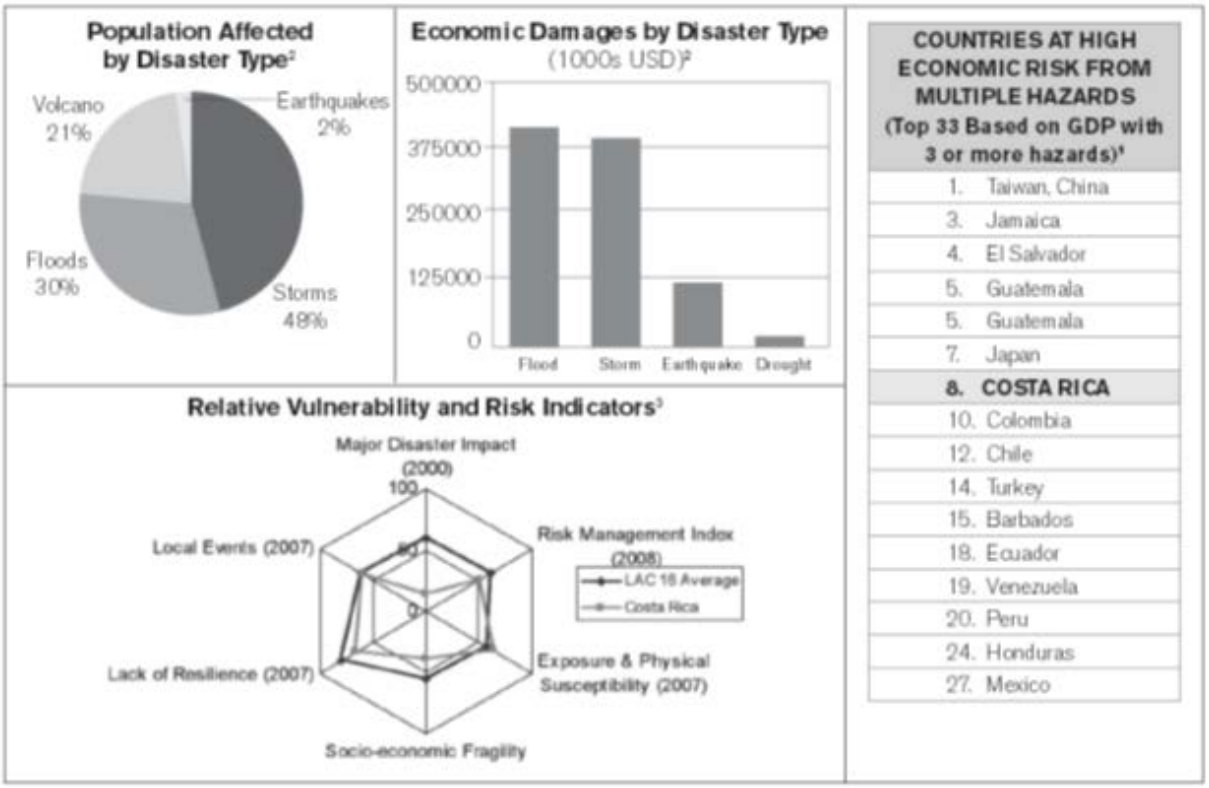
2. The country's topography and geomorphology are very diversified. It includes coastal plains, islands, mountain ranges and more than 100 volcanic cones. Costa Rica also comprises several islands. Cocos Island (24 square kilometres or 9.3 square miles) stands out because of its distance from the continental landmass, 300 mi (480 km) from Puntarenas, but Calero Island is the largest island of the country (151.6 square kilometres or 58.5 square miles).

3. Costa Rica is also home to a rich variety of plants and animals, representing nearly 5% of the total types of species identified worldwide, while the country has only about 0.1% of the world's landmass. More than 26% of the country's land area is under protection, which represents the largest percentage of protected areas in the world (developing world average 13%, developed world average 8%).

4. The country's climate vulnerability is mainly due to a combination of its geographical situation and economic factors. *"The country's vulnerability has to do with the presence of populations on zones that are prone to volcanic eruptions and unstable lands –eroded by extensive livestock and poorly planned settlements prone to landslides and floods, among others."* (The World Bank Group, 2011)

5. According to the World Bank's report "Natural disaster hot spot", which presents a global view of disaster risks associated with major natural hazards (drought, floods, cyclones, earthquakes, etc.), Costa Rica is the world's second most exposed country to multiple hazards[1] based on the total land area. A total of 36.8% of the total land area is exposed to three or more hazards. This study also ranges the country in the eighth position of the countries having the highest probability of experiencing economic risks as a result of a greater exposure to three or more natural disasters. Moreover, *"it is estimated that 77.9% of the Costa Rican population and 80.1% of the Gross Domestic Product (GDP) of the country reside in multiple-hazard areas –this is, risks of experiencing three or more natural disasters)"* (World Bank, 2005).

Figure 1 Costa Rica-Disaster Risk Profile according to the World Bank



Source: World Bank, 2005.

[1] Geophysical hazards include earthquakes and volcanoes; hydrological hazards include floods, cyclones, and landslides.

6. Additionally, the *Instituto Meteorológico Nacional –IMN* (National Meteorological Service), which is in charge of national communications to the UNFCCC[2] has made a special effort to contribute to the scientific basis that support the decision-making process regarding climate change. Vulnerability studies have been performed in the country's coastal zone, water resources, agriculture, and ecosystem, for both communications mentioned above, as well as for the third communication –which is currently being developed. These studies show how extreme hydrometeorological conditions have caused damages and disasters in different socioeconomic sectors of the country.

[2] So far the communications for 2000 and 2005 have been submitted

1.1 Economic Impact of Extreme Climate Events

Table 1 Global losses per economic activities attributed to the impact of extreme events. 1988-2009. (In US millions dollars by 2006)

Sectores	Total millones $ US	Distribución %
Obras Públicas y Transporte	696.9	38.22
Agricultura	**396.9**	**21.77**
Energia	329.1	18.05
Vivienda	206.5	11.33
Ambiente	54.3	2.98
Acueductos y Alcantarillados	45.4	2.49
Atención de la Emergencia	35.5	1.95
Salud	28.9	1.59
Educación	18.5	1.02
Sociales	6.2	0.34
Edificaciones Públicas	2.5	0.14
Industrias	1.2	0.07
Ferrovias	0.8	0.05
Obras privadas	0.098	0.01
TOTAL	**1 823.3**	**100.00**

Source: Department of Public Investments from the *Ministerio de Planificación Económica y Política Económica* (Ministry of Planning and Economic Policy)

7. *"For the period1988 - 2009, Costa Rica experiences losses for a total of 1,823.3 million dollars of 2006. Hydrometeorological events are those with greater recurrence, causing significant damages during this period–representing 34 events (82.9%of the total number of registered events). From those events, 32 correspond to excessive rainfall and two of them to lack of rain or drought. Five potentially destructive earthquakes have occurred along the study period and they represent 12.2% of the period events. In economic terms, the greatest absolute contribution regarding the global amount of losses is represented by hydrometeorological events –with 1,161.4 million dollars and 63.7% of relative participation. From these types of natural phenomena, excessive rainfall caused losses for 1,053 million dollars, which equals 57.8 % from the total. Drought events affected, in absolute terms, with losses for 107.5 million dollars, which, in relative value, represent 5.9%. Socio-natural events*

caused losses for 2.7 million dollars, which represented 0.15% from the total." (Ministerio de Planificación Nacional y Política Económica, 2012)

Table 2 Types of Events and their Absolute and Relative Participation in Global Losses 1988-2009

Tipología de eventos	Número de eventos	% eventos	Monto US $ 2006	%
Hidrometeorológicos	34	82,9*	1.161.422.141	63,7
Exceso de precipitaciones	32	78,4	1.053.868.315	57,8
Sequia	2	4,9	107.553.826	5,9
Sismos	5	12,2*	659.218.786	36,1
Otros	2	4,9*	2.677.404	0,1
TOTAL	**41**	**100***	**1.823.318.331**	**100**

*** Suma los totales de eventos Hidrometeorológicos, Sismos y Otros.**

Source: Department of Public Investments from the *Ministerio de Planificación Económica y Política Económica* (Ministry of Planning and Economic Policy)

8. An increasing trend in the number of extreme events in the last years (2005-2009) is highlighted in the studies mentioned since 40% of the events identified occurred in this period of time. Additionally, losses corresponding to that period total 187 million dollars (52.4%).
9. During the 2005-2011 period, Costa Rica registered a total loss of US$ 101.5 millions/year (Flores Verdejo, 2012).

Table 3 Accumulated Losses by Sector, 2005-2011
-millions of constant dollars of 2011 and percentages-

Impacted Sector	Total	%
Road Infrastructure	367.41	51.70
Agriculture	118.95	16.74
Rivers and Streams (Dikes and Dredging)	91.41	12.86
Housing	86.88	12.22
Emergency Response	13.49	1.90
Aqueducts and Sewage Systems	9.49	1.34
Aerodrome	7.70	1.08
Education	5.14	0.72
Airport	2.65	0.37
Health	2.59	0.36
Public and Private Buildings	2.30	0.32
Rail Transport	1.05	0.15
Dock	0.55	0.08
Electrical System	0.47	0.07
Environment	0.34	0.05
Telecommunications	0.22	0.03
TOTAL	**710.65**	**100.00**

Source: Flores Verdejo, R. (2012). *Technical Forum: Gestión de Riesgos Asociados con el Cambio Climático.* San José, Costa Rica: MAG-MIDEPLAN.

10. The following table details the percentage distribution of US$745,926,337.69, which represents the total accumulated losses, caused by hydrometeorological events per province between 2005-2010:

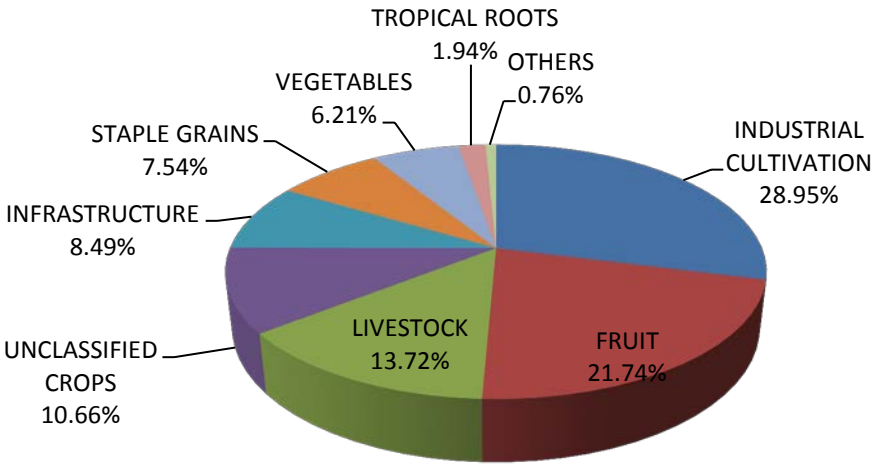
Table 4 Percentage distribution of accumulated losses caused by hydrometeorological events per province between 2005-2010.

Province	Loss Percentage
Puntarenas	23.33%
San José	20.57%
Guanacaste	19.53%
Limón	16.94%
Alajuela	6.87%
Heredia	5.23%
Cartago	4.56%
Without defined territorial location	2.97%

Source: Flores Verdejo, R. (2012). *Technical Forum: Gestión de Riesgos Asociados con el Cambio Climático.* San José, Costa Rica: MAG-MIDEPLAN.

11. The agricultural sector has been one of the most severely affected due to its high vulnerability to weather-related events. The sector lost more than 300 million dollars as a result of the impact of extreme events –about 21% of the total loss for that year. In terms of food security, it is important to mention that *"countries located in the tropics share the feature that most food crops are in the upper limit of the optimal production temperature, which means that little increases in the average temperature will be* ***evidenced in a marked decline in crop yields****. Additionally, the* ***occurrence of plagues and diseases, the threat to biodiversity and the modification of biophysical conditions (variations in atmospheric temperature, humidity, rainfall, wind, and atmospheric pressure) to different altitudinal layers, are also consequences of global changes that are affecting the weather"*** (*Ministerio de Agricultura y Ganadería* (Ministry of Agriculture and Livestock), 2011, quoting Montenegro, 2011).

Figure 2 Losses caused by Hydrometeorological Events in the Agricultural Sector by Type-millions of constant dollars of 2011 and percentages-



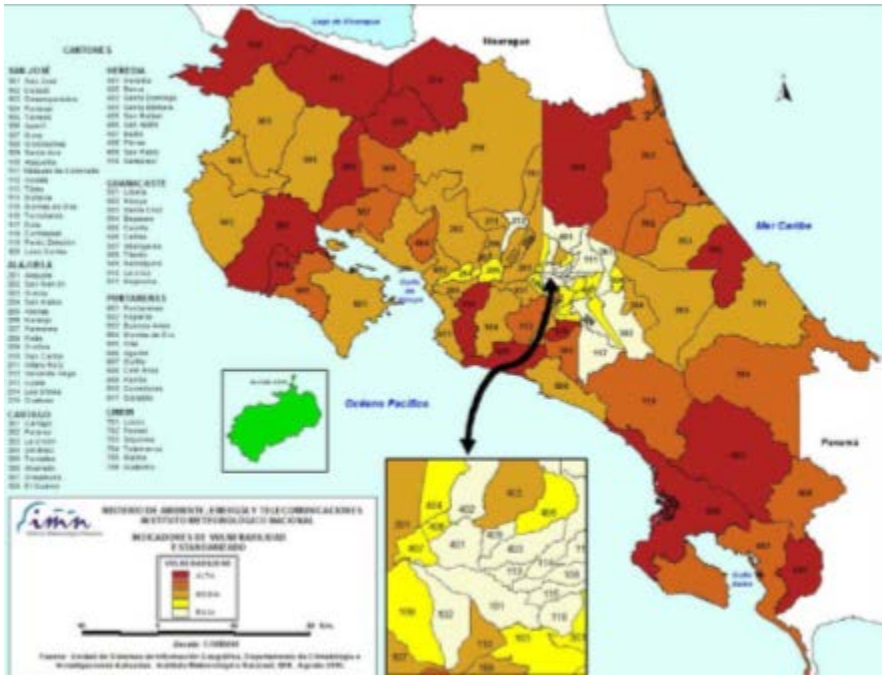
Source: Flores Verdejo, R. (2012). *Technical Forum: Gestión de Riesgos Asociados con el Cambio Climático.* San José, Costa Rica: MAG-MIDEPLAN.

12. On the other hand, the Water Resource in Costa Rica play different key functions for the country's development: hydroelectric power generation (a contribution of 18.5% of total energy consumed), drinking water supply (2.49% for the country's aqueducts and sewage systems), irrigation and drainage, among others that have been affected by extreme events. Due to the increase in the average sea level, coastal areas will be subject to flooding, groundwater salinization and the deterioration of freshwater ecosystems. By 2100, the sea level is expected to increase between 9 and 88 cm due to the melting of Greenland, the Antarctic, glaciers and ice caps, which will directly affect Costa Rica due to the disappearance of Puntarenas, a coastal city of 60,000 inhabitants.

1.2 Current and Future Vulnerability

13. Regarding the country's most vulnerable regions, Costa Rica's National Meteorological Institute (IMN) has completed the characterization of the current and future vulnerabilty for the different regions of the country, by taking into account the relation between their high vulnerability and their low human development index. (Echeverría Bonilla, 2011, pág. 22)

Figure 3 Current Vulnerability Map

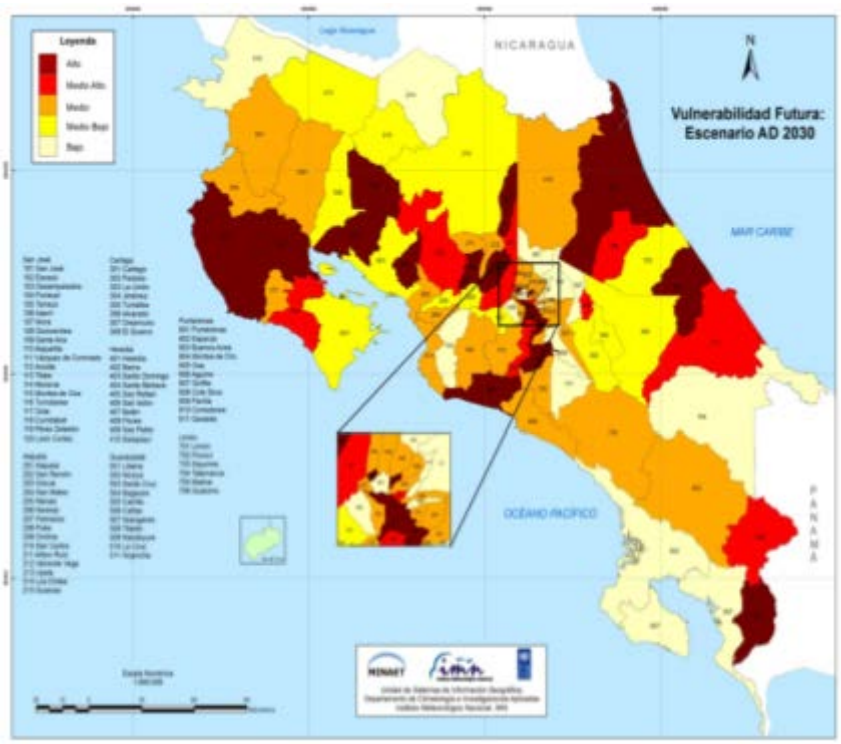


Source: *Instituto Meteorológico Nacional* (National Meteorological Service), 2011

14. By using colours, both figures (Figure 3 and Figure 4) "*indicate different levels of vulnerability (dark red represents the most vulnerable cantones (districts), red indicates districts with medium-high vulnerability, orange represents those districts with medium-level vulnerability, dark yellow represents those districts with medium-low vulnerability, and finally, light yellow indicates those least vulnerable districts)*" (MINAE, 2009).

15. The factors that determine this vulnerability are mostly socioeconomic and institutional because they are related to the resilience of population in case of different types of events (not only to hydrometeorological events). (Echeverría Bonilla, 2011)

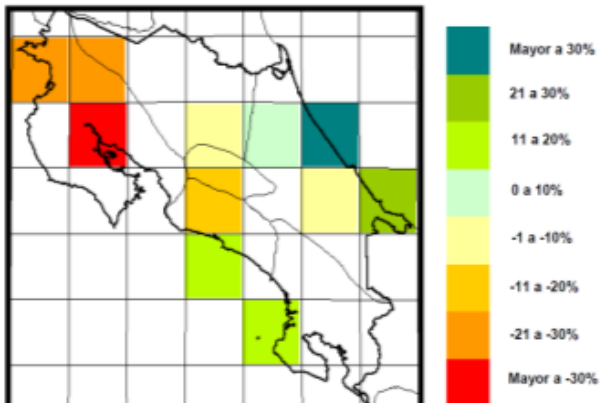
Figure 4 Future Vulnerability Map: 2030



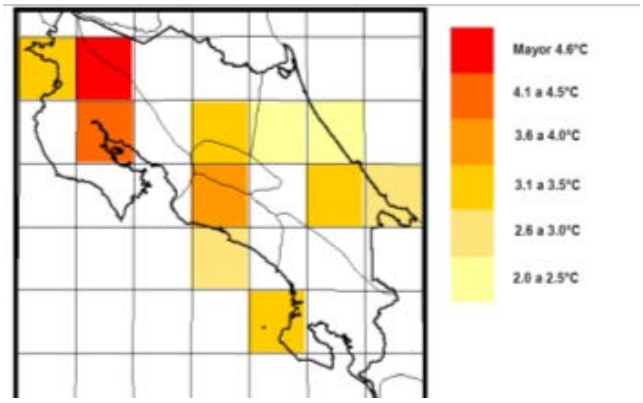
Source: *Instituto Meteorológico Nacional* (National Meteorological Service), 2011

Figure 5: Percentage variation of annual rainfall in a climate change scenario. Comparison between the 1961-1990 period and the 2081-2100 period

Figure 6: Variation of average temperature in a climate change scenario. Comparison between the 1961-1990 period and the 2081-2100 period



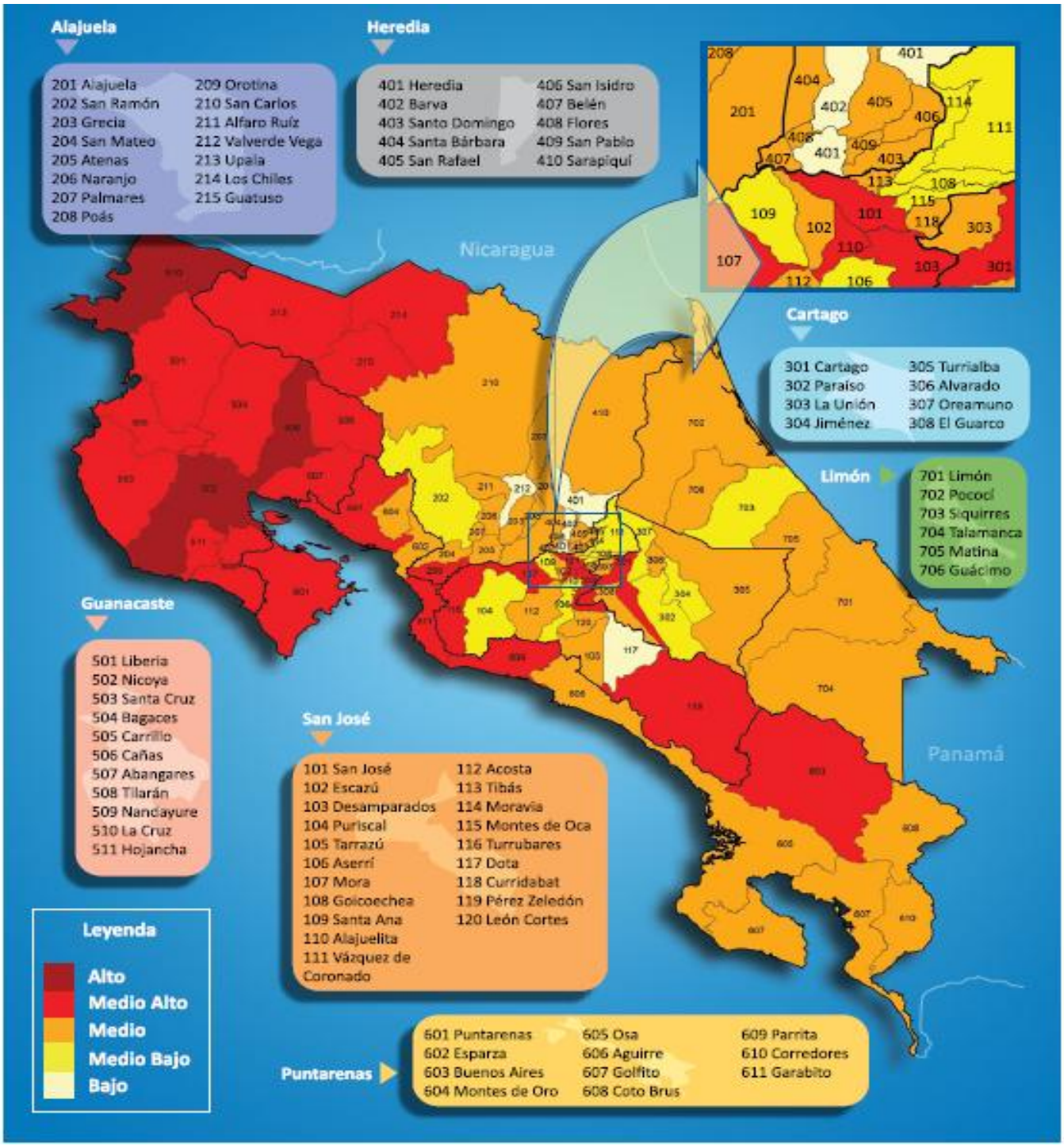
Source: IMN.



Source: IMN

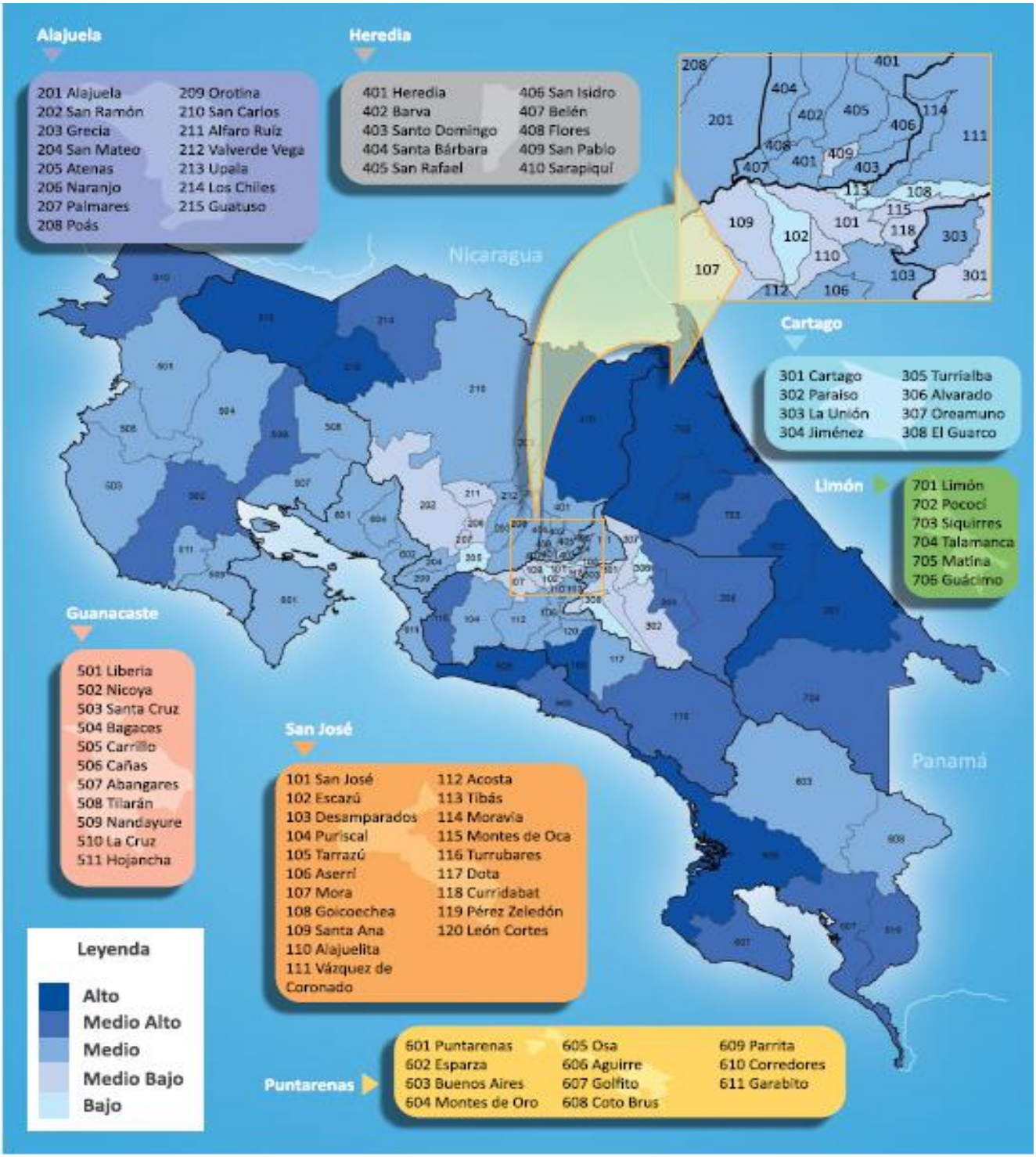
16. In general terms, based on figures 5 and 6, it can be concluded that projected decreases and increases of annual rainfall indicate drier summers and more humid winters. Coherently, for the summer period, in those places where a greater increase in temperature is projected, a decrease in rainfall is expected. On the other hand, an increase in evaporation due to more warming in winter months, may lead to more intense rainfall even when the annual rainfall may decrease.

Figure 7 Climate Hazards in Case of Extreme Dry Events



Source: Final Report: *Mejoramiento de las capacidades nacionales para la evaluación de la vulnerabilidad y adaptación del sistema hídrico al cambio climático en Costa Rica, como mecanismo para disminuir el riesgo al cambio climático y aumentar el IDH* (*Ministerio de Ambiente, Energía y Telecomunicaciones & Instituto Meteorológico Nacional* (Ministry of Environment, Energy and Telecommunications & National Weather Service), 2012)

Figure 8 Climate Hazard in Case of Extreme Rainy Events



Source: Final Report: Mejoramiento de las capacidades nacionales para la evaluación de la vulnerabilidad y adaptación del sistema hídrico al cambio climático en Costa Rica, como mecanismo para disminuir el riesgo al cambio climático y aumentar el IDH (*Ministerio de Ambiente, Energía y Telecomunicaciones & Instituto Meteorológico Nacional* (Ministry of Environment, Energy and Telecommunications & National Weather Service), 2012)

Current Scenarios:

17. An analysis of temperature and rainfall reveals several changes in the extreme values of these variables during the period between 1961 and 2003 in Costa Rica (Jara., 2010):

- ✓ *Temperatures have increased between 0.2 and 0.3 ° C per decade, with a prolonged dry and hot season, the number of hot days increased 2.5% and cold days increased 1.7%, while the number of cold nights and days decreased -2.2% and -2.4% per decade*
- ✓ *Extreme temperatures increased between 0.2 and 0.3 ° C per decade;*
- ✓ *Although most climate data show positive trends (increase of rainfall), the general average annual rainfall in the region and the number of consecutive days of rain do not show significant changes. However, there has been a slight increase of its intensity and extreme rainfall has significantly increased and it is often co-related with the temperature of the tropical Atlantic Ocean. The latter indicates that the periods of prolonged rainfall are related to warm waters in this ocean basin.*
- ✓ *The observed trend over the last 40 years suggests a strengthening of the water cycle, with more intense rainfall for shorter periods that cause more average rainfall per episode.*

Future Scenarios.

- ✓ It is anticipated that temperatures will increase between 2 and 4 ° C higher by 2100 (World Bank, 2005).
- ✓ *Future climate trends will be more severe in higher elevations than in lowlands.* The variations mentioned before have *"negative implications for ecosystems and endemic species that are used to a specific "comfort zone " and reveal a future with more water stress due to the increase in temperatures and the decrease of rainfall"* (Kamalkar, Bradley, & Diaz, 2008).

18. A greater frequency and intensity of extreme phenomena such as flooding and droughts are expected. *This suggests evident impacts on production, the agricultural and forest soils, and water conservation and availability -all of them already show signs of stress and vulnerability* (Jara., 2010).

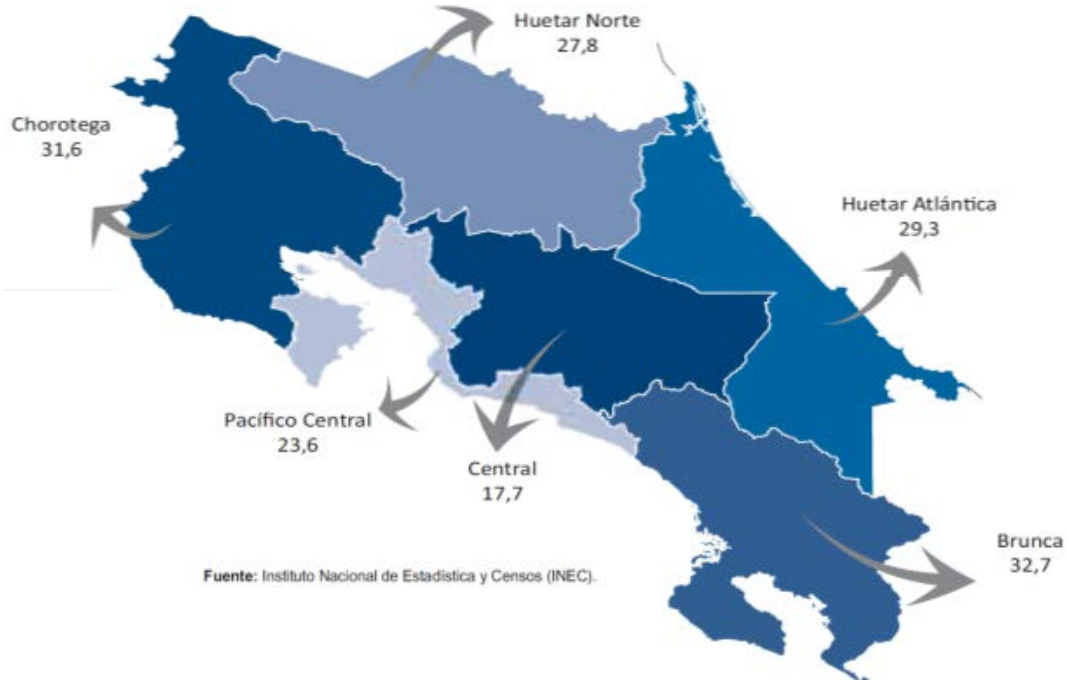
1.3 SOCIOECONOMIC VULNERABILITY

19. According to an analysis published by United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) in its technical report called "La economía del cambio climático en Centroamérica" ("The Economy of Climate Change in Central America"), *"the socioeconomic vulnerabilities of the region are exacerbated by its geoclimatic location on a narrow isthmus between two continents and between the Pacific and Atlantic oceans"* pre-existing in Central America are focused on poor regions, which consequently exposes these populations to more negative impacts due to threats or extreme events. According to the *Instituto Nacional de Estadística y Censos* –INEC (National Institute of Statistics and Census) for 2011, 21.6 % of the country's total population lives in poverty. The *Centro Internacional de Investigaciones para el Desarrollo* –IDRC (International Development Research Center) made a study about climate change and poverty for Latin America and the Caribbean, and among the 100 countries at greater risk due to climate change, Costa Rica ranks 38.

Figure 9: Chart of Households in Poverty according to the planning region

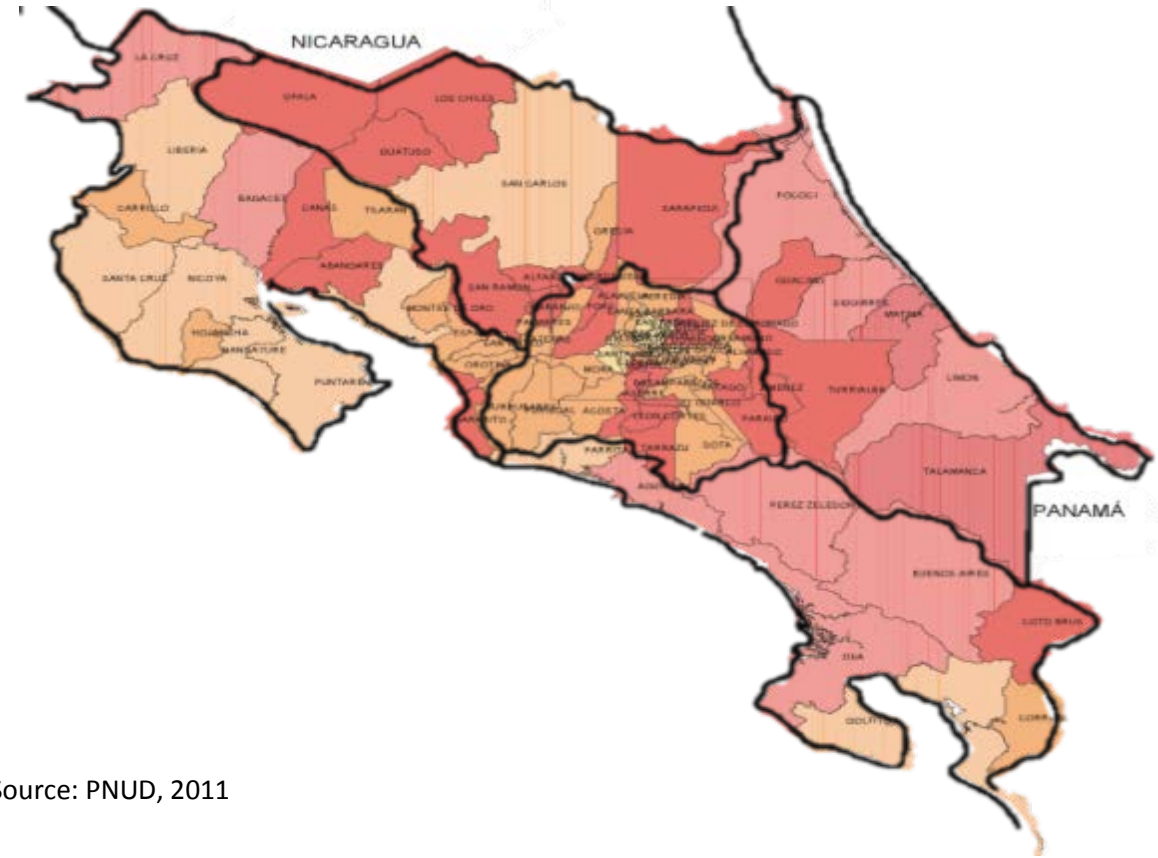
Región	Total	No Pobres	Pobres		
			Total	Pobreza no extrema	Pobreza extrema
Total País	**100,0**	**78,4**	**21,6**	**15,2**	**6,4**
Central	100,0	82,3	17,7	13,5	4,2
Chorotega	100,0	68,4	31,6	20,1	11,5
Pacífico Central	100,0	76,4	23,6	13,7	9,8
Brunca	100,0	67,3	32,7	19,0	13,7
Huetar Atlántica	100,0	70,7	29,3	19,4	9,9
Huetar Norte	100,0	72,2	27,8	18,2	9,6

Source: Instituto Nacional de Estadística y Censos –INEC (National Institute of



20. For 2011, Costa Rica ranked 69 in the Human Development Index, considered of high development. However, despite the country's progress regarding development, the 2011 Report indicates that environmental threats may eclipse the achievements reached by the country and the region, thus preventing them from reaching new achievements.

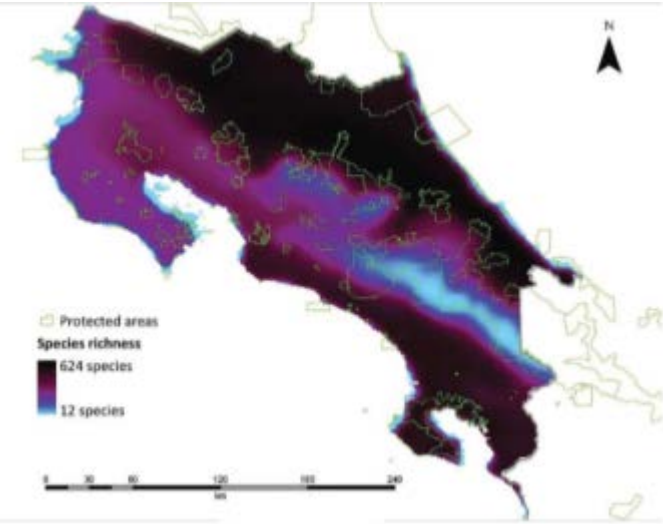
Figure 10: Human Development Index per Canton 2011



Source: PNUD, 2011

21. *This socioeconomic vulnerability of Central America is intensified due to its geoclimatic location in an isthmus that serves as bridge between two continents, that is rich in biodiversity and variety of ecosystems, located between two oceans: the Pacific and the Atlantic, with their corresponding climate processes.* (CEPAL, 2011). Central America and specifically Costa Rica are 'hot-spots" for the possible impacts of climate change on the environment.

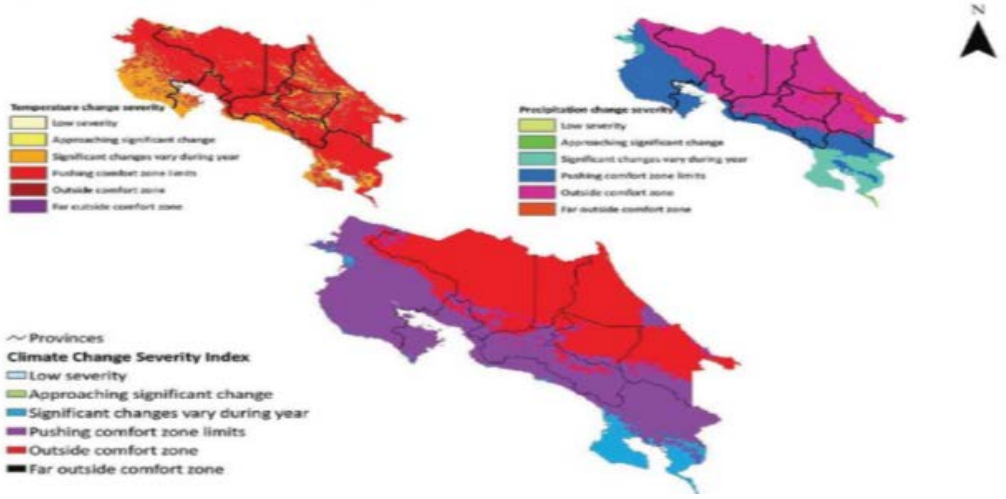
Figure 11: Species Richness in Costa Rica



Source: Potential Impacts of Climate Change on Biodiversity in Central America, Mexico, and the Dominican Republic, 2008

22. The variability of rainfall suggests a significant threat for the unique biodiversity of the region. Biological changes related to climate impacts have already been identified at the *Reserva Biológica del Bosque Nuboso Monteverde* – MCFR (Monteverde Cloud Forest Biological Reserve) and other forests in the country. The greatest concentration of species occurs in the *Brunca Region*, *Huetar Norte Region* and *Huetar Atántica Region*. The index of species richness showed in the study called "Impactos potenciales del Cambio Climático en la Biodiversidad" ("Possible Impacts of Climate Change in Biodiversity"), evidences that, by 2020, those regions with a significant number of species will be out of their "comfort zone" (Anderson, 2008).

Figure 12 Climate Change Severity Index for Costa Rica (Towards the 2020s)



Source: Potential Impacts of Climate Change on Biodiversity in Central America, Mexico, and the Dominican Republic, 2008

1.4 EXPECTED IMPACTS OF CLIMATE CHANGE-CHALLENGES TO BE ADDRESSED

23. A series of studies announced by the National Meteorological Institute explained that "climate change will lead to extreme weather phenomena in Costa Rica, likely leading to 35% to 75% more rainfall on the Caribbean slope during some months of the year while reducing precipitation by 15% in the northern Pacific and central regions. *The climate risk, then, differs by region and scenario. It is to be expected that the most vulnerable groups will face serious problems in handling extreme weather impacts."* (PNUD, 2012)

Table 5: Climate Risk Scenario for Costa Rica

Region	Risks
Central Region	Prolonged dry periods and high daytime temperatures put at risk the most populated cantons with low HDIs and dependent groups. Water resources are being pressured by the change in the natural water supply and growing demand. High risk of urban flooding, even without extremes of rainfall.
Chorotega Region	The Chorotega Region has the most dependent population, with high water needs that require addressing. Higher daytime temperatures along with the driest months of the year put dependent vulnerable groups at risk (children and senior citizens), due to high population density. Water resources are under pressure along with agricultural sectors of traditional products in Costa Rica.
Central Pacific Region	The region is at risk due to extended droughts or severe dry periods and their low

	HDI.
Brunca Region	The cantons could be impacted by droughts and high daytime and nighttime temperatures during drought periods, putting low HDI and citizens groups at risk.
Huetar Atlantica Region	All the cantons have low HDIs. During several months the region is at risk of facing frequency of flooding, putting at risk the entire population in. Reduced seasonal rainfall, along with reduced cold front activity, could diminish the water supply.
Huetar Norte Region	The border cantons have low HDIs that make their population vulnerable in extreme events. Also, border cantons have high risk of being impacted by more frequent droughts with limit response to extreme rainy events. It is expected also prolonged dry periods affecting poor cantons with low HDIs such as the border cantons.

24. As a result of these climate changes, the productive sectors selected for the proposal will experience changes and, in most regions, increased vulnerability:

- Agriculture:
    - Under current climate change scenarios it is urgent to avoid crop yield reductions and to maintain agricultural productivity to meet trends in food production. “This, coupled with large-scale land, soil, and water degradation, will challenge the long-term and sustainable production of agricultural resources that promote food security and sustainable livelihoods. Traditional mechanisms, including conventional agroecosystem management practices are not economically feasible and long-term sustainable adaptation strategies, especially for those communities already experiencing food security related issues.” (Oelbermann & E. Smith, 2010).
    - Changes in climate may alter the nutritional quality of crops, which may require changes in the composition and application rate of inorganic fertilizers and use of mineral supplements in livestock.
    - The demand of water for irrigation is a critical element to maintain important crops along the country. This will be important for Costa Rica’s food security agenda.
    - Implementation, improvement and refinement of sustainable land management practices. Sustainable agro ecosystem land management practices including the establishment of seed banks for the long-term storage of agricultural seeds, improved livestock forage quality, and agroforestry practices are crucial.
- Coastal and water ressources

- Increased temperatures and rising ocean levels will negatively affect mangroves and coral reefs, which serve as protective barriers to coastal communities. Mangroves and coral reefs are also crucial habitats for marine life – commercially important fish species reproduce and grow in mangroves, and reefs are hotspots of marine biodiversity.
- Small-scale fishermen in vulnerable coastal communities depend on local fisheries, which need reefs and mangroves to regenerate populations to feed their families.
- Increase in demand and the potential reduction of supply due to climatic change, together with the effects of extreme climatic events, places the water resource of the country in a state of high vulnerability.

Table 6 Priority per region based on social, economic and environmental vulnerability

PRIORITY	Current Vulnerability	Future Vulnerability	Biodiversity	Significant Agricultural Areas	Energy-producing Areas	Vulnerable Coastal Areas	Poverty	Population	HDI
Chorotega Region									
Guanacaste Province: Liberia, Nicoya, Santa Cruz. Bagaces, Carrillo, Cañas, Abangares, Tilarán, Nandayure, La Cruz, Hojancha. Alajuela Province: Upala.	High	High	Medium	Rice- Beans-Corn	Arenal, Corobicí, Sandillal,	High: Nicoya, La cruz Medium-high: Liberia, Carrillo, Santa Cruz, Hojancha, Nandajure	31.6	7,6	Medium-high
Central Region									
San Jose Province: San José, Escazú, Desamparados, Puriscal, Aserrí, Mora, Tarrazú, Goicoechea, Santa Ana, Alajuelita, Vásquez de Coronado, Acosta, Moravia, Tibás, Montes de Oca, Dota, Curridabat, León Cortés, Turrubares. Alajuela Province: Alajuela (except Sarapiquí), San Ramón (except San Isidro de Peñas Blancas), Grecia (except Río Cuarto), Atenas, Naranjo, Palmares, Poás, Zarcero, Valverde Vega. Cartago Province: Cartago, Paraíso, La Unión, Jiménez, Turrialba, Alvarado, Oreamuno, El Guarco. Heredia Province: Heredia, Barva, Santo Domingo, Santa Bárbara, San Rafael, San Isidro, Belén, Flores, San Pablo.	Medium-low	Medium-high	Low	Coffee - vegetables - sugar cane	La Garita, Rio Macho, Cachí, Alberto Echandi, Toro I, Angostura, Peñas Blancas	No coastlines	17.7	63,90%	Medium-high
Huetar Atlántica Region									
Limón Province: Limón, Pococí, Siquirres, Talamanca, Matina and Guácimo. Heredia Province: Horquetas in the district of Sarapiquí.	Medium-high	Medium-high	High	Banana	No main power plants	High: Siquirres Medium-high: Limón, Pococí, Siquirres, Talamanca and Matina	29.3	10,3	Low
Central Pacific Region									
Puntarenas Province: Puntarenas, Esparza, Montes de Oro, Aguirre, Parrita and Garabito. Alajuela Province: San Mateo and Orotina	Medium-high	Medium-high	Medium-high	Quite insignificant agricultural production	No main power plants	High: Parrita Medium-high: Puntarenas Province: Puntarenas, Aguirre, Esparza, and Garabito.	23.6	5,3	Medium-high
Brunca Region									
San Jose Province: Pérez Zeledón. Puntarenas Province: Buenos Aires, Osa, Golfito, Coto Brus and Corredores.	High	Medium	High	Rice - Beans - Corn - Banana	No main power plants	High: Osa Medium-high: Golfito	32.7	7,5	Medium-low
Huetar Norte Region									
Alajuela Province: San Carlos, Los Chiles, Guatuso, Sarapiquí in the district of Alajuela, Río Cuarto in the district of Grecia, San Isidro de Peñas Blancas in the district of San Ramón. Heredia Province: Puerto Viejo and La Virgen, in the district of Sarapiquí	High	Medium-low	High	Rice - Beans - Corn	Toro II	No coastlines	27.8	5,5	Low
Source:	IMN[3]	IMN[3]	CATHALAC[4]	MAG[5]		IMN[6]	INEC[7]	INEC[7]	HDI[8]

Source: Own Creation.

[3] According to the *Instituto Meteorológico Nacional* (National Meteorological Service), 2011
[4] Based on the Report-"Possible Impacts of Climate Change in Biodiversity"
[5] According to Regional Statistics made by MIDEPLAN and MAG.
[6] According to the *Instituto Meteorológico Nacional* (National Meteorological Service), 2011
[7] According to the *Instituto Nacional de Estadística y Censos* –INEC (National Institute of Statistics and Census)
[8] According to the *Human Development Index*-2011 Report

2. Adaptation

25. Currently the country has worked hard on mitigation efforts (eg, carbon neutral commitment for 2021), but this goal has to go hand in hand with a vision of low-carbon development and resilient to climate change impacts.

26. Due to current impacts and forecasts of possible effects of Climate Change in the country, the adaptation approach has been internalized by governmental and non- governmental institutions in order to guide joint efforts. *"Adaptation is a strategic agenda for the country, diverse studies show that the impacts of extreme hydrometeorological phenomena annually range between 0.5% and 1.5% from the GDP"* (MINAET/EPYPSA, 2012). Based on the aforementioned, Fundecooperación, conformed by a Board of Directors that represents all the sectors of society, has led significant efforts to achieve, through public-private partnerships, the implementation of programs that have global-national importance but that at the same time with great impact at the local level; an aspect that is important for the implementation of this program.

27. Climate Change has somehow affected the entire country –a country with only 51,000 km^2, specific adaptation measures are needed by prioritizing by topic and not by geographical area.

2.1 Intervention Component: Agriculture

Component name: Increasing the adaptation capacity to climate change in the agricultural sector

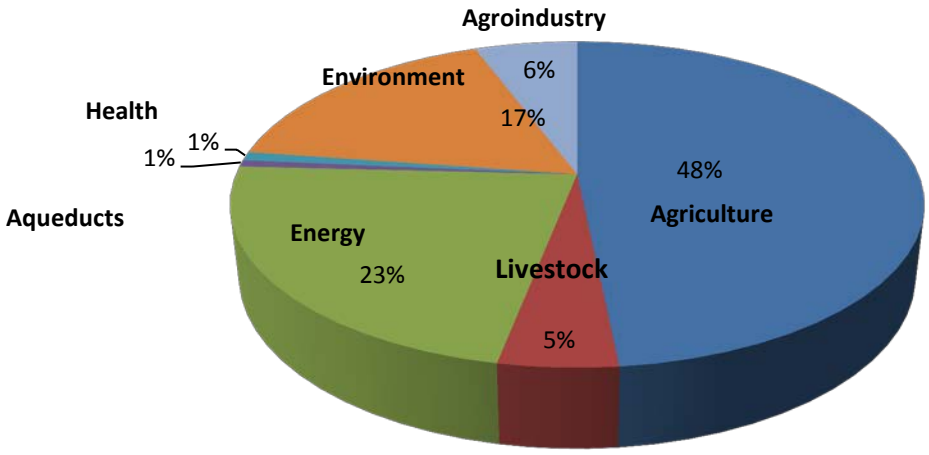
28. As established by the *Agenda Agroalimentaria, Cambio Climático y Carbono Neutralidad en el sector Agroalimentario de Costa Rica* (Agenda on Food and Agriculture, Climate Change and Carbon Neutrality in the Food and Agriculture Sector in Costa Rica 2010-2021) pests and diseases, the direct threat to biodiversity and the modification of conditions such as

atmospheric temperature, humidity, rainfall variation, winds and atmospheric pressure are also consequences of global changes that affect the weather and anything directly related to it. (Ministerio de Agricultura y Ganadería, 2011) Regarding the effects of hydrometeorological conditions and their fluctuations, it is important to mention that:

> *"Approximately 1,302,053 hectares (25%) of the national territory where there are projections of reductions of more than 1000mm a year in rainfall. When comparing these areas with the crop areas sensitive to the availability of rain water, 133,011 hectares of vulnerable agricultural use have been identified."* (GFA Consulting Group S.A. , 2010)

29. These atmospheric phenomena, which are difficult to forecast and control for the agricultural sector, represent losses in times of drought. Likewise, there can be losses due to the extreme increase in rainfall, thus causing flooding and loss of soil.

Figure 13 Costa Rica: Percentage Distribution of Losses per Sector due to Droughts (1993-94, 1997-98, 2001-2002, and 2009-2010)



Source: Flores Verdejo, R. (2012). *Technical Forum: Gestión de Riesgos Asociados con el Cambio Climático.* San José, Costa Rica: MAG-MIDEPLAN.

30. The agricultural sector is a highly important sector for the country since it covers economic, social, commercial, environmental and cultural activities. Moreover, it includes key fields for the development such as food safety, foreign trade, and environmentally sustainable

production. *In 2010, the agricultural value added was 1,241,469,000,000 colones* (US $2.458.354.455,45), *which represented 7.1% of the GDP. In that year, the value added for agribusiness was 1,161,594,000.000 colones* (US $ 2.300.186,14) *or 6.7% of the GDP. Therefore, the food and agricultural value added (agricultural plus agribusiness) corresponded to 13.8% of the PIB* (SEPSA, 2012)

31. The sector has been consolidated as one of the key drivers for the country's economic growth and social progress. Therefore, it should be mentioned that, regarding trading, Costa Rica is a clear agricultural exporting country, the commercial balance of this sector keeps a surplus condition –balance that reached US$1964.9 millions in 2010 (Ministerio de Agricultura y Ganadería, 2011)

32. When referring to the Costa Rican workforce, the agricultural sector is the second sector with the largest number of employed workers, with 14.1% active workers in activities such as agriculture, livestock, and fishing (SEPSA, 2012, pág. 171). Additionally, "*it is estimated that about 100,000 Costa Rican families directly depend on family agricultural system."* (MAG-Fundecooperación- ACICAFOC- INTA, 2012) By having that number of people and dependent families employed, it is required to implement measures and actions aiming at promoting the activity and decrease, through adaptation, aspects that directly or indirectly affect the said activity. It is highly important to have risk management and mitigation plans for the effects of natural disasters.

Table 7: Population Employed according to the Type of Activity. 2009-2011. (In number of people)

Rama de actividad 1/	2009	2010	2011	Variación % 2011/2010	Participación % 2011
Comercio y reparación	358.436	347.768	378.843	8,9	19,0
Agricultura, ganadería y pesca	281.070	285.076	280.301	-1,7	14,1
Industrias manufactureras /2	221.050	229.865	234.945	2,2	11,8
Hogares con servicios doméstico	131.371	135.512	150.084	10,8	7,5
Actividades inmobiliarias y empresariales	127.887	127.421	136.919	7,5	6,9
Enseñanza	119.846	126.942	118.289	-6,8	5,9
Transporte, almacenamiento y comunicación	122.636	119.346	129.994	8,9	6,5
Construcción	116.140	104.584	123.777	18,4	6,2
Hoteles y restaurantes	95.958	96.328	86.137	-10,6	4,3
Administración pública	90.907	92.823	110.484	19,0	5,6
Servicios comunitarios y personales	66.523	69.604	75.883	9,0	3,8
Salud y atención social	71.866	63.953	70.077	9,6	3,5
Intermediación financiera	37.531	48.979	50.035	2,2	2,5
Electricidad, gas y agua	27.852	35.675	33.216	-6,9	1,7
No bien especificadas	8.035	16.138	6.409	-60,3	0,3
Organizaciones extraterritoriales	1.950	2.150	2.656	23,5	0,1
Minas y canteras			1.481		0,1
Total Población Ocupada	**1.879.058**	**1.902.164**	**1.989.530**	**4,6**	**1,0**

1/ Según Clasificación Industrial Internacional Uniforme de actividades económicas (CIIU - 3)

2/ Incluye minas y canteras

Source: *Secretaría Ejecutiva de Planificación Sectorial Agropecuaria* – SEPSA (Executive Secretariat of Agricultural Sectorial Planning), 2012.

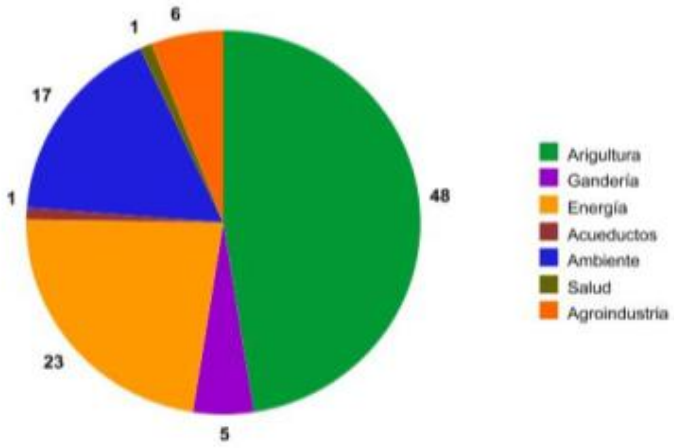
33. Agriculture is distributed according to the purpose and properties of each type of soil. For example, it is possible to find the production of staple grains in the *Chorotega* Region in the west of the country, *Huetar Norte* Region in the north of the country, and the *Brunca* Region in the southeast of the country. Moreover, in the east – in the Atlantic Region, the crop that prevails over the others is the banana crop as export fruit. On the other hand, the Central Valley, which at higher altitude than the regions mentioned above, has a type of soil dedicated to the industrial production of agriculture such as coffee plantations. (SEPSA, 2012) The national territory is divided by its agricultural practices depending on the richness of the soil and the different minerals that compose it, the climate differences and the culture of each region.

34. Based on this, when referring to the decrease of rainfall, the Chorotega Region is considered as the region most at risk in case of droughts. (Ministerio de Ambiente y Energía e Instituto Meteorológico Nacional, 2012) By taking the suggested data and estimations into account, it is important to emphasize that in the case of the *Chorotega* Region, its condition of being prone to experiencing drought periods as a result of climate change also increases the risk of experiencing losses in crops of staple grains. This region assigns its soils to the production

of more than 18 productive activities such as rice, sugar cane, beans; therefore, it plays an important role in topics such as Food Safety and employment in the agricultural sector.

35. In order to consider different situations that trigger the adverse effects of climate change, below is a chart obtained from the *Foro Técnico de Gestión de Riesgos Asociados con el Cambio Climático del Convenio MAG-MIDEPLAN* (Technical Forum on Management of Risks related to Climate Change from the MAG-MIDEPLAN Agreement), where it is possible to estimate the percentage of losses per sector due to drought phenomena:

Figure 14: Percentage Distribution of Losses per Sector due to Droughts (1993- 94, 1997-98, 2001-2002, and 2009-2010)



Source: Roberto Flores Verdejo (2012) Foro técnico: Gestión de riesgos asociados con el Cambio Climático. San José. Costa Rica. MAG-

36. Regarding Figure 14, it is possible to highlight that the most affected sectors are the agricultural, energy, and environmental sectors. In each of those cases, drought constitutes the main risk factor. On the other hand, regarding risks due to extreme rainfall and flooding, it is important to highlight that the regions indicated in Figure 12, at most risk of experiencing losses due to these types of phenomena, perform a significant agricultural activity for the country. In the *Huetar Norte* Region, staple grains are cultivated and export products such as bananas are cultivated in the *Huetar Atlántica* Region. Therefore, it is possible to estimate that the negative effects of extreme rainfall and flooding will not only affect the work of farmers, but they will also affect the commercial balance due to the lack

of products for export and food safety in the absence foods that are safe and nutritional for the population.

37. This leads to a key discussion when covering the topic of agriculture: food and nutritional security. As presented by Barahona (2011) in the publication called *Cambio Climático y Seguridad Alimentaria: Ejes Transversales de las Políticas Agrícolas* (Climate Change and Food Safety: Cross-cutting Themes of Agricultural Policies); there are different principles that must be complied in order to fully promote food safety. Some of them are the following: availability, access, and use of foods and the stability of access to these foods. At the same time, these four conditions depend on two factors directly related to the effects of climate change.

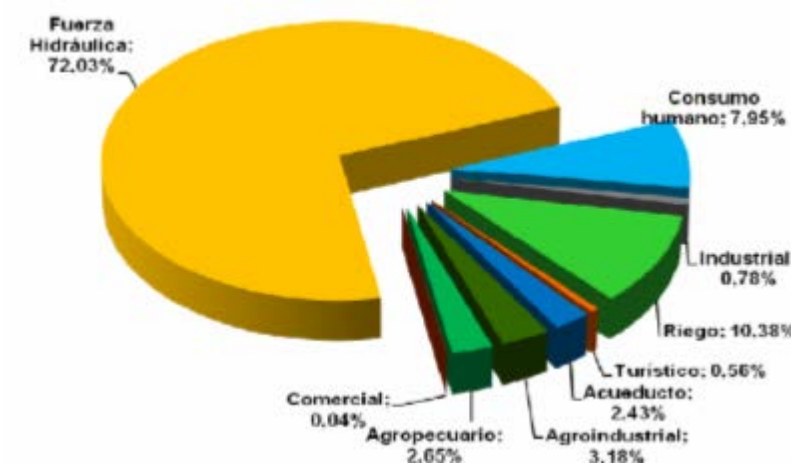
38. *"Complying with the principles of food and nutritional security has been complicated due to the limitation of food supply as a consequence of climate change in crops –mainly due to flooding, drought, fires and changes in temperature that affect crops and decrease the quality and security of food supply. Besides, another aspect to take into account is the decrease in purchasing power to obtain foods. The costs for facing natural phenomena and the replacement of affected crops limit the capital destined to improving the productive capacities and decrease the consumption as a result of the increase in the prices of food as a measure to counteract losses." (Barahona, 2011)*

39. Several factors prove relevance of the agricultural sector in Costa Rica: the economic value – based on the value of the production and income at a national level; the labour force – with the number of workers and families that depend on this income; the social and nutritional field –Costa Rican food safety; and the environmental pertinence – due to the relevance of the environment where the agricultural production is developed and the adverse effects of climate change that threaten it.

2.2 Intervention Component: Water Resource-Coastlines

40. In order to fully illustrate the importance of this resource, the following graph allows detailing the uses of the water flow in Costa Rica.
41. **Component name: Improving water resources management in order to increase resilience in coastal communities that are more vulnerable to climate change**

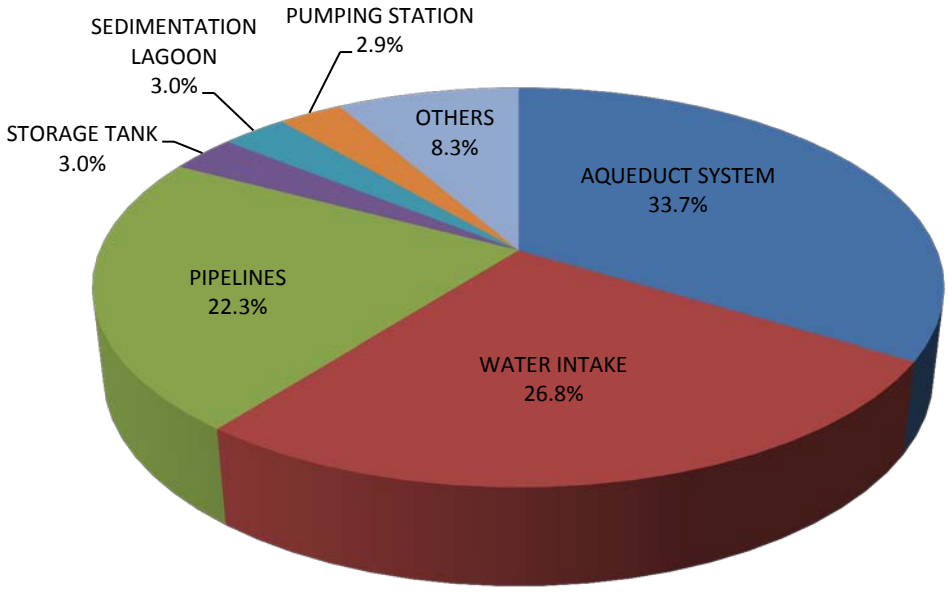
Figure 15: Percentage Distribution of Uses for water flow granted under concession at a national level.



Source: Water Department from MINAE. Created by H. Zúñiga and Y. Astorga.

42. In this way, it can be affirmed that, based on Figure 15, the water within the Costa Rican territory is destined to solve established needs. Therefore, due to the negative effects resulting from climate change, the disproportionate decrease or increase of the water flow may generate economic losses or health problems and the lack of hydroelectric power. Moreover, the impacts will also be reflected in the use of water resources for irrigation, aqueducts and sewage systems.

Figure 16: Losses caused by Hydrometeorological Events in the Aqueducts and Sewage System Sector at National Level, per Component.



Note: The category defined as "Others" includes: Purification plant, Treatment plant, Distribution lines, Wells, Headrace pipelines, Sewage Systems, Sand remover, and Submersible pump

Source: Flores Verdejo, R. (2012). *Technical Forum: Gestión de Riesgos Asociados con el Cambio Climático.* San José, Costa Rica: MAG-MIDEPLAN.

***Water Resources Management:**

43. Despite the fact that the availability of water is not currently a problem, the needs of the population for the supply of clean and safe water are not fully complied due to the lack of comprehensive water management policies. Due to this problem, the Food and Agriculture Organization (FAO) created a methodology that estimates the availability of water resources according to the total renewable resource. "*Costa Rica moved from a water capital of 27,932m3 per year per capita in 2000 to 26,450 m3 per year per capita in 2005. From those, 67% is surface waters and 33% is groundwater*." (Ministerio de Ambiente, Energía y Telecomunicaciones, 2008, pág. 5) This data deals with a latent problem regarding the decrease in the availability of water resources, which leads to negative effects in the other related sectors.

44. For these cases, it is important to emphasize that these ASADAS (Managing Associations for Community Aqueducts) have a significant role in their territory:

45. *"(…) the service they render impacts a series of conditions that make them key organizations to succeed in the comprehensive and sustainable development of the areas where they belong, with a direct impact on the inhabitants' health, on the socioeconomic development of the area, on the development of tourism and on the comprehensive management of water resources and the environment."* (*Instituto Costarricense de Acueductos y Alcantarillados* (Costa Rican Institute for Aqueducts and Sewage Systems), 2012, Sizing of ZMT)

46. However, a study made by *AyA* in October 2012 assessed the management of the ASADAS in the *Zona Marítimo Costera del Litoral Pacífico* (Pacific Coastal-Maritime Zone). The methodology used allowed indicating the category where the management of each ASADA can be placed at technical, environmental, and administrative levels. Among the categories, we can find the following: A) Consolidated, B) Developing and C) Weak. Based on the results obtained, it is important to mention that none of them complies with the requirements assessed in order to be ranked better than Category C) Weak. Therefore, it is possible to indicate that the water resource management is not fully developed.

47. Some variations have been also registered in rainfall per region. This is directly related to the previously mentioned availability problem. Each region in the country has suffered due to the changes –as it can be observed in the following reference:

48. "The intensity of droughts is greater in the north and the northeast of the country –in the border area with Nicaragua and near the Lake. Reductions exceed 32% per year. The Tempisque lowlands and plains (Guanacaste pampa) is the second area regarding the intensity of droughts. A third area to take into account is located in the rest of the North Pacific, Central Pacific and the Caribbean to the south where average reductions are about 28%. In the Central Valley and the North and Caribbean lowlands, average reductions of 25%

may occur, which are considered as extreme events. The rest of the country, especially in the mountain areas, the reductions are lower (22%). The lowest average reductions during drought periods occur towards El General Valley and the entire depression of Térraba River." (Ministerio de Ambiente, Energía y Telecomunicaciones, 2008, págs. 50-51)

49. Regarding the aforementioned, it is important to mention the generality of this phenomenon along the country. Although the percentages of rainfall reduction vary in terms of percentage, in most regions the effect of this reduction is significant when taking into account the economic activities that are developed there. Therefore, it is required to emphasize the importance of consolidating a comprehensive management of water resources in the areas at most risk in order to avoid and rationalize this valuable resource.

Coastlines and fishing areas

50. Costa Rican coastlines cover more than 1,100 km along the Pacific Ocean and 200 km along the Caribbean Sea. Under the future climate trends, according to reports and observations from the *Instituto Meteorológico Nacional* (IMN) and the International Ocean Institute –a world organization that has an office at the National University of Costa Rica), in this century the ocean levels may progressively increase until they reach more than one meter of their current level.

51. *"In Puntarenas –with a one-meter elevation, the water in high tides would break into the shores about 500 meters in average, and will flood about 300 hectares that are currently dry. In the most optimistic scenario, the increase of waters would be 30 centimeters. This would affect 105 hectares and 60% of the current residential sector in this port would be under water."*

52. Coastal communities greatly depend on fishing and tourism. Therefore, the future elevation of the sea level threatens the long-term sustainability of these populations. Table 7 also presents the importance of fisheries areas in terms of labor force with Costa Rican along with agriculture, around 14% of GDP.

Figure 17: Image of Puntarenas: scenario a 2010 - 2100

Source: IMN, 2005

53. Another important example of climate change impact has been a *"fifthy years of geomorphologic change in Damas Island, Quepos, Costa Rica, were studied from a photographic record that is available since 1947. Coastal dynamics were accelerated by the El Niño Phenomenon in 1997 which was simultaneous with the August-September astronomical tide, one of the highest in the 4-5 year cycle. Additionally, waves with high energy were present in some periods of these months. Processes were enough to break the island in two blocks and to initialize erosion and transport sediment that continues to date. The frequency of tropical storms and the wave energy will be greater in the next years increasing sediment instability processes in parts of the island. Two topographic profiles have shown that the island is not in equilibrium and that adding all the possible mareographic components it will be prone to continued erosion. The marine habitats around the island should be changing because the fresh and salt water input has been modified, especially because alteration in the Parrita and Paquita hydrological river basins, and its effects on the sediments of this system."*

54. As a conclusion, it is important to highlight the importance of the water resource in Costa Rica as a driving force of development in different significant sectors. In the social sector, its importance lies in its contribution to health and the consumption of drinking water, among others. Water is defined as the main source for the development of different sectors: for the environmental sector, it gives life to dependent ecosystems; in the agricultural sector, it provides irrigation to crops; and in the energy sector, it reinforces the mechanisms for generating electricity (80% of total energy generation is hydropower).

55. Each social sector is directly affected by the extreme alterations of rainfall as a result of climate change. This and the increase or decrease of temperature affects fragile activities such as agriculture and; therefore, it directly affects a country's food and nutritional safety. Likewise, the lack of production impacts the economic income of producing families, which is reflected in a country's economy. Additionally, the amount of crops or the poor quality of crops for exports affects the business relationships.

56. On the other hand, the same situation of the negative effects of climate change directly affects daily activities. Since Costa Rica is a country that highly depends on mechanisms to generate hydroelectric power, the alterations in the amount of water available may lead to continuous blackouts. Moreover, the population's health and basic needs are related to the access to this resource; therefore, the personal wellbeing of several people depends on its amount.

57. Within the framework described above and, based on the guidelines of the *Estrategia Nacional de Cambio Climático* (National Strategy on Climate Change), the programme proposal aims at solving the world problem regarding climate change with a national approach that requires a strong action, participation, and ownership of the different participants and sectors of the country. Fundecooperacion has the focus (its Board members configuration proves it) and experience to link community based experience and practice to local and national level policy making.

58. Fundecooperacion's approach is that all the initiatives funded and promoted must directly benefit the target population and improve their economic, environmental, social and gender conditions. The initiatives implemented must contribute as much as possible to alleviating and eliminating the poverty that persists in the country, especially in rural zones. In this sense, the programme was structured according to three main aspects: economic growth, social progress, and environmental protection to reach a better quality of life for Costa Ricans.

59. The main strategies and approaches of the programme consist on the following:

- The programme will be focused on the most vulnerable population to promote its capacity and participation. Technologies, methodologies, and tools that can be applied to other small-sized producers and beneficiaries, regions and sectors will be developed, assessed and validated through the programme as a means to reduce vulnerability and increase the national resilience in the medium and long term.

- The intervention will be focused on communities (bottom-up approach) in order to have a meaningful impact on the territory and be able to fulfill the needs and actions identified at local level.

- A comprehensive and sustainable management of available resources (biodiversity of soil, water, coastal and agriculture areas) is promoted within an adaptation approach that looks, among others, for a climatically intelligent agriculture, the improvement in the use of water services, resilience of coastal areas, and that is able of promoting innovation and knowledge management, learning from experience, exchanging knowledge, and guiding the transformation and replicability process.

- Capacity building activities will be focused on strategic local needs for building resilience to CC, including adaptation measures and best practices, management, organization capacity, and innovative ways to communicate and address climate hazards.

- The programme will be an integral part of the *Plan de Acción de la Estrategia Nacional de Cambio Climático* (Action Plan for the National Strategy on Climate Change) approved in 2012, and it will be governed by the general acting principles that improve sustainable development, awareness, equity, participation, and consultation. Lessons learned will be used for feedback and improvement opportunities to strengthen the National Strategy and its Action Plan.

Programme Objectives:

List the main objectives of the programme.

Support the development of Costa Ricas's adaptation capacity in line with the *Plan Nacional de Acción de la Estrategia Nacional de Cambio Climático* (National Action Plan of the National Strategy on Climate Change)

General Objective:

- Reduce the vulnerability by focusing on critical sectors (agriculture, water resources, and coastal zones) in order to reduce the negative impacts of Climate Change, and improve the resilience of those populations.

The three components of the programme are defined as follows:

1. Increasing the adaptation capacity to climate change in the agricultural sector.
2. Improving water resources management in order to increase resilience in coastal communities that are more vulnerable to climate change.
3. Improving the capacity of communities, producers, institutions, and stakeholders regarding adaptation to Climate Change.

PROGRAMME COMPONENTS AND FINANCING:

Fill in the table presenting the relationships among Programme 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.

COMPONENTS	CONCRETE EXPECTED PRODUCTS (OUTPUTS)	EXPECTED RESULTS (OUTCOMES)	AMOUNT (US$)
Component 1: Agriculture Sector Objective: Increasing the adaptation capacity to climate change in the agricultural sector.	1.1. A variety of technical options and methods resilient to the effects of Climate Change -developed, validated, and implemented in the agricultural sector according to the area. ($1,96) 1.2. Technical financial support promoted for adopting technical options generated in local communities. ($ 1)	1. Strengthened farming productivity in response to climate change, in order to reduce loss of soil and improve water management.	2.96
Component 2: Coastal Zones – Water Resource Sector Objective: Improving water resources management in order to increase resilience in coastal communities that are more vulnerable to climate change.	2.1 Developed and implemented Water Safety Plans and improvement initiatives from PIEVC Engineering Protocol for Climate Change Infrastructure Vulnerability ($0,6) 2.3 Efficient and effective comprehensive water resource management ($1,4) 2.4 Comprehensive management in the coastal area established and on-going ($1,4)	2. The availability of water resources for human consumption was preserved and the vulnerability of coastal communities was reduced through the participation of communities in protecting critical ecosystems (For example: mangroves, watersheds and coastal areas).	3.4
Component 3: Capacities Objective: Improving the capacity of communities, producers, institutions, and stakeholders regarding adaptation to Climate Change.	3.1 Improved community preparation through the development and consolidation of early warning, risk reduction systems and protocols for agriculture, water resources, and coastal areas in regards to climate change ($0,5) 3.2 Communities, producers, institutions, and stakeholders related to climate change and trained in regards to the corresponding adaptation measures. ($0,8) 3.3 Strengthened institutional capacities for the systematic monitoring of climate change in order to prevent and inform about the development of weather events. ($0,7)	3. Communities, producers, institution and stakeholders improve capacities regarding adaptation to climate change by developing and improving the information, awareness and abilities about related socioeconomic and environmental risks	2
4. Programme Execution Cost			0.86
5. Programme Total Cost			9.22
6. Management Fee of the Programme Cycle charged by the Executing Entity –if applicable			0.75
Requested Financing Amount			9.97

PROJECTED CALENDAR:

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

MILESTONES	EXPECTED DATES
Start of Programme Implementation	July 2014
Mid-term Review (if planned)	July 2016
Programme Closing	July 2019
Terminal Evaluation	March 2019

PART II: Programme JUSTIFICATION

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

60. The programme aims at increasing resilience and adaptation of the most vulnerable sectors of the country: agricultural sector (component 1), water sector and coastal sector (component 2) by implementing adaptation measures in selected communities –previously determined, by the *Instituto Meteorológico Nacional* [IMN] (National Weather Institute), as areas of great climate stress.

61. Moreover, the programme has a third component that covers topics regarding capacity building, awareness, local training, and knowledge and information management, in order to collect and share the lessons learned in each selected sector, and share that knowledge with other sectors, communities and countries facing the same climate threats and to facilitate information to strengthen national strategy and policies on climate change adaptation. This component is deemed required for guaranteeing the programme sustainability beyond the programme funding.

62. **Investing on Adaptation**: providing comprehensive support to the country's most vulnerable producers, and facilitating the adoption of measures identified in the

National Strategic Action Plan on Climate Change. The support will consist on investment of interventions, technical assistance, and training related to this plan.

Components:

63. **Component 1. Increasing the adaptation capacity to climate change in the agricultural sector.**

64. Agriculture: addressed to all micro, small and medium producers located in areas that are highly vulnerable to extreme hydrometeorological events and to gradual climate change effects. The programme will reduce the risk of climate change effects, in order to facilitate the adoption of the following outcomes:

65. **OUTCOME 1:** Strengthened farming productivity in response to climate change, in order to reduce loss of soil and improve water management.

66. Regarding the farming sector, there is great adaptation potential that allows enhancing the productivity and efficiency in managing the services of productive ecosystems. These enhancements will be achieved by implementing activities aimed at generating, sharing, and adopting technical options that reduce the vulnerability of productive units and strengthen the response to climate change. For them, the aim is to reduce the vulnerability through sustainable and low-cost production technical options, and their validation at field level. In this way, it is expected that, through the adaptation fund, the adoption of this type of technical options in the selected vulnerable areas is achieved and therefore risks are reduced.

67. **Geographical scope:** Among the selection criteria, one will be based on the project's location. Specifically, the project's location is going to be analyzed based on:

(1) Its relevancy with the proposed outcome. (e.g. is the problematic/risk significant in the region/district/township?)

(2) The location's priority rank at the country level. (e.g. is location a priority in the mitigation of the problematic/risk at the country level)

(3) An analysis of the adaptation capacity[9]

68. For all the activities included in OUTCOME 1 - Strengthened farming productivity in response to climate change - priority regions have been identified as follows:

Table 8: Priority regions for component 1

Component 1				
Priority	**Current Vulnerability**	**Future Vulnerability**	**Agricultural Importance**	**Population**
Central Region	Medium-low	Medium-high	High	High
Huetar Norte Region	High	Medium-low	Medium	Low
Chorotega Region	High	High	Medium-low	Low
Brunca Region	High	Medium	Medium-low	Low
Huetar Atlántica Region	Medium-high	Medium-high	Medium	Low
Central Pacific Region	Medium-high	Medium-high	Medium-low	Low
Central Region	Medium-low	Medium-high	High	High
Source:	IMN[10]	IMN	MAG[11]	INEC[12]

69. Governmental officials from the Ministry of Agriculture and the Costa-Rica Institute of Aqueducts and Wastewater Treatment (SENARA – National Service of Groundwater, irrigation and drainage) have both identified the Central Region has the priority region for the activities included in Component 1.

70. On the one hand, Central Region is one of the most important agricultural hubs in Costa-Rica and it is the first in terms of population density. Hence both the economical and ecological risks associated with climate vulnerability are higher than other regions. On the other hand, Central Region has a lot of small producers, which is aligned with the proposed programme's eligibility criterion #1.1 (see Annex 1). Moreover, Central Region concentrates the vast majority of the products sold on the national market (national diet products), which is aligned with the proposed programme's eligibility criterion #1.2 (see Annex 1)

[9] An analysis base on the 5 main criteria's established by Wongbusarakum & Loper (2011) y Adger et al. (2004) such as poverty, provision of basic services, aspects of productive activities, access to information and organizational skills.

[10] According to the *Instituto Meteorológico Nacional* (National Meteorological Service), 2011

[11] According to Regional Statistics made by MIDEPLAN and MAG.

[12] According to the *Instituto Nacional de Estadística y Censos* –INEC (National Institute of Statistics and Census)

71. Within the selected region, the selection of more specific geographical scope (e.g. cantons, communities) will depend on the prioritization and selection process among the ones that are proposed. An overview of the prioritization methodology is presented in Annex 1. Also, the Huetar Norte Region, specifically Upala, is selected as a priority area, due it has a lot of small producers, which is aligned with the proposed programme's eligibility criterion #1.1 (see Annex 1) and other of the criterion mentioned.

72. OUTPUT 1.1.: A variety of technical options and methods resilient to the effects of Climate Change -developed, validated, and implemented in the agricultural sector according to the area. The reduction of the risk of the sector to the impacts of climate change at local level is required: through a greater adaptation of productive systems and a reduction of their sensitivity to climate changes –this is; a lower impact on the system, with better recovery capacity after impacts. At the same time, both actions should be translated into less variability in production, specifically regarding losses due to climate variations, except catastrophic events such as hurricanes, earthquakes, and others. Due to the differences in the selected areas, it is important to assess and validate the technical options for each area in the country considered as vulnerable. Among the activities, we find the following and the description of how those activities link with or contribute to address climate resilience issues.

1.1.1. Implementation of new farming zoning scenarios in the selected communities according to vulnerability

73. **Contribution to climate resilience:** In Costa-Rica, the farming zones have been historically selected based on various criteria that were not directly related to climate resilience. Examples of existing criteria include the land productivity, the availability of the land area as well as the topography. Other criteria such as the areas under water stress, the crop suitability (actual, future projection) or climate risks analysis have typically never been taken into account in the selection of farming zones.

74. The integration of climate vulnerability as a criterion to define new farming zoning scenarios will contribute to building resilience to current climate variability or future climate change, as the land-use planning will be based on the available vulnerability indicators. The climate vulnerability diagnostic per zone will allow the zone modification or displacement of land-use activities, primarily in the most exposed farming zones.

1.1.2. Identification of farming technical options that can be adapted or implemented in order to enhance the resilience to Climate Change (droughts, heat, intensive rain, plagues, and others) and validation of technical options by areas.

75. **Contribution to climate resilience:** Even if activity 1.1.1 will contribute to reduce the exposition to climate variation by integrating the climate vulnerability in the criteria applied to define the farming zones, some zones will certainly remain partly exposed due to the intrinsic climate risk profile of the country. This residual risk can be further mitigated through the identification of new technical options (measures), based on their potential to enhance climate resilience. Before implementation (activity 1.1.3), those measures will be validated based on their pertinence and appropriateness at the local level.

76. The technical options for adaptation first includes understanding the patterns of variability of current and projected climate and seasonal forecasts, an analysis of each technical option in order to avoid maladaptations, but it also implies the implementation of hazard impact mitigation methods, land use planning, risk management and resource management tools. As indicative examples, technical options (methods and tools) that enhance resilience to climate variability and change may include:
    - Weather-based yield index for crop insurance;
    - Date of planning (actual, future projection);
    - Length of growing season (actual, future projection);
    - Crop intensification;
    - Post harvest practices;
    - Water use efficiency;

- Enhancing agrobiodiversity through diversification of production;
- Promotion of agroforestry; and
- Water supply and irrigation system.

77. Other more detailed options includes:
    - Implementation of growing techniques that help protect soils from erosion and moisture loss (use of vegetation coverage (cover crops), organic fertilizers, and agricultural conservation systems, among others).
    - Implementation of comprehensive farming production systems, conservation agriculture, agroforestry systems, cattle raising, and sustainable irrigation and percolation technical options,
    - Implementation of cattle feeding techniques for critical times (introduction of varieties of grazing resistant to droughts or floods, supplements and forages)
    - Support to protein and seed banks projects.
    - Creation of water safety plans focused on the risk area according to zoning.
    - Support replacing crops not suitable to extreme conditions for new crops or varieties that are resilient to changes in environmental variables, plant diseases and plagues, according to the zoning made.

78. The detailed demonstration of how and why those technical options contribute to enhance the resilience to climate variation has been widely documented throughout the years and relevant documentation is available. For instance, FAO's Climate-Smart Agriculture[13] report summarizes the options that can be used by farmers and food producers to reduce greenhouse gas emissions, adapt to climate change, and reduce vulnerability.

1.1.3. Implementation of validated technical options for climate resilience enhancement in agriculture

79. **Contribution to climate resilience:** The activity 1.1.2 already summarizes how technical option in agriculture has the potential to enhance climate resilience. Technical and strategic support to farmers will be crucial in order to ensure a

[13] http://www.fao.org/climatechange/climatesmartpub/en/

smooth transition through those alternative techniques and measures, as well as to facilitate the know-how transfer to the landowners. The implementation phase will also involves the continuous monitoring of the implemented measures, which will allow the identification and implementation of corrective actions that will lead to continuous improvements. Key performance indicators are going to be selected based on the technical performance (e.g. productivity, costs) as well as the results achieved in regards to climate resilience (e.g. reduction of yield losses due to flooding events).

80. OUPUT 1.2.: Financially support the adoption of technical options generated in local communities (local communities selected with the proposal and other vulnerable communities). The interest of this OUTPUT is generating greater financial support to producers regarding the implementation of available technical options and low-cost supplies. Indeed, even with the implementation of the measures described under the output 1.1, a residual climate risk will most probably remain, which will lead to financial losses especially in the agricultural sector, being the most exposed to climate risks (see Part I). Therefore financial instruments have to be developed and offered to farmers who will still suffer financial losses.

81. Two instruments are proposed as follows:

1.2.1 Creation of an agricultural insurance and insurance policies programme that includes criteria on climate resilience.

82. Various agricultural insurance products already exist and are available to farmers. This activity aims at identifying suitable products for the national and local context as well as the types of perils that insurance policy programme could cover. This activity also aims at defining the role government would play in assisting agricultural producers with climate variability insurance, in order to make sure the insurance products are accessible to farmers.

83. The final products of this activity would meet the following criteria:

84. **Goal**: The objective of an agricultural insurance is to reduce the farmers' economic exposure (as well as their producer associations, individual companies and regional finance and government institutions) to the negative effects of climate change variability. This contributes to the economic sustainability of the agricultural sector in the target region as well as the increase of climate resilience. In order words, climate insurance programs can help farmers improve their risk management, enabling them to invest and take chances that they would otherwise avoid. This creates the conditions needed to improve their livelihood and strengthen their resilience to climate variability.

85. **How it would work**: many innovative climate insurance schemes are being developed and introduced using index-based insurance instruments. Unlike conventional agricultural insurance, they are not based on measurement of actual damage, but on the occurrence of previously established climate data parameters that have been proven to predict damaging events, such as the rise in the temperature of the ocean's surface off the coast Central America, which correlates with the onset of the El Niño phenomenon.

86. **Management**: The design, planning and operationalization of the insurance programme would be made in collaboration with the National Insurance Institute. Furthermore, support and know-how transfer can be given by international agencies such as WFP (World Food Program) or the World Bank, who have already play important roles in enabling and facilitating the start up of such insurance interventions worldwide, especially in Africa and with SIDS (small island developing states).

87. **Financing**: Based on economic statistics such as OECD and World Bank, it has been demonstrated that the external aid sent to developing countries after disaster accounts for a relatively small fraction of the total losses caused by catastrophic events. On average over 90% of the cost from natural disasters is related to households, businesses and government[14]. This figure illustrates the need for insurance-based climate financing mechanisms implemented at the country level

[14] http://www.tandfonline.com/action/showPublications?category=43983476

(insurance policy programme). A fixed insurance premium paid by the government would represent a small fraction of the potential economic loss, especially in Costa Rica given the important frequency and gravity of those events. Thus, the government could cap the amount of its fiscal loss, greatly reduce the uncertainty of national budgetary outcomes due to natural disasters, and increase the speed of its post-disaster economic recovery.

88. **Contribution to climate resilience:** As previously described (Part I), agriculture is a major economic sector and an important source of livelihood in Costa-Rica and it is particularly exposed to climate variation and adverse natural events. The cost of climate variation is already significant and may even increase further in the future, which may ultimately lead farmers to poverty if unchecked. Since adaptation practices along are typically not sufficient to eliminate the climate risk, agricultural climate insurance is a tool that the producers can potentially use to adapt to the residual risks associated with adverse natural events. In that sense, agricultural insurance can complement and enhance risk management activities previously describe, which on a standalone basis are typically not proven sufficient.

89. In return, the idea is to provide incentives for the implementation of climate adaptation measures through a climate criterion that would be integrated into the clients' risk profiles. In other words, a producer that has implemented such measures would receive a lower risk score and, consequently, would have access to lower insurance fees.

90. Thus, such insurance aims at strengthening the farmers' financial resilience in the event of crop losses for instance, which would in return ensure the sustainability of the measures identified in output 1.1 and that aims at building climate resilience. Hence, the creation of subsidized agriculture insurance will contribute to climate resilience.

1.2.2 To facilitate access to financial schemes such as reimbursable funds to agricultural producers to implement sustainable management practices for lands,

and implement strategies to adapt to climate change and/or invest in new rural economic activities as contingency for the impact caused by climate change.

91. **Goal:** The goal of such reimbursable funds programme is to facilitate and accelerate access to financing for adaptation project proponents who, for various reasons, may face severe barriers of access to finance and have little possibility of obtaining financial support within traditional financing schemes. Leverage with other available credit funds will be promoted.

92. **How it would work: Initially, f**acilitating access to financing may be achieved through a credit programme design that has already been put in place by Fundecooperacion, called "Tailor-made Financing". Such programme allows credit funds allocation to be customized to meet each project's needs, instead of simply forcing the project to fit the funds requirements. This way of doing is especial pertinent to small-scale projects, for which needs may vary significantly from one project to another. Fundecooperacion scheme would be put in place as a pilot project.

93. Further, other available credit programs (traditional as well as microfinancing schemes) will be invited and motivated to incorporate adaptation within its funding criteria.

94. For instance, a reimbursable fund would fund projects that save operational dollars and the fund would be paid back out of the savings or loss reduction. Projects with short-term paybacks (e.g. 5 years or less) can be combined with projects with long-term paybacks, and the all projects could be funded and paid back in typically five years.

95. **Management:** The fund may be staffed and administered by Fundecooperacion, but funding decisions can be made by a Board of Directors that would include other relevant stakeholders and experts.

96. Fundecooperacion has the expertise and know-how to manage such fund. Since its foundation, Fundecooperacion has developed a solid expertise in sustainable

development micro-financing. Since 1994, Fundecooperacion has financed approximately 35 million USD in projects that promote sustainable development. A part of the financing has been allocated to the programme called "Tailor-made Financing" ("Crédito a su Medida"), which allows the reimbursable funds allocation to be customized to meet each project's needs. This includes the securities, terms, and repayments, which have been customized to meet the requirements of each project. Fundecooperacion has been leading the management so that the financing fits the project - rather than forcing the project to fit the financing – while ensuring the environmental integrity and economic feasibility. This is an added value of Fundecooperacion expertise in credit program, compared to other typical traditional funds.

97. Fundecooperacion's program is aimed at productive small and medium-sized businesses, -either individuals or associations, devoted to sustainable and innovative economic activities. Their activities must contribute to life quality improvement, environmental protection and gender equity. Credit scheme is framed within any of the seven thematic areas: sustainable agriculture, sustainable tourism, gender equity, adaptation y mitigation Climate Change, energy efficiency, supply chain and clean technologies.

98. **Financing: It will be partially financed by existing credit programs (like Fundecooperacion's and other). Furthermore, funding from the adaptation fund will facilitate, demonstrate benefits and promote innovative schemes to financial institutions to invest in agricultural projects that have built resilience to climate change.**

99. **Contribution to climate resilience:** The cost of implementing new agricultural practices (see output 1.1) may be significant, especially for small-scale agricultural production or production that have been the most exposed to climate adverse events in the past. Access to capital has been so far one of the most predominant barrier to innovation in climate change mitigation and especially adaptation, which is rarely associated with an increase in income on the short term. As a result, producers typically have difficulties to absorb the capital investment required to launch new initiatives and to implement improved agricultural practices. Hence,

the implementation of the activities described under output 1.1 will partly depend on the producers' access to capital and capacity to invest. In instances where access to capital is identified as a barrier to the implementation of measures to improve climate resilience, the programme will support the producers in order to facilitate the access to existing reimbursable funds aiming at reinforcing climate resilience in the agricultural sector. Since the access to such funds will allow financing climate resilience activities, therefore this activity will contribute to enhance climate resilience.

100. **Component 2. Improving water resources management in order to increase resilience in coastal communities that are more vulnerable to climate change.**

101. Water Resource – Coastal Areas: the environmental impact (such as the deterioration of coastal ecosystems) caused by climate variability (e.g. rise of sea level, precipitations, etc.) jeopardizes the safety, the amount, and the protection of water resources. Therefore, the systems show high vulnerability and low response capacity in case of events that jeopardize them.

102. **OUTCOME 2. Preservation and improvement of water resource availability for human development, and environmental sustainability through the participation of communities in protecting critical ecosystems.**

103. Protection of recharge areas, surface and underground waters. A priority is assessing the health of the ecosystems protecting the important water sources; and, based on these results, prioritizing a strategy for its protection with the participation of local and national stakeholders. The identification of gaps in the protection of significant water areas implies the creation of pilot plans and safety plans, as well as the improvement of the watershed resilience in order to improve percolation, promote reforestation and agroforestry practices. These actions will allow operators to previously have measures and protocols to reduce risk and improve the response capacity in case of these events.

104. **Preliminary geographical scope**

105. Among the selection criteria, one will be based on the project's location. Specifically, the project's location is going to be analyzed based on:

(1) Its relevancy with the proposed outcome. (e.g. is the problematic/risk significant in the region/district/township?)

(2) The location's priority rank at the country level. (e.g. is location a priority in the mitigation of the problematic/risk at the country level)

(3) An analysis of the adaptation capacity

106. For all the activities included in OUTCOME 2 - Preservation and improvement of water resource availability **-** priority regions have been defined based on two recent studies:

107. First, a recent study undertaken by the Costa-Rica Institute of Aqueducts and Sewage (Instituto Costarricense de Acueductos y Alcantarrillados): Water Supply for Human Consumption in the Coastal Zones of Costa-Rica. The study aimed at characterizing the quality of water supply and management per zone (canton), by assigning an average score based on a multi-criteria analysis. From the cantons analyzed in the report, the cantons with lowest scores were chosen as priority locations for component 2:

- Nicoya
- Hojancha
- Nandayure
- Osa
- Aguirre
- Puntarenas

108. Secondly, another recent study (2013) on climate vulnerability, undertaken by experts from CATIE institute for agriculture and natural resources, GIZ and US-

Aid[15], identifies other four cantons (including specification at the district level) as vulnerable to climate variability:

- Matina (Battán and Carrandí districts)
- Limón (Limón and Río Blanco districts)
- Siquirres (Pacuarito and Siquirres districts)
- Talamanca (Sixaola district)

109. Once combined, these two reports identify a total of 10 cantons that are deemed relevant and priority for Component 2 adaptation measures, as summarized below:

Table 9: Component 2 Priority Region(s)

Component 2			
Priority	**Current Vulnerability**	**Future Vulnerability**	**Vulnerable Areas Selected (Cantons)**
Chorotega Region	High	High	Nicoya Hojancha Nandayure
Brunca Region	High	Medium	Osa
Central Pacific Region	Medium-high	Medium-high	Aguirre Puntarenas
Huetar Atlántica Region	Medium-high	Medium-high	Matina Limón Siquirres Talamanca
Huetar Norte Region	High	Medium-low	Not selected
Central Region	Medium-low	Medium-high	Not selected

110. Within the selected cantons, the selection of more specific geographical scope (e.g. districts, ASADAS, communities, etc.) will depend on the selected projects that are proposed. An overview of the selection methodology is presented in Annex 1.

111. OUTPUT 2.1. Developed and implemented water Safety Plans for water users at local level, watershed management plans and application of PIEVC Engineering Protocol (Public Infrastructure Engineering Vulnerability Committee)[16]

15 https://dl.dropboxusercontent.com/u/41609727/Blog/130903_Publicación%20Regional_CAribeCAM_final.pdf

16 The protocol is a five-step process to analyze the engineering vulnerability of an individual infrastructure.

in vulnerable infrastructure. The creation of plans allows operators (ASADAS - community-based water management organizations, Municipalities managing aqueducts, Water and/or Irrigation Users Associations, among others) to previously have measures and protocols that should be implemented to reduce their risk and improve their response capacity in case events such as droughts or flooding occur. Developing plans aims at sustainably managing land in order for communities to be able to respond to the climate impact on the resource. Through the implementation of the PIEVC Engineering Protocol in vulnerable infrastructure the programme is able, not only to measure the vulnerability, but also it gives information needed to assess current and future climate threats, determine actions and to measure the results after the intervention is finalized. Additionally, it takes the risk factor into account. The activities to be implemented are the following:

2.1.1. Creation of water safety pilot plans at the canton and regional level to mitigate risks of water shortage or overage and to implement irrigation management plan, through the implementation of the PIEVC Engineering Protocol in vulnerable infrastructure assessment.

112. A vulnerable infrastructure assessment would use the PIEVC Engineering Protocol, which is a formalized process that guides infrastructure professionals to assess current and future climate risks. The process will be applied to individual infrastructures such as buildings or infrastructure systems such as potable water supply. PIEVC is designed for engineers, working with other professionals, including climate scientists, to document current and future climate risks to infrastructure.

113. **Contribution to climate resilience:** Recent climate variability trends cast doubt on the validity of applying historic climate data when designing water infrastructure. In the face of climate changes, engineers have to reconsider existing assumptions relative to infrastructure capacity and vulnerability. Based on this concern, enhanced climate resilience can be achieved through an engineering vulnerability assessment of the infrastructure (mainly wastewater and water resources). Hence, this activity will contribute to enhance climate resilience through the reinforcement of water infrastructure resilience to climate variability.

2.1.2. Development and implementation of Management Plans for selected watersheds.

114. In the context of climate change, new criteria such as minimizing vulnerabilities and managing climate-related risks have to be considered in the watershed planning processes. In many cases, climate change exacerbates existing management challenges, such as water shortages, water use conflicts, protecting water quality and managing natural hazards. Therefore, when adaptation is integrated into watershed plans, consideration will be given to the degree to which climate change is compounding those problems and to how strategies and responses need to be refined to address additional pressures related to climate change.

115. The ways in which adaptation is integrated into water and watershed planning will be influenced somewhat by the scope and detail of a particular plan. Here are a few indicative examples of climate resilience integration in the watershed management:

- A water conservation or drought management plan would be informed by future climate scenarios of drought events or water shortages rather than by historical levels of drought (e.g., an increased frequency and severity of drought).
- A stormwater, drainage, or flood management plan would be informed by current hydrological information and by an understanding of how the hydrological regime is anticipated to shift in response to climate change.
- A drinking water protection plan would be informed by information and knowledge about all possible threats to water quality, including climate-related impacts such as increased peak flows and turbidity.

116. **Contribution to climate resilience:** Local water management associations and national water systems in communities currently protect strategically important aquifer recharge areas. Organizations at local level –in charge of water management, improve the management of water supply and supply services by taking into account mechanisms for managing the demand. This mechanism shall

also include clear strategies to facilitate the access to water of the most vulnerable population, including reducing risk of water system deterioration associated with climate variation. Selected populations are vulnerable to water scarcity, flooding, landslides and diseases. These impacts will be aggravated due to climate change. A watershed management plan that integrates climate risks (see how in the above paragraph) will contribute to enhancing climate resilience by taking into account the climate variables that are affecting or will affect the watersheds in the near future, which will allow the identification of appropriate adaptation responses.

117. OUTPUT 2.2.: Efficient and effective comprehensive management of the water resource by implementing enhancements. (Beneficiaries: ASADAS, community water management and national water systems). Some of the activities are the following:

2.2.1. Implementations of measures to protect aquifer recharge areas. (Example: Reforestation at aquifer recharge areas)

118. Sea level rise increases the chance of saltwater intrusion in groundwater bodies, particularly in low-lying areas. A way of mitigating this threat is by systematically maintaining higher water table levels for groundwater, thus reducing the hydrological gradient from seawater. Groundwater aquifers areas can be protected and then recharged in a controlled way so that excess water can then be used later for water supply or environmental protection. Protection of groundwater recharge areas is an indirect measure to increase the water supply within a managed water supply system. Contrary to rainwater harvesting which increases the water supply directly with additional water from natural precipitation, groundwater recharge feeds precipitated water into an aquifer in order to ensure and increase a continuous extraction of groundwater from this aquifer.

119. **Contribution to climate resilience:** Measures to protect aquifer recharge areas will contribute to enhance climate resilience by mitigating the negative effects of sea level rise.

2.2.2. Planning and design of infrastructure for water use and distribution aiming at the adaptation, modernization, and improvement in order to enhance climate resilience.

1. Climate variation challenges the ability of water infrastructure (both drinking and wastewater) to ensure public health while protecting the environment. Therefore resilient and adaptable water utilities are needed to ensure clean and safe water. To achieve such utilities, the infrastructures' stakeholders have to be informed on the integration of climate variables in the planning and design of water infrastructure. Capacity building is also needed in order to ensure local know-how development. In order to avoid maladaptations, an important planning and design based on the needs of each project case is expected thorough this activity.

2. Concrete example of potential achievement that will enhance climate resilience through the proposed activity include:

    - Design of basic infrastructure (dikes, drainage systems, aqueducts, among others) against climate risks
    - Basic sewerage and drinking water systems to reduce vulnerability and risk in case of climate variability, extreme events, and climate change.
    - Development of infrastructure that enhances the infiltration of water at recharge areas
    - Efficient Water User Technical options
    - Implement infrastructures that allow rainfall to be captured in case of surplus, and then used when there is deficit. This will require some improved or even new water storage infrastructure.
    - Extended metering infrastructures that will allow leakage management (including infrastructure replacement)
    - Repair vulnerable infrastructures to strengthen them, or as needed move those infrastructures to other locations identified as less exposed to climate variability.

3. **Concrete example of how water infrastructures may be adapted to enhance climate resilience:** Climate change may cause inconsistent rainfall and increasing pollution of reservoirs, which means security of water supply is a climate risk that increases the vulnerability of water infrastructures. Technical interventions can be introduced in order to increase the capacity of the water treatment plant. The plant may incorporate new technologies such as ozone and ultra-filtration membrane, which would allow for the recycling of wastewater so that it can be reutilized as drinking water. Raw sewage may be mixed with water extracted from boreholes and reservoirs, and then distributed as drinking water. This way, the plant can substantially increase its initial capacity.

4. **Contribution to climate resilience:** infrastructures that are planned and designed considering the climate risks will be more resilient to adverse events that may affect the water quality and availability, such as sea level rise, shifting precipitation and temperature changes.

2.2.3. To promote refundable funds to Local water management associations, national water systems to implement sustainable management practices for water, and to implement strategies to adapt to climate change and/or invest in new infrastructure as contingency for the impact caused by climate change.

5. **Contribution to climate resilience:** The cost of implementing new water systems and water protection measures (see activities 2.2.1 and 2.2.2) may be significant, especially for small municipalities or locations that have been the most exposed to climate adverse events in the past. Access to capital has been so far one of the most predominant barrier to innovation in climate change mitigation and especially adaptation, which is rarely associated with an increase in income on the short term. As a result, project developers have difficulties to absorb the capital investment required to launch new initiative and to implement improved water system and protection measures. Hence, the implementation of the activities 2.2.1 and 2.2.2 will partly depend on the access to capital and capacity to invest. In instances where access to capital is identified as a barrier, the programme will support the developers in order to facilitate the access to existing refundable funds

aiming at reinforcing climate resilience of water systems. Since the access to such funds will allow financing climate resilience activities, therefore this activity will contribute to enhance climate resilience.

OUTPUT 2.3.: Establishment of a comprehensive management system in the coastal area. Strengthen coastal communities that are vulnerable to climate change. For this, adaptation measures should be identified and executed for the sustainable use of natural capital according to the needs identified, through the protection of ecosystems and the promotion and respect of practices installed at a local level. Some of the activities are the following:

2.3.1. Design and implementation of coastal protection and restoration measures.

6. This activity consists in developing a management plan for the effective management of selected marine protected areas, with activity zones delineated in three areas. Improvements will be made to the database for continuously monitoring changes in coastal ecosystems. At the practical level, sand dunes will be re-established, mangroves replanted in degraded coastal regions, and seagrass beds restored. Coastal protection measures and/or structures will be established in selected areas. A scheme will be developed to identify and assess the feasibility of alternative livelihoods, with grants awarded to develop these livelihoods.

7. **Contribution to climate resilience:** the restoration and protection of coastal areas will preserve or reestablish the environmental services brought by natural coastal protection such as sand dunes, mangroves and seagrass beds. As a result, climate resilience in coastal areas will be enhanced.

2.3.2. Development a comprehensive management plan for coastal-marine resources and sustainable productive activities

8. Climate change is a very important issue for ocean and coastal managers. Climate change has a significant impact on coastal populations, economies, and natural resources. Climate change is affecting the marine and coastal environment and the people and species that inhabit with increasing temperature, changing species

distribution, changing ocean chemistry, rising sea levels, shifting weather patterns and spreading exotic species.

9. A comprehensive management plan will identify the need for strategic planning and integrated management in long-term conservation, development and productivity of coast and marine environments. Furthermore, existing management plans will be updated in order to take into account climate risks.

10. **Contribution to climate resilience:** the development and implementation of a management plan for coastal-marine resources and sustainable productive activities will integrate climate risks in order to identify good practices, which will lead to enhanced climate resilience.

2.3.3. Development and implementation of strategies for preserving and recovering mangroves

11. The capacity of mangroves (as well as sea grasses and salt marshes) to sequester carbon dioxide from the atmosphere is becoming increasingly recognized at an international level. Of all the biological carbon, also termed as 'green carbon', captured in the world, over half (55%) is captured by mangroves and other marine living organisms, which are also known more specifically as 'blue carbon'.

12. Based on available literature, relative sea-level rise may be the greatest threat to mangroves of all the climate change outcomes. Most mangrove sediment surface elevations are not keeping pace with sea-level rise.

13. Hence the development of strategies aiming at mangrove preservation and recovery is crucial to ensure climate resilience.

14. **Contribution to climate resilience:** Coastal planning can adapt to facilitate mangrove migration with sea-level rise. Additional adaptation options include:

- Management of activities within the catchment that affect long-term trends in the mangrove sediment elevation
- Better management of other stressors on mangroves
- Rehabilitation of degraded mangrove areas

15. The implementation of such adaptation measures has the potential to improve resilience to climate change and offset anticipated mangrove losses.

2.3.4. To promote refundable funds to coastal communities to adapt to climate change and/or invest in new infrastructure as contingency for the impact caused by climate change.

16. Where feasible, refundable funds are going to be built from existing environmental funds, to which the adaptation criterion is going to be integrated. Fundecooperacion has already developed credit mechanisms that can be adapted to meet the proposed programme's specific objectives. On a project basis, proponents will have to demonstrate their project's contribution to strengthen climate resilience, plus other existing criteria such as co-benefits, environmental impacts, etc.

17. See activity 1.2.2 for more details on the goal, how it would work, the proposed management scheme and the financing of such funds.

18. **Contribution to climate resilience:** The cost of implementing coastal protection measures (activities 2.3.1, 2.3.2 and 2.3.3) may be significant, especially for mangrove zones that have been the most exposed to climate adverse events in the past. Access to capital has been so far one of the most predominant barrier to innovation in climate change mitigation and especially adaptation measures, which are rarely associated with an increase in income on the short term. As a result, project developers face difficulties to absorb the capital investment required to launch new initiative and to implement restoration and protection measures. Hence, the implementation of the activities 2.3.1, 2.3.2 and 2.3.3 will partly depend on the access to capital and capacity to invest. In instances where access

to capital is identified as a barrier, the programme will support the developers in order to facilitate the access to existing refundable funds aiming at reinforcing climate resilience of mangrove zones. Since the access to such funds will allow financing climate resilience activities, therefore this activity will contribute to enhance climate resilience.

Component 3.

19. Outcome 3: Communities, producers, institutions, and stakeholders improve the resilience capacity for adapting to climate change through information dissemination, awareness building, training, and knowledge exchange mechanisms about the related socioeconomic and environmental risks and effective adaptation measures.

20. The aim is capacity building about the risks of climate change, in order to improve the readiness of stakeholders -in the different levels, for climate change threats (both gradual and extreme).

21. OUTPUT 3.1.: Community preparation improved by developing and consolidating early warning protocols and systems. In order to help communities control the changes in the local conditions that might indicate the presence of difficulties, but mainly to generate the correct response, the aim is to generate early warning systems according to the needs of each community. Some of the activities are the following:

3.1.1. Development and implementation of Early Warning Systems (SAT, for its name in Spanish), district risk reduction plans and PIEVC Engineering Protocol in priority sites according to their vulnerability

3.1.2. Preparation of communities in the development of Early Warning Systems, district plans including analysis of risk and PIEVC Engineering Protocol at local level by established community organizations.

22. OUTPUT 3.2.: Communities, producers, institutions, and stakeholders aware and informed about risks related to climate change and trained in regards to the corresponding adaptation measures. Some of the activities are the following:

3.2.1. Mapping and consultation, from the different stakeholders, to determine the level of knowledge and awareness about climate change.

3.2.2. Promotion and training regarding the creation of new rural economic activities due to the impact of climate change, including technical and financial considerations.

3.2.3. Programs of public information and awareness about the problem and measures to adapt to climate change according to the vulnerability area

3.2.4. Workshops among community organizations, professionals, technical groups, producers, and beneficiaries in order to exchange knowledge and experiences

3.2.5. Systematization of lessons learned and good practices

3.2.6. Dissemination of information through printed, audiovisual, and electronic means.

23. OUTPUT 3.3.: Strengthened Institutional capacities for the systematic monitoring of climate change, in order to prepare and inform stakeholders about the development of significant weather events and/or gradual changes. Some of the activities are the following:

3.3.1 Modernization and expansion of the different hydrometeorological networks of the country through automated technological equipment and instrumentation.

3.3.2 Development and adaptation of information systems of satellite imagery, integrated information system in disaster risk management, systems of updated digital geographic and cartographic information for analyzing threats and reducing the impact of hydrometeorological events.

3.3.3 Systematization of information about climate variability by territory of interest/farming, water or coastal priority.

24. Despite being different regarding the approach, components 1 and 2 mutually reinforce each other, specifically regarding the protection of life conditions and guaranteeing food safety, which results in the reduction of vulnerability of human population and the natural environment. At political level, both components are

part of the National Strategy on Climate Change (ENCC, for its name in Spanish). The programme has the possibility of generating a series of beneficial effects for the environment such as soil fertility and conservation, and water availability. These two components are complemented with the capacity development approach (Component 3), which intends to guarantee that the programme results are kept throughout time by creating local capacities and awareness interventions.

25. These measures aim at reducing sensitivity and variability to climate change. The programme has identified the vulnerability levels of the different areas of the country through a specific study carried out by the IMN –which is well known for its expertise regarding studies on vulnerability, adaptation, and mitigation at a national level. The long-term result of the programme is the protection of life conditions and natural resources for the benefit of those people living in the beneficiary communities and for the country in general.

Table 9: Synthesis of activities, including contribution to climate resilience and beneficiaries						
Objective	**Output**	**Activities**	**Contribution to resilience**	**Expected Co-benefits**	**Beneficiaries**	**Geographical Scope**
Component 1: Increasing the adaptation capacity to climate change in the agricultural sector	**1.1**	1.1.1 Implementation of new farming zoning scenarios in the selected communities according to vulnerability	Land-use planning will be based on the available vulnerability indicators The climate vulnerability diagnostic per zone will allow the zone modification or displacement of land-use activities, primarily in the most exposed farming zones.	Greater production efficiency (increase of yields and better water use) Strengthened current agricultural productivity Meet food production and food safety trends. Reduction of money losses for beneficiaries. Reduction of land, soil, and water degradation Reduction of the impact of agricultural activities on water and soil Improvement of wastewater quality in farming activities Reduction of pollutants on soils, aquifers, fauna, and others Valued added on products	Direct: Agricultural producers Indirect: local and national society (communities)	Central Region **Huetar Norte Region (Upala)**

		1.1.2 Identification of farming technical options that can be adapted or implemented in order to enhance the resilience to Climate Change (droughts, heat, intensive rain, plagues, and others) and validation of technical options by areas.	The identification of alternative technical options based on their potential to increase climate resilience will allow the subsequent implementation of such options, which will enhance climate resilience. Examples of validated climate resilient technical options include crop intensification, post harvest practices, water use efficiency, diversification of production, promotion of agroforestry, etc.			
		1.1.3 Implementation of validated technical options for climate resilience enhancement in agriculture	The effective and efficient implementation of the identified climate resilient options will enhance climate resilience.			
	1.2	1.2.1 Creation of an agricultural insurance and insurance policies programme including criteria on climate resilience.	Such insurance aims at strengthening the farmers' financial resilience in the event of crop losses for instance, which would in return ensure the sustainability of the measures identified in output 1.1 and that aims at building climate resilience. Furthermore, an insurance that includes criteria on climate resilience will be an economic incentive to producers to adapt to climate change and therefore has a sustainability effect beyond the programme.	Improvement of landscape Protection of biodiversity		
		1.2.2 To facilitate access to reimbursable funds to agricultural producers to implement sustainable management practices for lands, and implement strategies to adapt to climate change and/or invest in new rural economic activities as contingency for the impact caused by climate change.	The access to such funds will allow and accelerate the financing of climate resilience activities, which will contribute to enhance climate resilience.			
Component 2: Improving water	**2.1**	2.1.1. Creation of water safety pilot plans at the district and regional level to mitigate risks of	An engineering vulnerability assessment of the infrastructure	Establishment of a comprehensive water resource management	Local communities Public and private	10 Cantons:

resources management in order to increase resilience in coastal communities that are more vulnerable to climate change		water shortage or overage and to implement irrigation management plan, through the implementation of the PIEVC Engineering Protocol in vulnerable infrastructure assessment.	(mainly wastewater and water resources) will leads to the reinforcement of those infrastructures' resilience to climate variability.	Reinforcement of Capacities in GIRH and CC for: ASADAS, Municipalities, universities, others. Protection of biodiversity Leverage of financial resources to implement further adaption measures	organizations that invest resources in protecting water resources. SME (small and medium size enterprises)	Nicoya Hojancha Nandayure Osa Aguirre Puntarenas Matina Limon Siquirres Talamanca
		2.1.2. Development and implementation of Management Plans for selected watersheds.	A watershed management plan that integrates climate risks will contribute to enhancing climate resilience by taking into account the climate variables that are affecting or will affect the watersheds in the near future, which will allow the identification of appropriate adaptation responses.			
	2.2	2.2.1. Implementations of measures to protect aquifer recharge areas	Measures to protect aquifer recharge areas will contribute to enhance climate resilience by mitigating the negative effects of sea level rise.	Availability of water resources Reduction of wastewater Help with the rational use of water Economic benefit due to a reduction in water consumption Reduction of contamination in water and aquifers More availability of non-polluted water		
		2.2.2. Planning and design of infrastructure for water use and distribution aiming at the adaptation, modernization, and improvement in order to enhance climate resilience	Once adapted and modernized, infrastructures that are planned and designed considering the climate risks will be more resilient to adverse events that may affect the water quality and availability, such as sea level rise, shifting precipitation and temperature changes.			

		2.2.3.To promote refundable funds to Local water management associations, national water systems to implement sustainable management practices for water, and to implement strategies to adapt to climate change and/or invest in new infrastructure as contingency for the impact caused by climate change.	In instances where access to capital is identified as a barrier, the programme will support the developers in order to facilitate the access to existing refundable funds aiming at reinforcing climate resilience of water systems. Since the access to such funds will allow financing climate resilience activities, therefore this activity will contribute to enhance climate resilience.			
	2.3.	2.3.1. Design and implementation of coastal protection and restoration measures	The restoration and protection of coastal areas will preserve or re-establish the environmental services brought by natural coastal protection such as sand dunes, mangroves and seagrass beds. As a result, climate resilience in coastal areas will be enhanced.	More protection of water and coastal ecosystems Increase of resilience of ecosystems that protect superficial and underground water sources through the participation of communities in protecting critical ecosystems. Protection of biodiversity (mangroves		

				and coral reefs)		
		2.3.2. Development of an ecologic economic model of a comprehensive management plan for coastal-marine resources and sustainable productive activities at the Dulce and Nicoya Gulfs and Central-Pacific coastal districts.	The development and implementation of a management plan for coastal-marine resources and sustainable productive activities at the Dulce and Nicoya Gulfs and Central-Pacific coastal districts will integrate climate risks in order to identify good practices, which will lead to enhanced climate resilience.			
		2.3.3. Development and implementation of strategies for preserving and recovering mangroves	Coastal planning can adapt to facilitate mangrove migration with sea-level rise. Additional adaptation options include: * Management of activities within the catchment that affect long-term trends in the mangrove sediment			

			elevation * Better management of other stressors on mangroves * Rehabilitation of degraded mangrove areas The implementation of such adaptation measures has the potential to improve resilience to climate change and offset anticipated mangrove losses.			
		2.3.4. To promote refundable funds to coastal communities to adapt to climate change and/or invest in new infrastructure as contingency for the impact caused by climate change.	In instances where access to capital is identified as a barrier, the programme will support the developers in order to facilitate the access to existing refundable funds aiming at reinforcing climate resilience of mangrove zones. Since the access to such funds will allow financing climate resilience activities, therefore this activity will contribute to enhance climate resilience.			
Component 3: Capacity building about the risks of climate change, in order to improve the readiness of stakeholders	**3.1**	3.1.1. Development and implementation of Early Warning Systems (SAT, for its name in Spanish), district risk reduction plans and PIEVC Engineering Protocol in priority sites according to their vulnerability	Component 3 activities aim at improving climate resilience through information dissemination, awareness building, training, and knowledge exchange mechanisms. Component 3 activities consist in capacity building tools that are all crucial to the successful implementation of component 1 and component 2 activities, which contribute to enhance climate resilience.	Faster and more effective response to events Reduction of risks -due to the increase in the training of communities	All stakeholders (institutions, organizations and private companies) that are related to climate change. Communities in the study area	Will include geographical scopes of component 1 and component 2
		3.1.2.Preparation of communities in the development of Early Warning Systems, district risk reduction plans and PIEVC Engineering Protocol at local level by established community organizations.				
	3.2	3.2.1 Mapping and consultation, from the different stakeholders, to determine the level of knowledge and awareness about climate change.		Improved knowledge, a catalogue of good practices, innovative instruments, and lessons learned about adaptation. Rationalization of resources		
		3.2.2. Promotion and training regarding the creation of new rural economic activities due to the impact of climate change, including technical and financial considerations.				

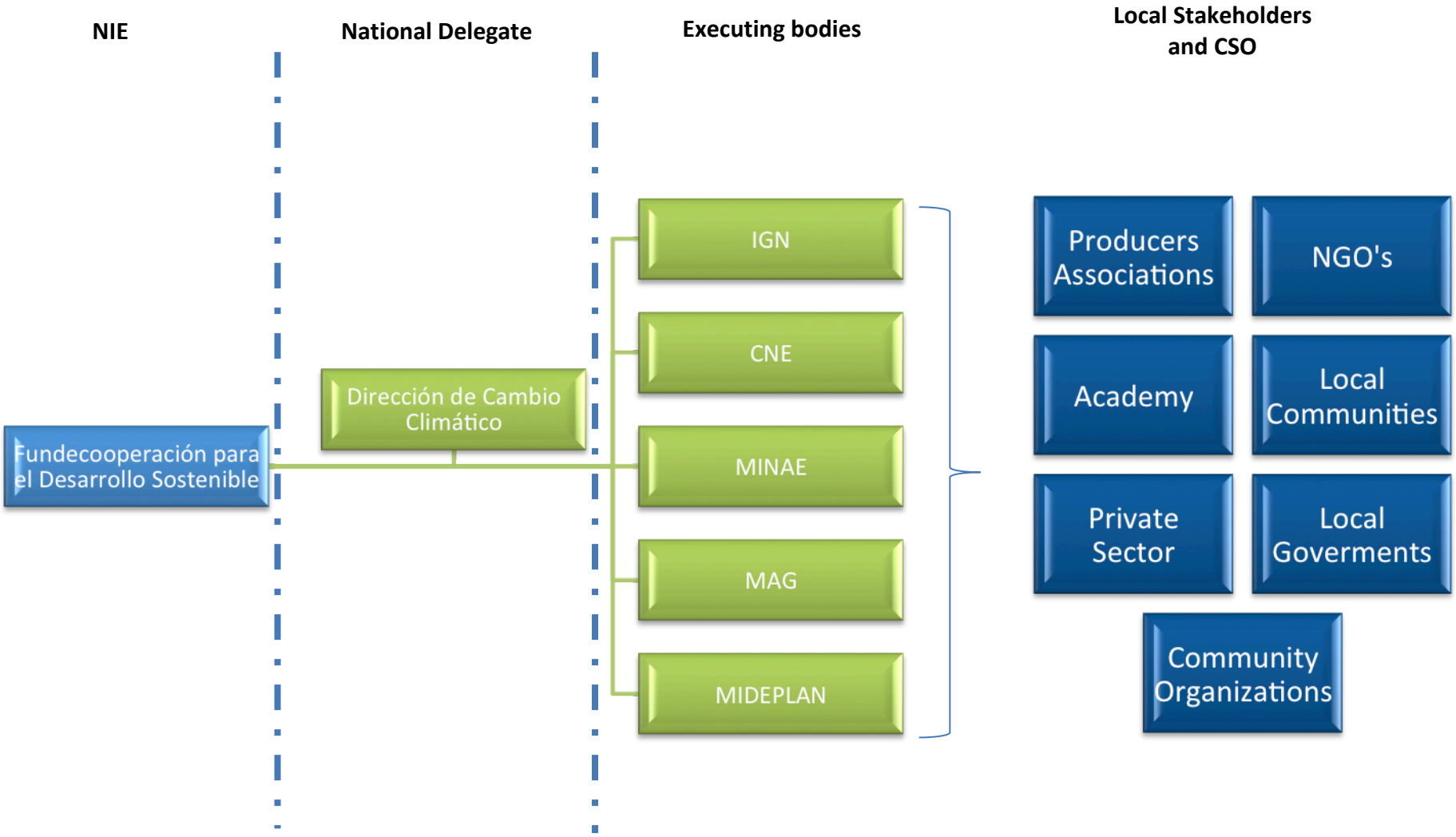
		3.2.3 Programs of public information and awareness about the problem and measures to adapt to climate change according to the vulnerability area				
		3.2.4 Workshops among community organizations, professionals, technical groups, producers, and beneficiaries in order to exchange knowledge and experiences				
		3.2.5 Systematization of lessons learned and good practices				
		3.2.6 Dissemination of information through printed, audiovisual, and electronic means.				
	3.3	3.3.1 Modernization and expansion of the different hydrometeorological networks of the country through automated technological equipment and instrumentation.		More knowledge about the impacts on climate and adaptation measures		
		3.3.2 Development and adaptation of information systems of satellite imagery, integrated information system in disaster risk management, systems of updated digital geographic and cartographic information for analyzing threats and reducing the impact of hydrometeorological events.				
		3.3.3 Creation of risk maps by using models for developing future climate scenarios.				
		3.3.4 Systematization of information about climate variability by territory of interest/farming, water or coastal priority.				

Programme Strategy

26. The application structure includes a direct link and coordination between the National Implementation Entity and the local entities that work directly with communities for executing direct adaptation initiatives. The programme, understood as a process, a plan or an approach for addressing climate change impacts which are broader than the scope of an individual project, through the implementation individual projects, will implement each of the components established in the proposal as individual's project due it implies different organizations and beneficiaries. The strategy is based on the fact that adaptation at community level is required, and it requires awareness, knowledge, and improvement of capacities; without forgetting about the need of the human being for having a stable service supply of ecosystems. Monitor and assess the efficiency of adaptation initiatives; assess what activities are efficient to help the communities adapt to climate change, and that increasing the resilience of the ecosystem is a priority to guarantee the success of the expected outcomes and to generate a greater impact on the communities.

27. The three components addressed communities at high risk of experiencing extreme climate changes, with low availability of water due to climate vulnerability and that are less capable of facing that climate variability. The approach in communities allows the programme to impact vulnerable households, specifically those led by women and people with high poverty levels. Thanks to the experience of Fundecooperacion, the program promotes full coordination and collaboration at all levels of stakeholders and sectors (academia, private sector, NGOs, government, civil society).

Figure 18: Organization Chart for Implementing the Strategy



B. Describe how the programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and groups within communities, including gender considerations.

28. The programme will provide significant economic, social and environmental benefits to communities selected previously (see component description). Costa Rica faces multiple hazards and shows a wide variety of vulnerabilities to climate change where communities and ecosystems will be negatively affected. “The greatest vulnerability occurs in the country’s border and coastal zones –with rural characteristics. Rural vulnerability is due to low human and infrastructure conditions related to poverty.” (MN/PNUD, 2011)

29. Vulnerable groups benefiting from this programme include:

- Rural communities: livelihoods are highly dependent on climate and particularly those communities that are considered more vulnerable. The main communities main actors are the municipalities, associations of local development, ASADAS, cooperatives and associations.
- Local farmers and fishermen’s:
    - Local farmers: the programme will help improving their production systems using a low cost/organic/nontraditional approaches that would contribute to increase their productivity, maintain income and be resilient to climate change.
    - Fishermen´s: adaptation activities would promote repopulation species to increase the resilience of reef systems and contribute to long - term sustainability of the activity in the areas selected.
- Women: specifically women-headed households that will benefit from improvements on water quality protection, implementation of sustainable and organic measures for agricultural sectors, and the support of local fisheries.

Beneficiaries:

30. Benefits distribution: Programme activities are expected to combine social, environmental and economic benefits to the local communities, responding to local priorities in order to deliver specific adaptive initiatives needed. Through the creation of capacities and knowledge management among beneficiaries it is expected that benefits extend beyond its immediate zone of application (replication among other communities with similar necessities). Consequently, it is expected to have impacts and benefits on selected communities however it is expected to impact broader geographic area.. The measure implemented will have immediate local impacts, at the same time secondary impacts: due natural resources are protected, impacts in terms of soil fertility, and farms protection extends much further. Similarly, an initiative as the rehabilitation of water infrastructure is expected to benefit not only the ASADAS directly but communities indirectly through quality services, and creation of protection of a limited resource.

31. The beneficiary regions and sub-regions (cantons) are detailed in **Table 9**: **Synthesis of activities, including contribution to climate resilience and beneficiaries.**

Strategy

1. **Build on existing capacity**

32. The main principle of the programme is to develop practical experience on the implementation of adaptive measures in the selected sectors to improve climate resilience. The programme concept (strategy of implementation, cost-effectiveness, identification and follow up of impact and results) is based on Fundecooperación accumulated experience on programme management. At the same time, lessons learned on necessities of communities and local organizations, relations, and efforts developed throughout the years (in general climate change impacts, water resources management, agriculture necessities, and coastlines efforts) guarantees not duplicating efforts and guarantees the effectiveness of actions to be performed.

33. It is important to mention that adaptation projects, that promote the execution of specific and concrete actions, haven't been implemented in Costa Rica. Many of the initiatives implemented at the time are rather focused on research about the impacts of climate change in the regions and determine the measures that should be implemented in each sector. Those investigations allow us today to select the sectors that are priority for the country and the communities that, as result of its vulnerability, need to implement adaptation measures as soon as possible.

2. Participative, Consultative, and Agreed Process.

34. In order to face the hazard faced by the country due to Climate Changes, the agricultural production systems, the use practices, and water management must be modified. This requires a planned adaptation, an approach based on the community that allows the adoption of decisions about their own development. The guiding principles of the programme will be equality, reciprocity and the participation of all interested social agents. Therefore, different sectors and levels of the society are involved. The programme promotes the full coordination and cooperation in all management levels and sectors (academia, private sector, NGOs, government, civil society) in order to guarantee that the socioeconomic and environmental benefits reaching the local level. In this way, the strengthening of the capacity in all levels will help reach the benefits at national, province, and local levels, and will allow sustainability (economic, social and environmental) beyond the financing period of the programme.

3. Monitoring and Follow-up.

35. The improvement of their living conditions, their perspectives, the strengthening of their organizations and adaptation capacities will prevail –focused on the immediate and strategic interests of those that are vulnerable, when identifying, suggesting, and monitoring initiatives and activities, in a participative and bottom-top approach. Investments will focus on adaptation as well as on the improvement of the response

capacity to existing risks, thus providing better access to technologies and technical assistance that allow resilience to CC.

- The investment in adaptation mechanisms, education, systematization, feedback with the interested parties, and two-way responsibility (beneficiaries / parties as facilitators of inputs) will be essential for the programme's sustainability. Supervision activities will be based on best practices, technologies and experiences accumulated in each component and widely available in Web sites of several "excellent" research institutions and "think tanks" (guidelines, training materials, documents about policies, research reports, statistics, etc.) performed during the creation process of the proposal.

Environmental, Social, and Environmental Impacts.

- The specific social benefits of the programme are the following:
  - ✓ Increase of capacities and adaptation capacity in all the components of the programme,
  - ✓ Reduce the social dynamics of rural migration to urban areas,
  - ✓ Active community participation,
  - ✓ Increase of competence among social groups,
  - ✓ Social cohesion,
  - ✓ Increase of income of vulnerable families,
  - ✓ Improvement of food and nutritional safety of rural communities.
  - ✓ Efficient management of water resources for the benefit of the community.
  - ✓ Decrease in the occurrence of diseases related to Climate Change, and
  - ✓ Food availability.
- Economic Benefits:
  - ✓ Reduction of production losses due to the negative effects of the climate variability;
  - ✓ Increase of productivity and quality of local production;
  - ✓ Increase of the capacity to face climate variability,
- Environmental Benefits:

- ✓ Soil preservation
- ✓ Reduction of erosion and sedimentation.
- ✓ More availability of water for production and consumption
- ✓ Improvement of access to water supplies and their corresponding management.
- ✓ Protection of ecosystems in coastal areas (including coral reefs and beaches).
- ✓ Development of adaptation plans in coastlines for the protection and preservation of natural and physical assets in the area.
- ✓ Adopt good practices that will be kept through continuous work with community groups and with public and private entities as well.

36. Regarding gender, it is important to emphasize that gender equity is a cross-cutting theme in each component included in the programme. Both, men and women will be benefited from interventions in communities.

Sustainability

37. Initiatives part of this programme promotes impacts that will continue to provide results beyond the years of implementation. As an example, the restoration and improvement of water systems have long-term lifespan. Although, many initiatives requires regular maintenance after the implementation, as it is mentioned in "Figure 18: Organization Chart for Implementing the Strategy" the participation of local organizations, government, NGO´s and specially the commitment of local beneficiaries (individuals and organizations) make possible to preserve and even improve the initiatives.

38. The activities proposed are supported by training and capacity building of local communities beneficiaries, associations, organizations and governmental institutions in each of the areas selected towards the enforcement of the activities by combining long term incentives-benefits and economic-social outcomes. However, it is necessary to take into account that all adaptation needs in the communities cannot be addressed with the programme, for this reason the component 3 is oriented to create momentum and upscalability through the creation of capacities and knowledge management. Capacity building, promotion of best

practices and exchange of lessons learned will make possible to replicate and upscale the initiatives, at the same time that increases Costa Rica‘s capacity to manage climate change adaptation issues.

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

39. The programme interventions (the 3 components) imply investments on infrastructure for the rehabilitation of key recharge zones, water management systems, and coastal wetland protection and restoration coastal and shoreline productive activities, zoning (to reduce risk and to optimize land use) and implementation of integrated farming systems. This kind of investment is expected to generate long-term benefits in terms of resilience.

40. Complementarily, interventions related with knowledge management and creation of capacities are comprised of technology transfer among beneficiaries, technicians, private-public organizations that search for modifications of traditional resource uses, methods and management practices to new technologies or methods (some of those technologies cost-effective) that increase the resilience of farmers, water administrative organizations and fishermen's.

41. As an important knowledge management approach, knowledge exchange mechanisms are promoted among communities and organizations as well as capacity building that will ensure adaptation needs on local planning processes and better decision-making and actions by involving local people on topics such climate change, resilience and adaptation on agriculture, water and coastal areas management. At the same time, the exchange of knowledge will lower the operational costs due the opportunity of replicating best practices and lessons learned among communities.

42. The implementation of this programme is highly significant because it discusses a series of key issues for Costa Rica:

- ✓ The beneficiaries of the programme are amongst the most vulnerable population of the country, communities with low human development indicators, dependent on natural resources stress. It's expected through the programme to add appropriate considerations of climate change and variability into strategic planning and daily practices among beneficiaries.

- ✓ The participatory approach and processes (a multistakeholder participation) both at the time of design and implementation of the programme will allow to improve capabilities of governmental organizations, civil society organizations, producers associations and NGO's

43. During the implementation of the programme, it is expected to have counterparts that allow reaching a greater impact. Based on the aforementioned, the cost-effectiveness of the proposal is based on recognizing the importance of the problem addressed through the programme where, due to the absence of the programme, the scenario will face the continuous deterioration of the integrity of the Costa Rican ecosystem and vulnerable life systems. Therefore, the programme will emphasize on the effectiveness of the outcomes and impacts to be achieved with each component and, at the same time, on the profitability of all activities of the programme.

44. The resources of the adaptation fund will not be the only income for the programme, but they can help mobilize other resources:

    - Complementation of investments and leverage by the creation of synergies: It is expected that the direct beneficiaries and main participants of the programme have assets or partial resources available for executing the programme. First, the human resource that takes into account the human capital, accumulated skills and capacities and, probably, at large scale, workforce. Second, by providing their own assets or control assets: land, natural resources, facilities, and other physical assets, and also their capital stock resources (family relationships, community organizations, associations, etc.) As it is mentioned above, it is expected an active participation of local institutions and beneficiaries, relying on the execution of local knowledge and expertise, which reduces the cost of implementation and enhances sustainability of outputs.
    - Moreover, executing organizations will also provide their knowledge, networks, skills, facilities, etc. for implementing the initiatives. To do this, Costa Rican experienced professionals, technicians and researchers will be hired, which is more profitable than hiring expensive consultants from other countries (unless exceptions that knowledge

shall not be locally available), and promote the strengthening of local capacity of people and organizations that stay in the country.

- It is a priority to promote commitments and co-responsibilities for developing adaptation activities:

  First, in its role as platforms for expanding alliances for sustainable development, promote the interest and local associations among the different interested parties (governmental institutions, civil society, private sector, academic institutions).

  Second, in the mobilization of national financial, human and physical resources (for example, promote the co-responsibility and co-financing in executing the activities, or the allocation of personnel, equipment, facilities, transportation, among others).

  Third, the adoption of high quality standards measures, the investment in the transparent and agile monitoring and accountability mechanisms, the promotion of values and practices related to actual participation, transparency, cooperation, respect to different identities, etc. since they provide credibility and the good operation of the execution of the programme.

  The institutional reinforcement and the component of creation of local capacity will have a cost-benefit relation since it will help minimize damages and losses related to extreme weather events through greater awareness and knowledge while the ordinary expenses to finance the impact of CC post investment will be reduced.

45. Operationally, the resources of the Adaptation Fund will be carefully managed to reach the efficiency and the quality-price relation. The measures include:

- assure that procurement procedures are appropriately implemented
- assess costs-quality (value for money) and implementation of cost benefit analysis
- effectively use of limited resources and operational costs
- Products and services acquired will be governed by rules established by the AFB.

Component 1 (Amount: US $3.160.000). The component aims to:

46. Improved land management and interventions including zoning (to reduce risk and to optimize land use) and introduction of climate resilient crop, livestock adaptive technologies and integrated farming systems.

Component 2 (Amount: US $3.200.000)

47. Supports the protection of recharge zones, surface waters and groundwater, it strengthens coastal communities that are vulnerable to climate change and promotes technologies that allow the efficient and effective use of water resources (including measures that allow the effective management of water supply and demand) and improvement of infrastructure to be resilient to hydro-meteorological events.

Component 3 (Amount: US $2.000.000)

48. The first two components are complemented with the approach for developing capacities (Component 3), which is intended to guarantee that the programme outputs are kept through longer time by creating local capacities and awareness interventions. It must be taken into account that these are not independent activities, and they are complemented with other initiatives that have been already started in the country. This component will upscale the interventions within and around the target area that depend on natural resources and are most vulnerable to the impact of climate change.

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

Background Information about International Commitments.

49. The agenda on climate change is positioned at the highest level of national and international commitment. Costa Rica, by Law 8219, ratified the Kyoto Protocol from the United Nations Framework Convention on Climate Change, which recommends the application of a series of actions such as:

- ✓ Formulate national programmes to improve the quality of emission factors, activity data and/or local models that are effective regarding the cost and that reflect the socioeconomic conditions of each Party for the periodic creation and update of national inventories of anthropogenic emissions by sources and of absorption by drains of all the Green House Gases (GHG) that are not controlled by the Montreal Protocol.
- ✓ Periodically formulate, apply, publish, update national programmes (National Communications) that contain actions to mitigate climate change and ***facilitate an*** *adequate* ***adaptation*** to it. These programmes will keep a relationship, among other things, with energy, transportation, and industry sectors as well as with agriculture, forestry and waste management.
- ✓ Help promote and share technologies, specialized knowledge, ecologically rational practices and processes regarding climate change.

50. Based on article 4 from Law number 7414 that deals with the Convention, Costa Rica make the following commitments:

- ✓ Periodically create and update national inventories of anthropogenic emissions by sources and of absorption by drains of the Green House Gases (GHG) that are not accounted under the Montreal Protocol.
- ✓ Periodically formulate, apply, publish, and update national programmes aimed at mitigating climate change.

- ✓ Promote the sustainable management of drains and deposits of the Green House Gases (GHG) that are not controlled by the Montreal Protocol.
- ✓ ***Develop and create appropriate and integrated plans for the regulation of coastal areas, water resources and agriculture.***
- ✓ ***Include the considerations related to climate change in the corresponding social, economic, and environmental policies.***
- ✓ Promote and support the scientific, technologic, technical, socioeconomic and other types of research.
- ✓ Promote and support education, training, and awareness of the public regarding climate change, and promote the participation in this process, including non-governmental organizations.

National Agenda on Climate Change

51. Based on the aforementioned guidelines of national policy, Costa Rica intends to assume a leadership role regarding climate change and become a neutral carbon country by 2021, so that its model can be replicated internationally, and influence the world climate agenda. To do this, the country formulated and adopted the *Estrategia Nacional de Cambio Climático* (National Strategy on Climate Change), which purpose is:

Reduce the social, environmental and economic impacts of CC and take advantage of opportunities by promoting the sustainable development through the economic growth, social progress, and environmental protection through mitigation initiatives and adaptation actions for Costa Rica to improve the quality of life of its inhabitants and its ecosystems, by leading towards a low-carbon and competitive economy by 2021. This shared responsibility must occur by developing capacities and legitimacy to influence the National Agenda and the International Agenda as well

52. The *Estrategia Nacional de Cambio Climático* (ENCC) is a governmental initiative that aims at responding to the world problem of climate change in the country, with a strong participation of the different participants and sectors. To do this, the strategy includes the following strategic work themes within the national and international framework:
    - ✓ Mitigation of greenhouse effect gases
    - ✓ **Adaptation to climate change to reduce the vulnerability of the main sectors and regions of the country**
    - ✓ Accurate, reliable, and measurable metrics (MRV)
    - ✓ Development of capacities and transparency of technology
    - ✓ Financing
    - ✓ Public awareness, creation of culture and change of consumption habits.

53. The ENCC allowed to develop an International and national Agenda on Climate Change. The National Agenda is intended for Adaptation and Mitigation measures along with four important themes: Metrics, Capacity building and technology transfer, public awareness, education and cultural change and Financing. Adaptation must focus, on reducing vulnerability and risk to the impacts of climate change according to the sector: water, agriculture, fisheries, health, infrastructure, coastal zones and biodiversity.

54. The programme is identified within the framework of an active policy to climate change that recently formulated and adopted a ***Plan de Acción para la Estrategia Nacional de Cambio Climático*** (Action Plan for the National Strategy on Climate Change)**.** The plan was formulated with participative approaches and reached the consensus and support of all sectors. Therefore, the programme is well aligned with the priorities defined and the actual needs of the most vulnerable communities of the country, and it will support the government's policy to manage the adaptation of ecosystems and the needs of the community regarding climate change in 3 main areas for the country: water resource, coastlines, and agriculture.

55. The political – institutional framework is given by a set of national laws from the Constitution, a National Development Plan, and country's environmental laws, a National Strategy of Climate Change, a Carbon Neutral Country Program and specific sector frameworks:

- State Policy for Climate Change in the Agriculture and Food-
- Strategy and National Plan of Integrated Water Resources and Coastlines Management.

E. Describe how the programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc.

56. Among the aspects taken into account during the creation of the programme have been the regulatory frameworks where the activities of the agricultural sector are developed. First, Law 7779 regarding the Use, Management, and Preservation of Soils should be undertaken. It establishes the correct and sustainable use of soil since 1998. Law 7779 has different main purposes. One of them is promoting the correct management of soils along with other natural resources, by which it takes into account the richness of the resources and the importance of its preservation. It also suggests facilitating mechanisms for integrated actions of related institutions in order to promote the inter-institutional planning to promote the usage capacity and productive potential. One of its approaches is promoting the involvement of citizens of communities in the decision-making process related to the management and preservation of soils; this purpose approached the development principles adopted by Costa Rica based on the Agenda 21 on the grounds of sustainable development. Finally, it aims at promoting improved practices to avoid soil erosion and deterioration, and promote agroecology –this as strategies of preservation and sustainable use. This Law promotes the increase of soil productivity, as well as the increase of the vegetable cover of the land in order to optimally enhance the use of soil. It also suggests a definition of areas according to its quality regarding number and characteristics.

57. Now, regarding Law 8591 for the Development and Promotion of Organic Agriculture Activity, it is important to emphasize its function to promote the agricultural activity in order to benefit human, animal, and vegetable health. It is a complement for the development of public policies regarding the use of soil, water resource and biodiversity. The priority of micro, small and medium-sized producers and the needs of their families are emphasized, as well as the promotion of gender equity, the respect to cultural diversity and the correct distribution of wealth. Moreover, it promotes the research related to the organic agricultural activity as a mechanism to control the certification processes and ensure the application of optimal sustainable productive methods. The Law on the Development and Promotion of Organic Agricultural Activity makes available the methods

to strengthen the quality and number of producers that market their products with the name of "national organic product", as well as the quality and number of producers with harvest insurance for the organic agricultural production, due to possible catastrophes resulting from climate change. A specific paragraph in this Law allows showing the importance of promoting loans or other products offered for micro, small and medium-sized enterprises.

58. In a similar way, it is important to highlight the *Reglamento de Agricultura Orgánica* (Regulations on Organic Agriculture) Decree number 29782-MAG, which covers the principles by which the organic agriculture is developed in Costa Rica. Its purpose is to establish the guidelines to regulate the production, creation and marketing of organic agricultural products and regulate their production and certification processes. The Regulations establish the definition of terms of usability when referring to a productive process of organic agriculture, and it defines the minimum control requirements and precautionary measures for this production.

59. Regarding the regulatory framework of the water resource sector, there is a wide variety of ratified international conventions that cover this resource –either as cooperation agreements, patrimonial agreements or others. However, there are three key regulations regarding water. First, it is important to highlight the 1942 Water Law. This law is considered as the regulations of the water resource ordinance in Costa Rica. It covers the differentiation of public and private domain of the resource by which it intends to define the jurisdiction to be taken into account. It also emphasizes the use of water and the supply of drinking water. The Water Law establishes the special rules for easement, the creation of users associations, the establishment of taxes, criminal measures, and institutional management, among others.

60. As part of the legal framework of the Costa Rican water resource, the General Law on Drinking Water is proclaimed. It consists on a regulation to declare the public utility for the planning, projection and execution of drinking water supply works. Among the most important aspects of this Law, it establishes the institution that is in charge of ensuring the

different distribution means of drinking water, as well as determining what institution is in charge of establishing the consumption fees. In regards to water resources, the Draft Law with File number 14585 named Law on Water Resources is submitted in 2002. This draft aims at regulating the public domain of water resources, structuring the institutional framework for their protection and proclaiming their right to be used. The promotion of the Human Right to have access to water –in quality and quantity, is highlighted since it is essential to fulfill the basic needs of the human being.

61. Costa Rica is part of original initiatives from the International Standardization Organization (ISO); being a member of different technical committees –either as participant or as observer, targets the processes made in the country for the compliance with the international standardization.

62. In direct relation to the agricultural and water resource sectors, Costa Rica is member of four committees related to these topics. It is an observer in the technical committee of Foods and Energy Management, and it is a participant in the technical committees of Coffee and Environmental Management. Each of them issues regulations that their members must comply in order to establish an international standard in products or means that will be involved in order to reduce trade barriers and international relations.

63. It is important to mention that, regarding the committees mentioned above, those where Costa Rica is a participant (Coffee and Environmental Management), they are part of two areas of special interest for the country. Although the standardization of practices in these fields represent significant business and diplomatic opportunities, its due compliance deserves particular attention –as stated above. However, due to the effects of climate change and the variations with negative environmental incidence, there can be difficulties for the correct operation of the practices established.

64. Building codes and other construction, labor codes as well as the relevant sectorial laws and regulations that include adaptation measures from the inception of the infrastructure programmes will also be undertaken.

65. Although, the programme is not pretending to deliver regulatory outputs, it is however considered possible that the impact and results obtained at local level could be a driving force to influence the existing legislation in relation to climate change adaptation. It is worth mentioning, that “Dirección de Cambio Climático” (DNA) and Fundecooperación are aiming that this proposed program would become a reference for concrete and important local actions on adaptation to Climate Change, as well as on national and local strategic planning processes. As a result of that, there will be an opportunity to scale-up in more communities that the ones selected for the proposal; this will definitely impact at local, regional and national level. This is planned to be facilitated through component 3.

66. The compliance with relevant national standards is included as an eligibility criterion in the Screening Methodology (see Annex I). Hence, each proposed project will have to demonstrate compliance in order to be considered by the programme.

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

67. Costa Rica has different initiatives regarding climate change, a series of ongoing climate change initiatives do not deal with the adaptation needs based on the community and they do not deal with the effects of climate changes in regards to water-coastal resources and agriculture.

68. The programme design made a preliminary analysis of ongoing initiatives; in order to determine best practices, avoid possible areas of duplication and search for possible alliances among the programme and other initiatives and projects. It is important to clarify that, at this time, on the climate change adaptation matter, the country made concrete investments on researches to determine the vulnerability of the country in the areas mentioned (agriculture, water resource and coastlines and fisheries) and possible adaptative measures, but no other project has implemented, to the level required by this proposal, adaptation options in an integrated manner in local communities benefit. A list of ongoing related projects on topics of Climate Change can be found in the table 10.

69. The programme supports the government's priorities by implementing joint activities with the most vulnerable populations by teaching topics on climate change and the development of activities at a community level. The designated authority –the Climate Change Direction, is the entity in charge of leading the efforts of the country in regards to Climate Change. In this way, the country guarantees the no duplication of efforts with other projects financed by bilateral or multi-lateral entities. Moreover, during its formulation, the programme planned to complement the actions with other initiatives that are being implemented at a territorial level. To do this, a consultation process was made to interested parties such as organizations, public or private institutions that are implementing projects regarding climate change (mitigation and adaptation), in order to avoid duplicating efforts, resources, or geographical coverage, and guarantee the synergy or complementarily among initiatives. Activities regarding water preservation and agricultural development have been executed in

the country but without a specific approach on the adaptation to climate change. The suggested programme intends to use experiences to start concrete adaptation actions to scale up.

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

70. The knowledge management aspect is intrinsic on all the proposal activities and initiatives, however due to its importance on the impact and sustainability of the program it was enhanced as an independent component which responses to the third objective of the program: "Improving the capacity of communities, producers, institutions, and stakeholders for the adaptation to Climate Change". The component of knowledge management (component 3) is a priority for the country to be able to ensure sustainability of the program, to replicate initiatives regarding adaptation to climate change and thus generate even wider impact at the local level. Due to this significance, the development of knowledge management is established as one of the priority components in the programme. This component promotes strengthening of capacities through dissemination, awareness building, training, and knowledge exchange mechanisms for initiatives supported by the programme. Moreover, the generation of information will be used to raise awareness in the communities.

71. Under components 1 and 2, the beneficiaries involved will develop their own capacities to apply adaptation strategies, by integrating scientific knowledge, information about weather, and local practices. The programme will promote the exchange, and the generation of learning activities; will be executed by the exchange visits, accompaniment, training and workshops. At the same time, exchange visits, workshops and training courses will generate reports including the lessons learned.

72. Through the generation of capacities at the local level the programme guarantees that beneficiaries will be able to continue with the adaptive initiatives once the financing is completed. The programme focuses on the transfer of knowledge and techniques. In the resulting empowerment process, the beneficiaries may make decisions about the interpretation of data and their own knowledge.

73. The programme will include the information means and documentation of:
    - Good adaptation practices to reduce vulnerability and increase resilience
    - Methods and techniques for protecting water resources
    - General updated information and documentation of the programme.
74. Documented information from the programme will be shared through workshops, reports and mass media (Web pages, social networks, videos, and news) at national and international level. Local activities will serve as “knowledge generation areas” and will provide opportunities to learn by doing.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations.

75. Fundecooperación, along with the *Dirección de Cambio Climático* (Climate Change Direction – the DNA- Designated National Authority in the country) have worked in close coordination for formulating this programme. Besides, it has been a priority to identify the needs of the country regarding the three topics selected for the proposal (water resource, coastlines and agriculture).

76. Therefore, it was required to make different informative workshops on adaptation at a country level (including the topic of the Adaptation Fund as an item in the agenda) and consultation meetings with different local organizations that work on these topics.

77. The main intention of the implementation of those consultative workshops, during 2012 and 2013, was to identify possible projects that could support the activities proposed on this concept.

78. Consultations, workshops and investigations on climate vulnerability and adaptation have been made by the Dirección de Cambio Climático at community level since the development National Strategy on Climate Change.

Table 10 Initiatives on Climate Change

THEMES	Activities-Efforts
Adaptation	• National risk management plan -*Comité Nacional de Emergencias* (National Emergency Committee) • Adaptation to climate change and ecosystem services in Latin America (Adaptación al cambio climático y servicios ecosistémicos en América Latina) • Ecosystem-based adaptation to climate change: what role for policy-makers, society and scientists. Mitigation and Adaptation Strategies Global Change. (study) • Adaptation strategies of small farmers to climate change (study) • Adapting agriculture to climate change (study)

Awareness and Education	• Training for trainers on Adaptation to Climate Change. Support from IICA-GIZ. • Micro-programmes on Climate Change • *Voces nuestras*: (www.vocesnuestras.org/) A RADIO SERIES about adaptation to climate change. • Cycle of Talks • *Bandera Azul*. • Manos a la costa • Options of market linkages and technological innovation in areas coffee agroforestry systems in Colombia, Costa Rica and Nicaragua. • Study of perception and attitudes of the Costa Rican population on climate change
Metrics	• Programme of Municipalities C-Neutral and Resilient • BIOMARC: Study on Vulnerability in Coastal Areas • IMN: Studies on Adaptation and Vulnerability • Costa Rica: effects of climate change on agriculture • Pilot implementation in Costa Rica of the Engineering Vulnerability Assessment Protocol (conducted by Engeneers Canada, together with the Costa Rican Engineers Professional Association, Colegio Federado de Ingenieros y Arquitectos, CFIA)
Development of Capacities and Technologies	• C-Neutral and Adapted Enterprises • Study on Technological Needs • Project MAG-INTA-Fundecooperación-ACICAFOC, named "Development of local capacity on environmentally friendly and low carbon agriculture technologies"

Source: Own Creation.

79. During the development of this concept proposal, stakeholders were consulted and consensus was developed with regard to specific needs on adaptation actions for each of the sectors selected. Through these activities, it was possible to have conversations about topics such as needs at the level of communities, most vulnerable areas, current actions regarding these topics and general information about the country's threat and vulnerability, as well as discuss and identify the significant climate threats. Among the participating organizations, we find the following:

Table 11: Participating Organizations for Climate Change

Water Resource Component	*Agriculture Component*	*Coastal Zones Component*
Organizations	**Organizations**	**Organizations**
Universidad de Costa Rica (UCR)	Agencia Española de Cooperación Internacional para el Desarrollo (AECID)	Fundación para la Paz y la Democracia (FUNPADEM)
Dirección de Cambio Climático	Universidad de Costa Rica - Instituto de Investigaciones Agrícolas (IIA)	Universidad Técnica Nacional (UTN)
Dirección de Aguas Ministerio de Ambiente, Energía y Mares (MINAE)	Corporación Educativa para el Desarrollo Costarricense (CEDECO)	Cooperación Alemana (GIZ)
Asociación Administradora de Sistemas de Agua Potable y Saneamiento San Juan (ASADA) and other ASADAS	Centro Nacional de Ciencia y Tecnología (CITA) – Universidad de Costa Rica	Biodiversidad Marino Costera en Costa Rica (BIOMARCC)
Fundación Bandera Ecológica	Instituto Interamericano de Cooperación para la Agricultura (IICA)	Conservación Internacional
Unión Internacional para la Conservación de la Naturaleza (UICN)	Asociación Coordinadora Indígena y Campesina de Agro forestaría Comunitaria Centroamericana (ACICAFOC)	Cooperativa Autogestionaria de Servicios Profesionales para la Solidaridad Social (COOPE SOLIDAR, RL)
Instituto Meteorológico Nacional(IMN)	Centro Internacional de Política Económica para el Desarrollo Sostenible (CINPE) -	Unión Internacional para la Conservación de la Naturaleza (UICN) -
Acueductos y Alcantarillados Sistemas Comunales (A Y A)	Instituto de Innovación y Transferencia de Tecnología Agropecuaria (INTA)	Viceministerio De Aguas y Mares

Engineers Professional Association (Colegio Federado de Ingenieros y Arquitectos, CFIA)	Ministerio de Agricultura y Ganadería (MAG)	MAR VIVA
Unión de Acueductos Comunales (UNAGUAS)	Centro Agronómico Tropical de Investigación y Enseñanza (CATIE)	Universidad Técnica Nacional (UTN) Sede Pacifico
Servicio Nacional de Aguas Subterráneas Riego y Avenamiento (SENARA)	Instituto de Innovación y Transferencia de Tecnología Agropecuaria (INTA) -	Parque Marino Pacifico
Agencia Española de Cooperación Internacional para el Desarrollo (AECID) -CRICA		Programa de información científica y tecnológica para prevenir y mitigar desastres (PREVENTEC)-
Universidad de Costa Rica (UCR)/ SEDE PACIFICO/		Vicerrectoría Investigación de Universidad de Costa Rica (UCR)
Comisión para el Fortalecimiento del Sector de Acueductos Comunales(COFORSA)		Instituto Costarricense de Pesca y Acuicultura, INCOPESCA

Source: Own Creation.

80. Contacts and consultations with programme partners have been maintained throughout the project design in order to feed into technical design and to refine outputs and activities. As an example, stakeholders involved in the consultation process were given drafts of the programme concept proposal, so that comments suggestions of improvement were collected and addressed in the final draft. It is also important to mention that, during 2012 and 2013 several consultations with multi-sectorial representatives have been taken in place in order to identify and prioritize the adaptation needs to Climate Change and to strengthen the planning process with technical and scientific information. This also includes the participation of local associations and actors that know the reality and understand the vulnerability of local communities and related risk to climate change.
81. For development of the full proposal, it is expected to hold additional stakeholder consultation processes (planned for the end part of 2013).

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

82. According to a study from CEPAL named "La Economía del Cambio Climático en Centroamérica" ("The Economy of Climate Change in Central America) it indicates that:

"Climate change is a serious threat for Central American societies due to its multiple impacts anticipated on the population and productive sectors. In fiscal terms, it constitutes a contingent public liability that will affect the public finances for several generations. The economic impacts on the Central American economies are truly significant –despite the uncertainties due to the interaction among the economic variables, weather conditions, and social, political, and cultural aspects[17] (…). The adaptation challenge for Central America is of very high concern because it demands redoubling efforts to reduce poverty, inequality and socioeconomic and environmental vulnerability, and increase resilience and the adaptation capacity of societies, specific populations, and related ecosystems."

Table 12 Central America: Initial Estimation of the Accumulated Costs of the Impact of Climate Change in the Agricultural Sector by 2100 (in percentage of the GDP for 2008 at current net value)

Año	Tasa de descuento			
	0,50%	2,0%	4,0%	8,0%
2020	1,28	1,20	1,11	0,97
2030	2,48	2,11	1,75	1,22
2050	3,70	2,86	2,14	1,41
2070	5,18	3,53	2,39	1,45
2100	11,13	5,40	2,80	1,47

Source: CEPAL

Table 13 Central America: Initial Estimation of the Accumulated Costs of the Impact of Climate Change in the Farming Sector by 2100 (in percentage of the GDP for 2008 at current net value)

Año	Tasa de descuento			
	0,50%	2,0%	4,0%	8,0%
2020	1,84	1,72	1,59	1,38
2030	3,45	2,94	2,44	1,81
2050	5,36	4,12	3,07	2,00
2070	8,50	5,55	3,58	2,07
2100	18,53	8,70	4,29	2,11

Source: CEPAL

[17] Discount rate: the discount rate reflects the percentage by which a unit of present benefits is more valuable than the unit itself in a subsequent period. In a sense, it weighs the importance we assigned to the future.

Table 14 Central America: Initial Estimation of the Accumulated Costs of the Impact of Climate Change in the Farming Sector by 2100 (in percentage of the GDP for 2008 at current net value)

Tasa de descuento	2020	2030	2050	2070	2100
			Belice		
0,5 %	1,09	1,90	4,22	6,89	12,12
2 %	0,96	1,58	2,99	4,19	5,82
4 %	0,83	1,26	2,00	2,43	2,79
Tasas de descuento			Costa Rica		
0,5 %	0,15	0,27	0,60	1,00	6,31
2 %	0,13	0,22	0,42	0,60	2,15
4 %	0,11	0,18	0,28	0,34	0,66
Tasas de descuento			El Salvador		
0,5 %	0,35	0,74	2,76	5,89	16,22
2 %	0,31	0,60	1,79	3,19	6,37
4 %	0,26	0,46	1,06	1,56	2,25
Tasas de descuento			Guatemala		
0,5 %	0,59	1,06	2,46	4,11	12,95
2 %	0,52	0,88	1,72	2,47	5,12
4 %	0,45	0,69	1,14	1,40	1,96
Tasas de descuento			Honduras		
0,5 %	0,78	1,39	3,09	5,05	9,14
2 %	0,69	1,15	2,18	3,07	4,33
4 %	0,59	0,91	1,45	1,77	2,05
Tasas de descuento			Nicaragua		
0,5 %	1,17	2,14	4,37	6,59	14,28
2 %	1,03	1,77	3,12	4,13	6,46
4 %	0,88	1,40	2,10	2,47	2,97
Tasas de descuento			Panamá		
0,5 %	0,23	0,46	1,10	2,02	3,90
2 %	0,21	0,38	0,76	1,18	1,77
4 %	0,18	0,30	0,50	0,65	0,78
Tasas de descuento			Centroamérica		
0,5 %	0,43	0,81	1,99	3,52	9,80
2 %	0,38	0,67	1,39	2,09	4,02
4 %	0,33	0,54	0,92	1,17	1,59

Note: The cost covers the cost of new sources, deficit or use cost (demand) and cost for ecological loss, all with climate change, minus deficit or use cost (demand) and cost for ecological loss –these latter without climate change.
Source: CEPAL

The programme includes the financing of a wide variety of initiatives:

Component 1: Agricultural Sector	**Objective:** 1. Increasing the adaptation capacity to climate change in the agricultural sector.

Baseline – without the resources from the Adaptation Fund

83. As established by the *Plan de Acción Estrategia Nacional de Cambio Climático* (Action Plan of the National Strategy on Climate Change), *"the sector is highly affected by climate change, mainly due to alterations in the distribution of temperature and rainfall. According to the climate scenarios of the country and the region, an increase in the mean values and the variability of temperature is expected. The rainfall pattern is expected to have a larger number of extreme values (drought periods and excessive rainfall). In the case of Costa Rica, although all regions will be affected, the most affected regions are the Atlantic Region (rainfall) and the North Pacific Region (heat and droughts) (MINAET, IMN 2011). Therefore, it is expected that main crops in these regions are consequently impacted. In general, models predict reductions in productivity and production and, in some cases, the emergence of opportunities. According to the study by MAG and MIDEPLAN about the Economic Impact of Extreme Phenomena in Costa Rica (Impacto Económico de Fenómenos Extremos en Costa Rica) for the 1988- 2009 period, there are losses for the agricultural sector which reach up to US$396.9 millions."* Up to now, some efforts have been made to address adaptation to climate change, but the efforts have been performed in an inconsistent manner. Therefore, in the country it is necessary to face challenges such as: spreading and training the population of the agricultural sector in regards to correct measures for their adaptation and regarding climate hazards.

Adaptation measures:

84. This proposal seeks to provide small-scale producers tools, technology and information adequate to appropriate production techniques, improve yields and life quality and food safety. This programme will provide funding for:
    - ✓ Zoning (to reduce risk and to optimise land use)
    - ✓ Reduction of large-scale degradation of land, soil, and water

- ✓ Technical design of sustainable production that promote food security and sustainable livelihoods.
- ✓ Agricultural productivity strengthened in response to climate change in order to meet trends in food production and food security.
- ✓ Reduction of money losses for beneficiaries due to climate change effects

Component 2: Water Sector **Objective:** 2. Improving water resources management in order to increase resilience, in the communities that are more vulnerable to climate change

Baseline – without the resources from the Adaptation Fund

85. It is expected that the impact of Climate Change in the country's water and coastline sectors is the result of the intensification of extreme events. According to climate forecasts, more areas in the country might be indirectly affected by hydrometeorological phenomena related to excessive rainfall (flooding) or with the lack of rainfall (droughts). Some of the challenges of the country in this regards are the following: infrastructure, guaranteeing the supply of underground water resources, operation measures, and maintenance of aqueducts and sewage systems, as well as deficiencies in the administrative management of associations that manage aqueducts (ASADAs), and the management of existing information about availability of the resource and its monitoring.

Adaptation measures:

86. This program will support costs of rehabilitating the fragile coastal and water ecosystems, without this programme, these ecosystems would gradually disappear and the communities would be even more vulnerable to climate change. This programme will provide funding for:
    - ✓ Improvement of water management,
    - ✓ Capacity building for local organizations to improve management systems.
    - ✓ Rehabilitation and protection of reefs.
    - ✓ Promotion of Technologies for an Efficient Use of Water

- ✓ Promotion of chains between activities implemented in water and productive activities on the ground.
- ✓ supporting livelihoods in coastal communities, food security at the same time that allows biodiversity protection (mangroves and coral reefs) against the impacts of extreme climate events

Component 3: Capacity building. **Objective:** 3. Improving the capacity of communities, producers, institutions, and stakeholders regarding adaptation to Climate Change.

Baseline – Creation of Capacities

87. The lack of knowledge and easy-to-understand information regarding climate change and possible adaptation practices to be implemented under specific circumstances has contributed to the low adaptation capacity –especially in vulnerable communities. In order to face this, the awareness regarding climate change, education programs to improve knowledge, awareness towards change and the creation of information to help understand better the impact of climate hazards in their geographical area, are techniques required for adaptation. The documentation and the exchange of experiences among different communities will allow generating a greater impact at a local level.

Adaptation measures:

88. This programme will seek to relevant knowledge on climate change adaptation for the selected the sectors. Strengthened risk management system, and improvement of information about adaptation, climate risk and extreme events will enable to monitor key indicators of climate change and to provide best available technical advice to future activities.

89. The programme will also support additional capacity building to enable beneficiaries to maintain their activities beyond the programme timespan.

90. Although this programme is not expected to address all of the sectors needs, it will support to leverage and cover the costs of enabling the implementation of the activities mentioned above in order to increase resilience to climate change by funding rehabilitation, improvement or modification of actual situations in the communities selected. This programme will also fund the costs related to reducing the risks and therefore avoiding the adverse impacts of extreme climate changes in vulnerable areas due to increased or decreased precipitation (by improvement of infrastructure on coastal communities and water management areas at the local level).

91. The financing from the Adaptation Fund would be used to minimize risks by, building capacity of local institutions and communities to implement climate resilient technologies and actions. This programme will therefore support the additional costs of rehabilitating fragile ecosystems. As it is shown in the "Figure 18: Organization Chart for Implementing the Strategy" it will provide funding to local institutions, communities, NGOs, private and public sector in order to ensure that communities are resilient and can respond to climate change, so beneficiaries selected are equipped with the knowledge and resources necessary to adopt climate resilient strategies.

L. Describe how the sustainability of the Programme outcomes has been taken into account when designing the project.

92. By taking into account the difference among the three main components: agricultural sector, water-coastal sector, and institutional capacities – each of them with expected outcomes in accordance with their corresponding objectives- it is possible to distinguish the key aspects taken into account when designing this programme for their sustainability.

93. First, the programme works together with the national policies regarding the adaptation to climate change –which is a key aspect for effectively developing any initiative.

94. When referring to the aforementioned, it is important to note the involvement of regional and sectorial participants and their ownership of knowledge, activities, and actions to be performed. The participation of local institutions and the different sectors involved helps improve the capacities for a sustainable management of natural resources, reduction of hazards in vulnerable areas, and the awareness for modifying the behavior and the consumption.

95. Due to the medium and long-term vision of the initiatives to be promoted, it is necessary to refer more specifically to each component:

- In the agricultural sector, the sustainability of the proposal works together with the new knowledge provided by the adaptation initiatives, the use of innovative cost-effective technologies, zoning and the monitoring of the effects of climate change and its variations. In these cases, the fulfillment of the objective may be observed in terms of the productivity and the profits of the agricultural sector, by having successfully included adaptation actions.
- Regarding the water-coastal sector, the initiatives are focused on water management, the preservation of related ecosystems, and the strengthening of the protection of coastlines to climate change. Their sustainability is related to the capacity for keeping the suggested practices in operation in order to comply with the objectives mentioned above. In these cases, the factor of environmental education plays a key role that must be promoted by the initiative owners and by the institutions of the region as well.

- Finally, regarding the third component of institutional capacities, its sustainability depends on a national plan included in the National Strategy against Climate Change (*Estrategia Nacional contra el Cambio Climático*), which emphasizes the importance of taking into account the environmental and climate hazards and threats in the Costa Rican planning.

96. **Sustainability through different angles:**

- ✓ Socially: The appropriation of the initiatives by the communities allows each beneficiary to implement the adaptation measure that it is suitable for their area. In order to ensure the success and sustainability of these initiatives, the programme searched to truly respond to needs, local conditions and traditions. A wide relevance will be given to capacity building at the local community and institutional levels, in order to enhance, not only upscaling and replicability by other communities, but further and continuous adaptation measures taken by stakeholders.
- ✓ Financially: The appropriate technologies and initiatives proposed intends to be cost-effective that will enable the extension of adaptive actions with practical, efficient and low-cost solutions. At the same time, Fundecooperación is committed and strongly believes in helping the development of initiatives at the national level through the access to micro-financing and income generating activities. Therefore, it is expected to implement the actions through non-reimbursable funds leveraged by financial support of the programme; the appropriation of the programme by the beneficiaries at the financial level, will make possible to continue its implementation beyond the end of the programme's intervention.
- ✓ Institutionally: it is expected the participation of multi-stakeholders of society which give the opportunity to organizations and institutional structures to embrace the adaptation needs and initiatives and to improve interinstitutional coordination. Through the programme it is expected to support institutional programs that will make possible to continue working in the areas of intervention of the programme.

One of the main factors is the promotion and strengthening of the adaptation practices because, although this proposal represents an opportunity to execute initiatives in vulnerable regions, the

effort and its assessment must be generalized. The actions promoted will have greater incidence on the adaptation to climate changes and its adverse effects. Specific activities (the creation of **reimbursable funds and the creation of a agricultural insurance)** will allow to impact, not only the geographical scope selected, it is expected to have an impact during and after the implementation of the Adaptation Fund at the national level. Economic incentives will create special conditions for the implementation of adaptation measures at the local level.

The results and lessons learned during the implementation of the adaptation fund will support the National Strategy of Climate change, in order to promote and implement adaptation measures at the national level.

PART III: Implementation arrangements

A. Describe the arrangements for programme implementation.

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

C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan. Include break-down of how Implementing Entity's fees will be utilized in the supervision of the monitoring and evaluation function.

D. Include a results framework for the project proposal, including milestones, targets and indicators and sex-disaggregate targets and indicators, as appropriate. The project or programme results framework should align with the goal and impact of the Adaptation Fund and should include at least one of the core outcome indicators from the AF's results framework that are applicable[18].

E. 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.

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

[18] Please refer to the *Project level results framework and baseline guidance* for the Adaptation Fund's results framework and guidance on developing a results framework and establishing a baseline [add link here].

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Annex 1. Programme Screening Methodology

Phase 1 – Regional Prioritization

The purpose of the regional prioritization methodology is to use a standardized, country-driven process to identify a short list of adaptation opportunities or projects in a given sector that meet a region's specific needs and that is aligned with pre-existing policy frameworks

The regional prioritization process will produce a regional report that will provide context on the region and outlines a list of adaptation projects that have been proposed and screened against the following main criteria:

- Adaptation potential and contribution to climate resilience
- Alignment with governmental priorities
- Evidence of existing action (antecedents)
- Co-benefits along the following dimensions:
    - Mitigation of climate change
    - Economic development
    - Environmental benefits
    - Social benefits

A five-step process is involved and detailed as follows:

1. **Research and Categorization –** (if not already done previously) collect, review and categorize relevant documents and data that provide region context, including a description of the socio-economic context, information on climate vulnerability, government priorities and climate change-relevant actions.

2. **Long List of Eligible Projects (EP) –** Based on the eligibility criteria, the proposed projects are going to be either deemed eligible or rejected. Then a comprehensive list of eligible projects is going to be developed in the relevant sector (e.g. agriculture)

   Eligibility criteria for **Component 1** have been selected based on consultation with the Ministry of Agriculture are the following:

   - Criteria 1.1 – Project is located within the geographical scope of Component 1 as defined in by the Programme
   - Criteria 1.2 – Products that are consumed (partly or totally) in Costa-Rica (national diet products)
   - Criteria 1.3 – Crops that are not cultivated in monoculture
   - Criteria 1.4 – Project proponents are involved in project or initiative related to gender issues
   - Criteria 1.5 – Small scale (maximum of 5 hectares per producer)
   - Criteria 1.6 – Compliance check: the project has demonstrated compliance or capacity to comply with all relevant national standards

   Eligibility criteria for **Component 2** have been selected based on consultation with the National Service of Groundwater Irrigation and Drainage (SENARA - *Servicio Nacional de Aguas Subterráneas Riego y Avenamiento*) and are the following:

   - Criteria 2.1 – Project is located within the geographical scope of Component 2 as defined in by the Programme
   - Criteria 2.2 – The project generates benefits to the communities and improve the access to water for people
   - Criteria 2.3 – Project proponents are involved in project or initiative related to gender issues
   - Criteria 2.4 – Compliance check: the project has demonstrated compliance or capacity to comply with all relevant national standards

3. **Short List –** Screen the long list of potential projects against a set of criteria in order to generate a short list of the most compelling projects. A ranking scale can be used as quantitative support in discriminating among projects. Criteria derived from the most recent literature include but are not limited to the following:

    i. Level of contribution to the resolution of the immediate and urgent problems related to adaptation to climate change [1= highly important, 5= not important]
    ii. Capacity to contribute to poverty reduction. [1= high contribution, 5= no contribution]
    iii. The number of beneficiaries. [1= large number, 5= few beneficiaries]
    iv. The consistence with other existing policy instruments (e.g. environmental policy) [1= highly consistent, 5= not consistent]
    v. The overall cost of the action, and the anticipated benefit, in monetary terms if possible. [1= low costs, high benefits, 5= low benefits, high costs]
    vi. Strategic Value: Is it in line with the programme's overall strategies? [1= 100% in line, 5= not in line]
    vii. Ease: Will this project be fairly easy to complete (i.e. ease to approach for funding)? [1= very easy, 5= very difficult]
    viii. People's participation: Shall this project generate people's (beneficiary's) involvement in project implementation? [1= active participation, 5= no participation]
    ix. Co-benefit: Will the project's deliverables likely yield cobenefits (sustainable development, social, environmental)? [1= highly likely 5= not likely]
    x. Resource Impact: Will this project have a great impact on the resources (people, equipment, etc.)? [1= low impact/high sustainability, 5= high impact]
    xi. Multiplier effect: Does the project create multiplier effect (like adaptation to climate change and co-benefit to mitigation) [1= high effect, 5= no effect]

Additional criteria may play a particular role in making an adaptation project compelling, such as timing requirements for investment, access to funding, environmental compliance, etc. Hence it is crucial to ensure the completeness of the criteria beforehand. Completeness may be

ensured through the development of prioritization criteria with the support of the local stakeholders and relevant experts.

Once the applicable criteria are defined, each project will be revised against each criterion and a value will applied based on the ranking scale for each of the criteria. As a result, there is a total score for each project, which is then divided by the number of criteria to determine its priority rank. This step may be completed at two levels: at the individual level (by managers or supervisors from various stakeholder and organizations) and at the advisory committee level, as a group effort in order to compare notes on the prioritization results and develop a consensus list of prioritized projects. The final consensus list will be considered the "short list" of adaptation actions.

Here is an example of a completed project prioritization worksheet, where the lower the score corresponds to the higher priority.

Project	Adaptation to climate change	Feasibility	Beneficiaries	Cost effectiveness	Resources impact / sustainability	Co-benefits	Consistence with existing policies	Overall priority
1								
2								
3								
4								

4. **Review –** Evaluate the short list using an analytical grid that examines the actions based on the aforementioned four key criteria: adaptation potential, government priorities, current actions and co-benefits.

5. **Validation and Finalization –** Validate the short list of priority adaptation opportunities with government authorities and key stakeholders. Revise the short list and regional report based on expert input.

The Phase I report presents a short-list of potential adaptation actions, describe the process and background against which the initial selection was made, and provide guidance on how to further prioritize and select actions for consideration.

Once the Phase I is complete, the Phase II can be undertaken and consists in analyzing the merit of the adaptation opportunities identified in the Phase I process.

Phase II - In-depth Analysis

The in-depth analysis report will result in a detailed analysis of selected **short-listed projects (SLP)** in the Phase I for the selected region(s). For a given project, the in-depth analysis will provide a technical assessment of:

- Vulnerability reference case and current level of climate risks
- Adaptation potential (climate resilience)
- Adaptation costs
- Sustainable development and climate mitigation co-benefits

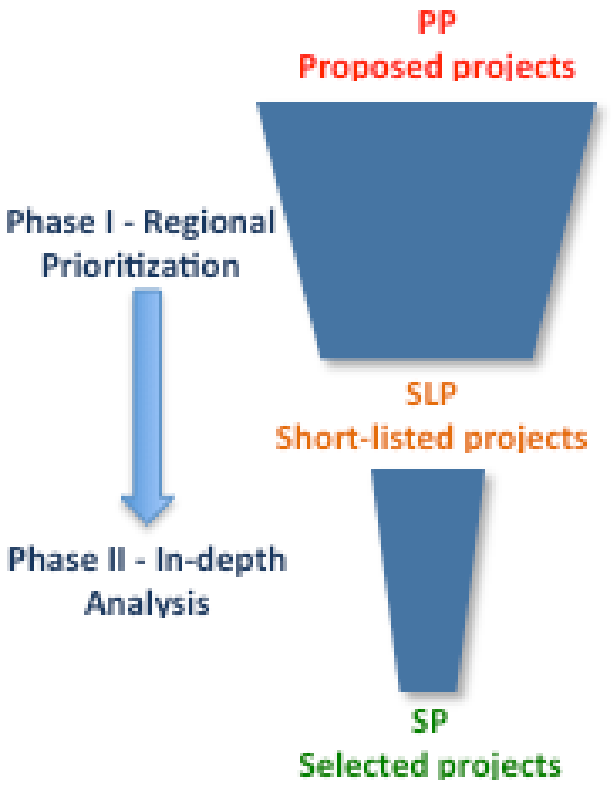
The Phase II has five steps if undertaken as a follow-on action of the Phase I:

1. **Selection of Action** – identify a short list of potential adaptation actions for further analysis (short list developed under the Phase I)
2. **Development of a Reference Case** – determine historical and projected climate risks and vulnerability profile in the absence of the proposed adaptation measure(s)

3. **Adaptation Potential** – Assessment of the potential for the enhancement of climate resilience
4. **Assessment of Sustainable Development and Co-Benefits –** assess the co-benefits such as:
    - Climate Mitigation
    - Job retention and/or creation
    - Economic diversification
    - Environmental investment
    - Local capacity building
5. **Project readiness**
    a. A well-defined scope that is sufficiently detailed and has clear parameters
    b. A realistic and reliable budget
    c. No major issues that would prevent implementation once a commitment of funds has been made
    d. The project demonstrates local commitment through:
        - Planning that involves interested and affected members of the community
        - Public participation and involvement

6. **Validation and Finalization of Selected Projects (SP)** – validate assumptions and analysis with government authorities, stakeholders and local experts. Revise analysis based on expert input.

The screening methodology can be summarized as follows:


PP
Proposed projects
Phase I - Regional Prioritization
SLP
Short-listed projects
Phase II - In-depth Analysis
SP
Selected projects