ADAPTATION FUND

AFB/PPRC.12/4
17 June 2013

Adaptation Fund Board
Project and Programme Review Committee
Twelfth Meeting
Bonn, 1-2 July, 2013

Agenda item 4 a)

PROPOSAL FOR COSTA RICA

I. Background

1. The Operational Policies and Guidelines (OPG) for Parties to Access Resources from the Adaptation Fund (the Fund), adopted by the Adaptation Fund Board (the Board), state in paragraph 42 that regular adaptation project and programme proposals, i.e. those that request funding exceeding US$ 1 million, would undergo either a one-step, or a two-step approval process. In case of the one-step process, the proponent would directly submit a fully-developed project proposal. In the two-step process, the proponent would first submit a brief project concept, which would be reviewed by the Project and Programme Review Committee (PPRC) and would have to receive the endorsement of the Board. In the second step, the fully-developed project/programme document would be reviewed by the PPRC, and would ultimately require the Board's approval.

2. The Templates approved by the Board (OPG, Annex 3) do not include a separate template for project and programme concepts but provide that these are to be submitted using the project and programme proposal template. The section on Adaptation Fund Project Review Criteria states:

> *For regular projects using the two-step approval process, only the first four criteria will be applied when reviewing the 1st step for regular project concept. In addition, the information provided in the 1st step approval process with respect to the review criteria for the regular project concept could be less detailed than the information in the request for approval template submitted at the 2nd step approval process. Furthermore, a final project document is required for regular projects for the 2nd step approval, in addition to the approval template.*

3. The first four criteria mentioned above are:
   1. Country Eligibility,
   2. Project Eligibility,
   3. Resource Availability, and
   4. Eligibility of NIE/MIE.

4. The fifth criterion, applied when reviewing a fully-developed project document, is:
   5. Implementation Arrangements.

5. In its seventeenth meeting, the Board decided (Decision B.17/7) to approve "Instructions for preparing a request for project or programme funding from the Adaptation Fund", contained in the Annex to document AFB/PPRC.8/4, which further outlines applicable review criteria for both concepts and fully-developed proposals.

6. Based on the Board Decision B.9/2, the first call for project and programme proposals was issued and an invitation letter to eligible Parties to submit project and programme proposals to the Fund was sent out on April 8, 2010.

7. According to the Board Decision B.12/10, a project or programme proposal needs to be received by the secretariat no less than nine weeks before a Board meeting, in order to be considered by the Board in that meeting.

8. The following project concept titled "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" was submitted by the

Fundecooperación para el Desarrollo Sostenible, which is the National Implementing Entity of the Fund for Costa Rica. This is the first submission of the project concept. It was received by the secretariat in time to be considered for the twentieth Board meeting. The secretariat carried out a technical review of the project proposal, assigned it the diary number CRI/NIE/Multi/2013/1, and completed a review sheet.

9. In accordance with a request to the secretariat made by the Board in its tenth meeting, the secretariat shared this review sheet with Fundecooperación para el Desarrollo Sostenible, and offered it the opportunity to provide responses before the review sheet was sent to the PPRC.

10. The secretariat is submitting to the PPRC the summary and, pursuant to Decision B.17/15, the final technical review of the project, both prepared by the secretariat, along with the final submission of the proposal in the following section.

II. Programme Summary

Costa Rica – 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.

Implementing Entity: *Fundecooperación para el Desarrollo Sostenible*

Programme Execution Cost:	US$ 860,000
Total Programme Cost:	US$ 9,220,000
Implementing Fee:	US$ 750,000
Financing Requested:	US$ 9,970,000

Programme Background and Context: Costa Rica is experiencing the effects of increasing temperatures and intensity of extreme rainfall. These effects, due to climate change, are increasing the vulnerability of the water resources of the country, threatening the sustainable production of agricultural resources that promote food security and livelihoods, as well as negatively affecting mangroves and coral reefs, which serve as protective barriers to coastal communities.

The objective of the proposed programme is to reduce climate 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 programme comprises the following three components:

Component 1: Increase the adaptation capacity and the reduction of vulnerability to climate change in the agricultural sector. (US$ 3,160,000)

This component aims to improve the sustainability of agricultural production systems that promote food security and sustainable livelihoods. It aims to do this through developing strategies that promote water and soil conservation, organic agriculture, low cost technologies, improved livestock forage quality, and the establishment and support of seed banks. Funding is proposed to be directed to agricultural producers to implement sustainable land management practices and climate change adaptation strategies through a system of payment for ecological services. This component includes a subcomponent relating to the participation of research institutions in order to garner lessons learned and disseminate these throughout the region.

Component 2: Strengthening coastal communities most vulnerable to climate change and improving the management of water resources in order to build resilience. (US$ 3,200,000)

This component contains activities relating to the establishment of local water management associations in rural communities to improve the management of aquifer recharge zones, reforestation and water treatment, reinforcement and adaptation of basic water infrastructure, and the promotion of integrated coastal management of the coastal zone.

Component 3: Improve the capacity of communities, producers, institutions, and stakeholders for the adaptation to climate change, and increase awareness for modifying the behaviour regarding this topic. (US$ 2,000,000)

This component aims to create early alert systems and recovery strategies for agriculture, water resources and coastlines with respect to the risks posed by climate change. The activities involved to achieve this aim relate mainly to training on efficiency and management of water resources, climatically intelligent agriculture, and the adaptation of coastal areas to climate change. It also promotes capacity building in line with the National Development Plan.

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT CATEGORY: **Regular-sized Programme Concept**
Country: **Costa Rica**
Programme Title: **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**
AF Programme ID: **CRI/NIE/Multi/2013/1**
NIE/MIE Programme ID:
Requested Financing from Adaptation Fund: **US$ 9.97 million**
Regular Programme Concept Approval Date (if applicable): **N/A**
Anticipated Submission of final RP document (if applicable): **N/A**
Reviewer and contact person: **Daniel Gallagher**
Co-reviewer(s): **Franck Jesus**
NIE/MIE Contact Person: **C P Appanna**

Review Criteria	Questions	Comments 15 May 2013	Comments 4 June 2013
Country Eligibility	1. Is the country party to the Kyoto Protocol?	Yes	

	2. Is the country a developing country particularly vulnerable to the adverse effects of climate change?	Yes, Costa Rica is experiencing the effects of increasing temperatures and intensity of extreme rainfall, causing an increase in the vulnerability of sectors of the population and economy. The proposal includes very comprehensive information in the background and context section, some of which is not directly relevant to climate change adaptation issues (e.g. seismic risks and associated costs). **CAR1**: Please consider reformulating the background and context chapter in a more condense format clearly highlighting the expected impact and risks associated with climate change in the targeted areas and sectors.	**CAR1:** Addressed
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	Yes, Letter of Endorsement from William Alpizar, Adaptation Fund designated authority in Costa Rica, dated 29 April 2013.	

	2. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?	The general objective of the proposed programme is to reduce vulnerability to climate change by focusing on the agricultural and water resource sectors, as well as coastal zones. However, the description of the activities pertaining to the different components is too generic at this stage which precludes an assessment of the viability and effectiveness of the proposal. Furthermore, the terminology used throughout the concept makes it unclear if the proposal constitutes a 'programme', i.e. a series of coordinated individual projects, or a standalone 'project'. **CAR2**: Please reformulate the proposal to clearly describe the adaptation challenge to be addressed, the objective of the programme, what the specific activities of the projects (if applicable) will be, what they will deliver for intended beneficiaries in the target areas; when, how, where, and by whom activities will be undertaken, and how the programme will ensure	**CAR2:** Not fully addressed The revised proposal more clearly describes the adaptation challenge to be addressed, namely (a) climate change increases the vulnerability of the water resources of the country (b) climate change threatens the sustainable production of agricultural resources that promote food security and livelihoods and (c) increased temperatures and rising sea levels will negatively affect mangroves and coral reefs, which serve as protective barriers to coastal communities. Although the proposal is clearer on what it wants to achieve, it remains unclear how it will do so - i.e. through which specific activities. For instance, in the agricultural sector it is proposed to implement "activities aimed at generating, sharing, and adoption (sic) technologies… previously validated at the field level" yet no specific activities, nor the reason for their selection, are described. Projects and programmes financed through the Adaptation Fund must clearly demonstrate

		(i) the impact of these activities can be sustained beyond the programme duration, and; (ii) possible replications and further development of these activities.	that the proposed adaptation measures are adequate for the identified climate threats. Proposals should clearly describe what the specific activities are, and explain how they are commensurate to the scale of the adaptation challenges.
	3. Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations?	It is unclear if the intended beneficiaries are communities in particular geographic areas. Given the vagueness of the activities, it is not possible to assess how the beneficiaries are expected to benefit from the programme. **CAR3:** Please clearly identify the intended beneficiaries of the proposed programme (including where they are located within the country), making reference to how benefits will be equitably distributed to vulnerable communities, households and individuals.	**CAR3:** Addressed

	4. Is the project / programme cost effective?	Cannot be assessed at this stage. The concept makes continual reference to a series of separate projects e.g. "*each project includes a logical framework*" (p46), and; *"In each executed project…*" (p54); yet the relevance of this discussion of individual projects does is not clear. **CR1**: Please clarify what specific projects are being discussed and their relevance to this proposed programme.	**CR1:** Partially addressed. The revised proposal clarifies that the programme comprises three components, each of which focuses on one sector. The proposal mentions two types of investments: concrete investments on infrastructure; and capacity building. Due to the generic nature of the activities discussed, the cost effectiveness of activities, and hence the programme, cannot be assessed.
	5. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?	The concept cites international commitments relating to climate change, and some high-level information from the National Climate Change Strategy. It should also identify all relevant national sustainable development strategies so that the alignment of specific project activities with those can be verified. **CR2:** Please identify all relevant national, sub-national, and sectorial development strategies which the fully developed project proposal would seek to comply with.	**CR2:** Addressed. Relevant parts of the National Strategy on Climate Change are mentioned and sectorial plans have been identified.

	6. Does the project / programme meet the relevant national technical standards, where applicable?	This cannot be fully assessed until the programme activities are described in more detail. In reference to national standards, the concept states that, "*This project aims at becoming the reference regulatory framework regarding water resources*", yet there is no regulatory output described in the programme components, nor is there a budget component assigned to such an output. **CR3**: Please clarify what regulatory level outputs (if any) are planned to be delivered through the proposed programme and ensure that any such component is discussed consistently in the concept document.	**CR3:** Addressed. The programme does not intend to deliver regulatory outputs.

	7. Is there duplication of project / programme with other funding sources?	The concept document reports that the proposed programme is based on "*accumulated experiences [and] lessons learned … in regards to water resources, agriculture and coastlines*" (p43). **CR4:** Please present the experiences and lessons learned that have formed the basis for the proposed programme, clarifying how these were used to inform the programme design. This is key to ensuring that Adaptation Fund resources are used to go beyond existing initiatives, to meaningfully contribute to establishing sustainable mechanisms that support increased resilience to climate change. The concept states that the proposed programme will avoid duplication of efforts with existing initiatives. **CR5:** Please identify the existing initiatives that are relevant to the proposed programme and explain how the project will ensure complementarity and avoid duplication with these initiatives.	**CR4:** Addressed. The proposal describes how a preliminary analysis was undertaken to avoid duplication and seek alliances between the programme and other initiatives. **CR5:** Addressed.

	8. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?	The concept states that "*knowledge management is established as one of the priority components in the programme*" (p55) yet it is unclear which of the project components (p35) is being referred to. Activities relating to knowledge management and dissemination of lessons learned should be an integral part of the proposed programme and hence be clearly articulated in all relevant sections of the proposal, including under Programme Objectives, Programme Components and Financing, Programme Justification. **CR6**: Please clarify how a knowledge management component is to be integrated into the proposed programme, and ensure that all corresponding project activities as presented as required throughout the concept document.	**CR6:** Addressed. Knowledge management is included as a separate component of the programme and a preliminary strategy for gathering and disseminating lessons learned is outlined.

	9. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations?	The concept identifies a large number of entities that have participated in workshops and consultation meetings. It remains unclear if the concept refers to general (i.e. not specific to this proposal) discussions or if specific consultations have already been undertaken relating to this proposed programme. Additionally, the proposal does not make clear if an initial consultation has directly sought the views of communities. **CR7:** Please clarify if any initial consultations have taken place specifically relating to this programme, and if so, what views of intended target communities have emerged and been incorporated in the design of the proposed programme.	**CR7:** Addressed. Consultations took place during 2012-2013 with the intention of identifying possible projects that could support the activities proposed in this concept.
	10. Is the requested financing justified on the basis of full cost of adaptation reasoning?	Potentially. This can be properly assessed once the proposed programme activities, and their corresponding justification, have been incorporated in the concept document.	
	11. Is the project / program aligned with AF's results framework?	Potentially. **CR8:** Please clarify how the objectives of the project are	**CR8:** Addressed. The objective of the programme is, in

		aligned with the Adaptation Fund Results Framework.	principle, aligned with outcomes 2 and 4 of the Adaptation Fund Results Framework.
	12. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	To ensure that the impact of the programme may be sustained and continue to develop beyond its completion, the proponents may wish to consider including activities beyond capacity building, to establish mechanisms and the associated means to enable impacts to be scaled up and replicated to achieve increased resilience to climate change at the national level. **CR9**: Please clearly demonstrate how the adaptation benefits achieved through the proposed project will be sustained after its end and how it will enable replication and scaling up. All key areas of sustainability should be addressed, including but not limited to economic, social, environmental, institutional and financial aspects.	**CR9:** Not addressed. The revised proposal considers that the results are sustainable because of efforts to (i) involve the communities, (ii) develop capacities and (iii) promote inter-institutional coordination. This assumes that the key barriers are related to knowledge, information or organization. The proposal does not explain, however, how it will make it possible for activities and capacity development to be sustained beyond localized resilience improvements in a few areas. For example, would responsibility for continuing to support activities in the chosen sectors be transferred to a national financial mechanism? Would this allow communities to access sustained financing? Would the national budget allocate means to support further capacity building?

Resource Availability	1. Is the requested project / programme funding within the cap of the country?	Yes.	
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	No. The Implementing Entity Management fee is 9.3% **CAR4**: Please revise the Implementing Entity Management fee to be at or below 8.5 per cent of the total programme budget.	**CAR4:** Addressed. The Implementing Entity Management fee has been reduced to 8.1 per cent of the total programme budget.
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?	Yes. The Programme Execution Costs are 8.6 per cent of the total programme budget.	
Eligibility of NIE/MIE	4. Is the project/programme submitted through an eligible NIE/MIE that has been accredited by the Board?	Yes, Fundecooperación para el Desarrollo Sostenible is an accredited NIE of the Adaptation Fund.	
Implementation Arrangement	1. Is there adequate arrangement for project / programme management?	Not assessed.	
	2. Are there measures for financial and project/programme risk management?	Not assessed.	
	3. Is a budget on the Implementing Entity Management Fee use included?	Not assessed.	
	4. Is an explanation and a breakdown of the execution costs included?	Not assessed.	
	5. Is a detailed budget including budget notes included?	Not assessed.	
	6. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans ?	Not assessed.	

	7. Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function and sex-disaggregated data, targets and indicators?	Not assessed.	
	8. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	Not assessed.	
	9. Is a disbursement schedule with time-bound milestones included?	Not assessed.	

Technical Summary	The overall objective of the proposed programme is to reduce vulnerability to climate change by focusing on the agricultural and water resource sectors, as well as coastal zones. The programme comprises the following three components: 1. Increase the adaptation capacity and the reduction of vulnerability to climate change in the agricultural sector. 2. Strengthening coastal communities most vulnerable to climate change and improving the management of water resources in order to build resilience. 3. Improve the capacity of communities, producers, institutions, and stakeholders for the adaptation to climate change, and increase awareness for modifying the behaviour regarding this topic. The initial technical review found that the description of the activities pertaining to the different project components was overly generic, which precluded an assessment of the viability, effectiveness and sustainability of the proposal. The initial technical review made four Corrective Action Requests (CAR) and nine Clarification Requests (CR): **CAR1:** Please consider reformulating the background and context chapter in a more condense format clearly highlighting the expected impact and risks associated with climate change in the targeted areas and sectors. **CAR2**: Please reformulate the proposal to clearly describe the adaptation challenge to be addressed, the objective of the programme, what the specific activities of the projects (if applicable) will be, what they will

	deliver for intended beneficiaries in the target areas; when, how, where, and by whom activities will be undertaken, and how the programme will ensure (i) the impact of these activities can be sustained beyond the programme duration, and; (ii) possible replications and further development of these activities. **CAR3:** Please clearly identify the intended beneficiaries of the proposed programme (including where they are located within the country), making reference to how benefits will be equitably distributed to vulnerable communities, households and individuals. **CAR4**: Please revise the Implementing Entity Management fee to be at or below 8.5 per cent of the total programme budget. **CR1**: Please clarify what specific projects are being discussed and their relevance to this proposed programme. **CR2:** Please identify all relevant national, sub-national, and sectorial development strategies which the fully developed project proposal would seek to comply with. **CR3**: Please clarify what regulatory level outputs (if any) are planned to be delivered through the proposed programme and ensure that any such component is discussed consistently in the concept document. **CR4:** Please present the experiences and lessons learned that have formed the basis for the proposed programme, clarifying how these were used to inform the programme design. This is key to ensuring that Adaptation Fund resources are used to go beyond existing initiatives, to meaningfully contribute to establishing sustainable mechanisms that support increased resilience to climate change. **CR5:** Please identify the existing initiatives that are relevant to the proposed programme and explain how the project will ensure complementarity and avoid duplication with these initiatives. **CR6**: Please clarify how a knowledge management component is to be integrated into the proposed programme, and ensure that all corresponding project activities as presented as required throughout the concept document. **CR7:** Please clarify if any initial consultations have taken place specifically relating to this programme, and if so, what views of intended target communities have emerged and been incorporated in the design of the proposed programme. **CR8:** Please clarify how the objectives of the project are aligned with the Adaptation Fund Results Framework.

	CR9: Please clearly demonstrate how the adaptation benefits achieved through the proposed project will be sustained after its end and how it will enable replication and scaling up. All key areas of sustainability should be addressed, including but not limited to economic, social, environmental, institutional and financial aspects. The final technical review concludes that additional information provided by the proponent has clarified some aspects relating to the climate adaptation challenge being confronted, whom the programme would benefit, and ensuring alignment with national adaptation and sectorial development plans. However, the proposal remains unclear on how it will confront the adaptation challenge, lacking detail on specific programme activities and the reason for their inclusion, which programmes financed through the Adaptation Fund must clearly demonstrate. Without a focused description of the proposed activities, it is not possible to evaluate the adequacy of the proposed adaptation measures in combating the identified climate threats, nor is it possible to evaluate whether these measures are commensurate with the scale of the adaptation challenge being faced. A revised proposal should address the following issues: i. The proposal should clearly describe the specific activities of the proposed programme as well as explaining how these activities are commensurate with the scale of the challenge. ii. The proposal should demonstrate the cost effectiveness and sustainability of the investment in the proposed programme by providing a logical explanation of the selected scope and approach. iii. The proposal should articulate how the programme is designed to ensure that the adaptation benefits achieved would be sustained after its end, including how these would be replicated and scaled up.
Date:	4 June 2013

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), MINISTRY OF NATIONAL PLANNING AND ECONOMICAL POLITICS (MIDEPLAN), NATIONAL EMERGENCY COMMISSION (CNE).**

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.

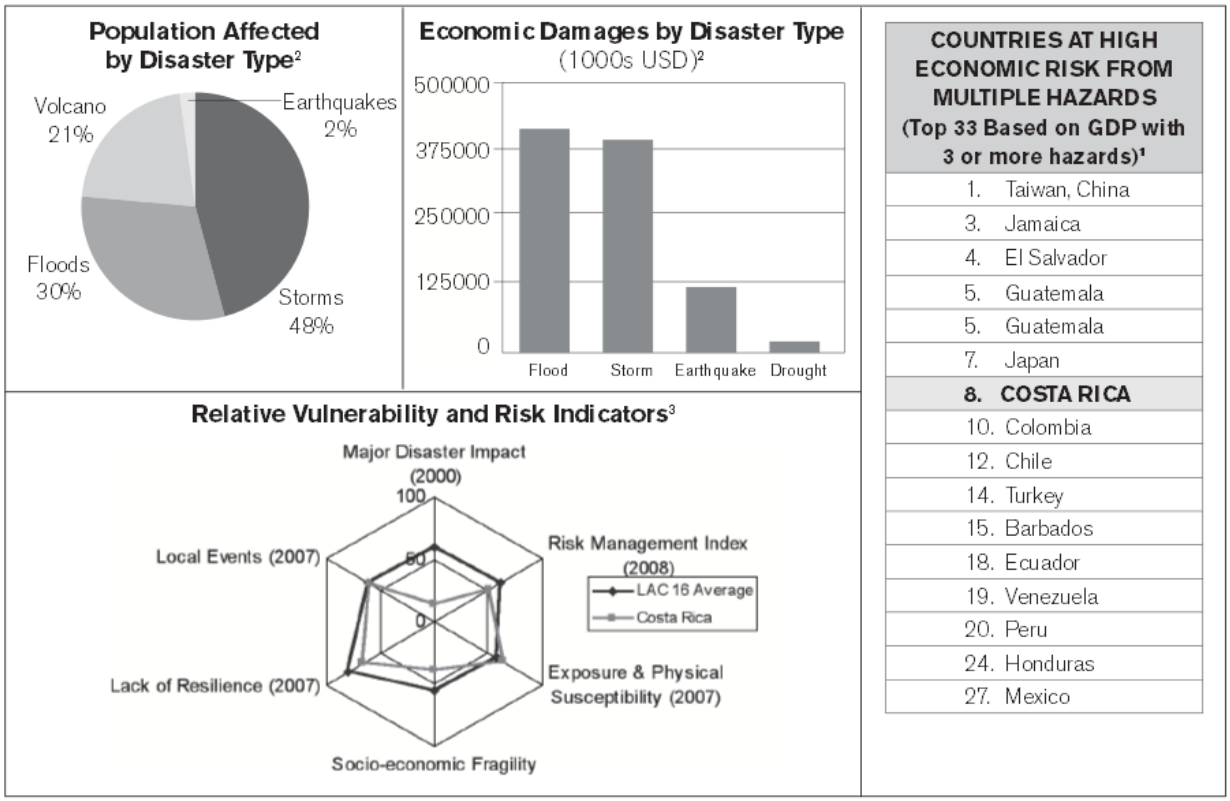
Country Context

Costa Rica is a country that is 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)

The country's topography and biodiversity is varied and it includes coastal plains separated by mountains, more than 100 volcanic cones, is home to nearly 5% of the total types of species estimated worldwide; and more than 26% of its surface is under protection. Due to a combination of geographical variations 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)

According to the study "Natural disaster hot spot" created by the World Bank, Costa Rica is the second in the world among the countries that are most exposed to multiple hazards –based on the total Earth surface (a total of 36.8% of the total surface is exposed to three or more natural adverse events). This study also ranges the country in the eighth position, with more possibilities 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).

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



COUNTRIES AT HIGH ECONOMIC RISK FROM MULTIPLE HAZARDS (Top 33 Based on GDP with 3 or more hazards)¹
1. Taiwan, China
3. Jamaica
4. El Salvador
5. Guatemala
5. Guatemala
7. Japan
8. COSTA RICA
10. Colombia
12. Chile
14. Turkey
15. Barbados
18. Ecuador
19. Venezuela
20. Peru
24. Honduras
27. Mexico

Source: World Bank, 2005.

Additionally, the *Instituto Meteorológico Nacional –IMN* (National Meteorological Service), which is in charge of national communications (up to this moment, the communications for 2000 and 2005 has been submitted) 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 being developed. These studies show how extreme hydrometeorological conditions have caused damages and disasters in different socioeconomic sectors of the country.

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**
Energía	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
Ferrovías	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)

"In the 1988 - 2009 period, Costa Rica experiences losses for a total of 1,823.3 million dollars of 2006. The type of events with greater recurrence and that has caused significant damages along the period are hydrometeorological events – with 34 events (82.9%). 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
Sequía	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: MIDEPLAN

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 are for 187 million dollars (52.4%).

In the 2005-2011 period, Costa Rica has 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: (MIDEPLAN, 2012)

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

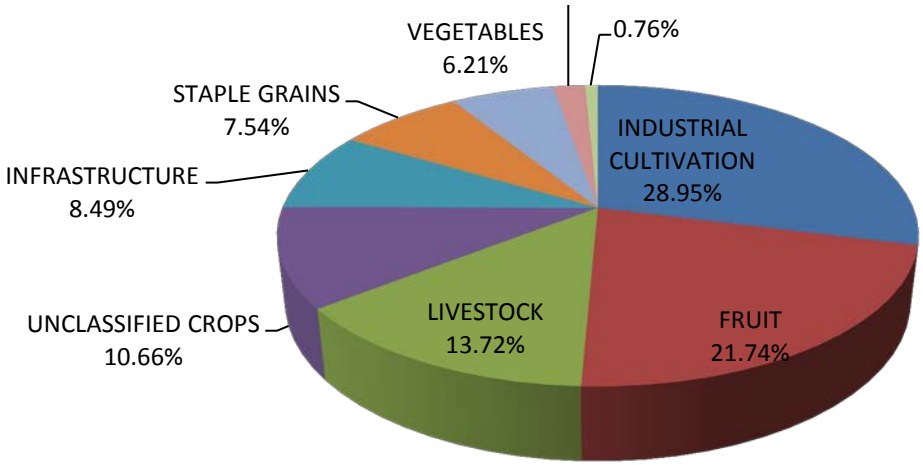
Table 4 Table of percentage distribution of accumulated losses caused by hydrometeorological events per province between 2005-2010.

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.

The agricultural sector has been one of the most severely affected due to its high dependence on weather. 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 safety, 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).

Ilustration 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.

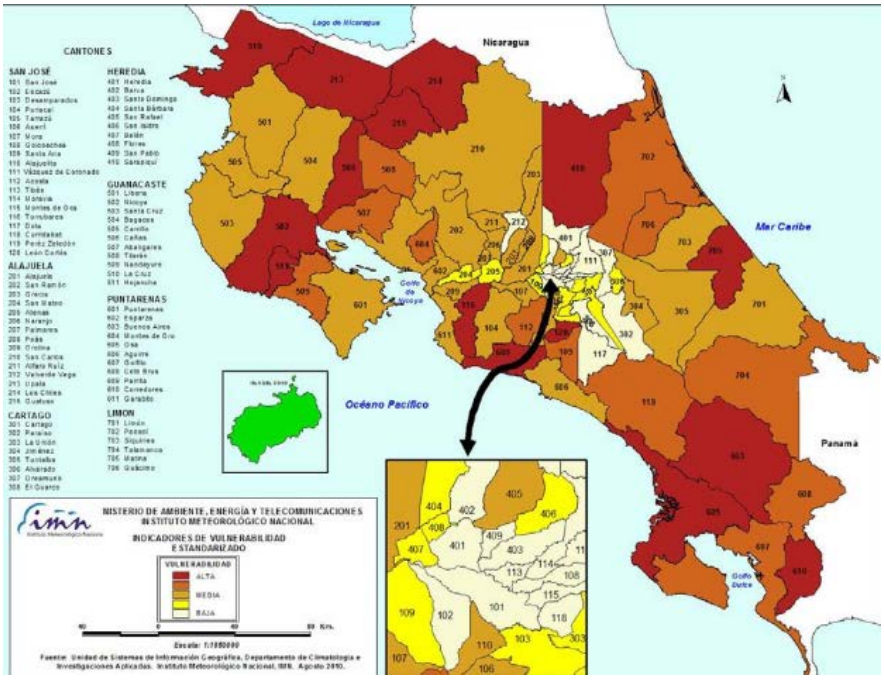
On the other hand, the Water Resource in Costa Rica shares different key functions for the country's development: hydroelectric power generation (contribution of 18.5% regarding energy), drinking water supply (2.49% regarding aqueducts and sewage systems of the country), irrigation and drainage, among others that have been affected by extreme events. Due to the increase in the average level of the sea, coastal areas will be subject to flooding, salinization and deterioration of ecosystems. By 2100, the sea level is expected to increase between 9 and 88 due to the melting of

Greenland, the Antarctic, glaciers and ice caps, which will directly affect Costa Rica due to the disappearance of Puntarenas.

CURRENT AND FUTURE VULNERABILITY

Regarding the country's most vulnerable regions, the IMN has made current characterizations and forecasts for the different regions of the country. All this by taking into account the relation between their high vulnerability and their low human development index. (Echeverría Bonilla, 2011, pág. 22)

Ilustration 3 Current Vulnerability Map (Retana et al, 2011)

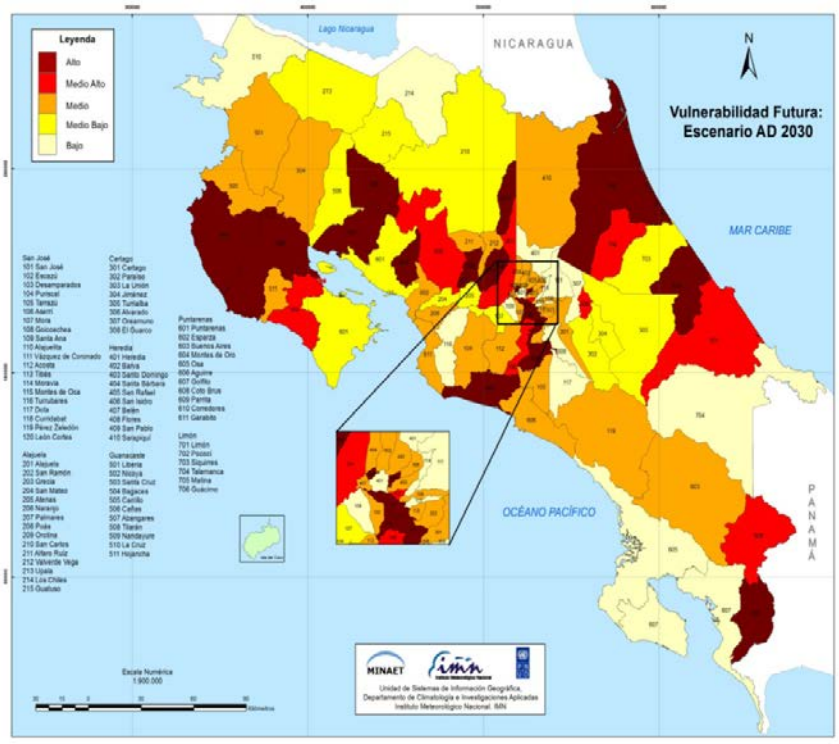


Source: *Instituto Meteorológico Nacional* (National Meteorological Service), 2011

By using colours, both illustrations (illustration 2. and illustration 3.) "*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).

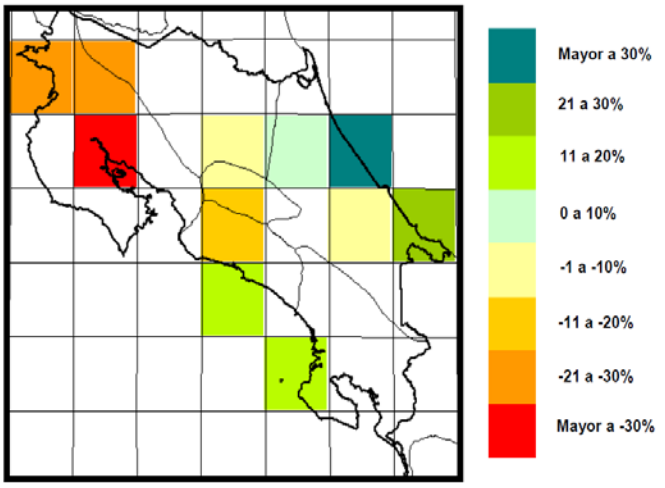
The factors that determine this vulnerability are mostly socioeconomic and institutional because they are related to the capacities a population has for resilience in case of different types of events (not only to hydrometeorological events). (Echeverría Bonilla, 2011)

Ilustration 4 Future Vulnerability Map: 2030

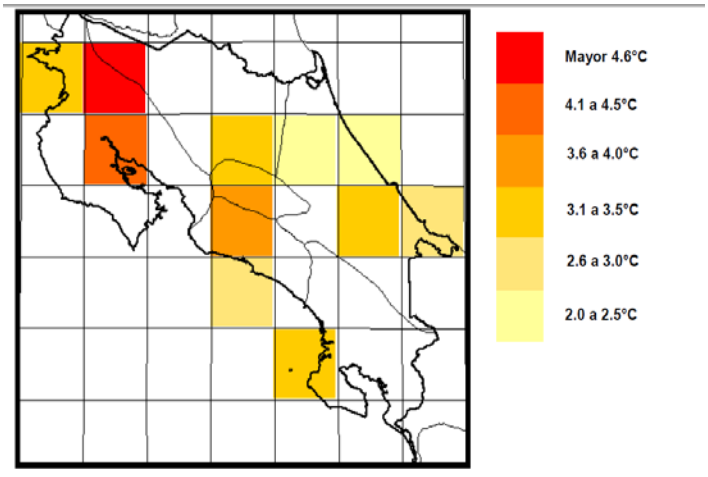


Fuente: Instituto Meteorológico Nacional, 2011

CLIMATE FACTORS:



Ilustration 6 Percentage variation of annual rainfall in a climate change scenario. Comparison between the 1961-1990 period and the 2081-2100 period. **Source: IMN.**

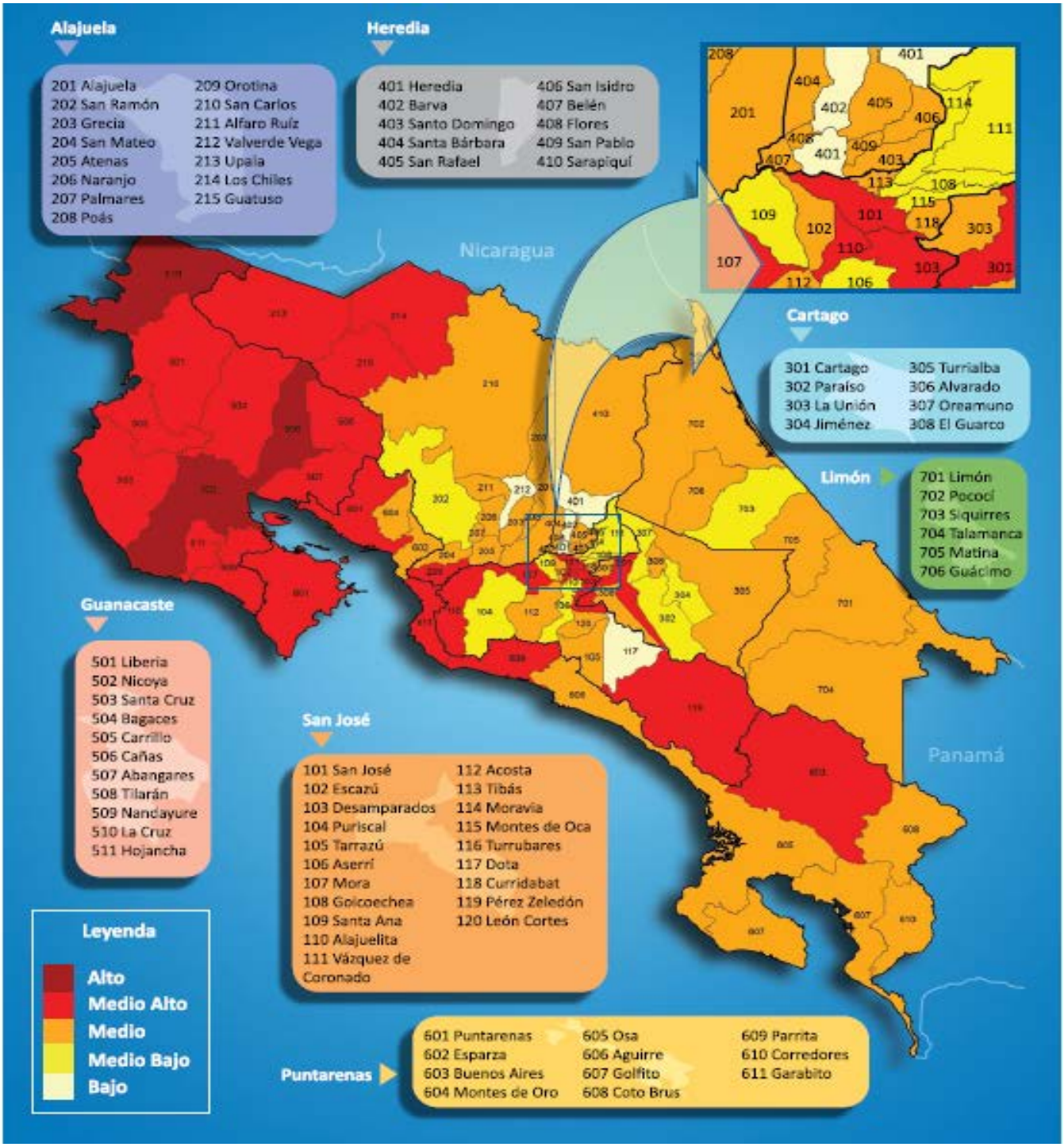


Ilustration 6 Variation of average temperature in a climate change scenario. Comparison between the 1961-1990 period and the 2081-2100 period. **Source: IMN**

In general terms, based on Ilustration 5 and Ilustration 5, it can be concluded that projected decreases and increases of annual rainfall indicate drier summers and more humid winters.

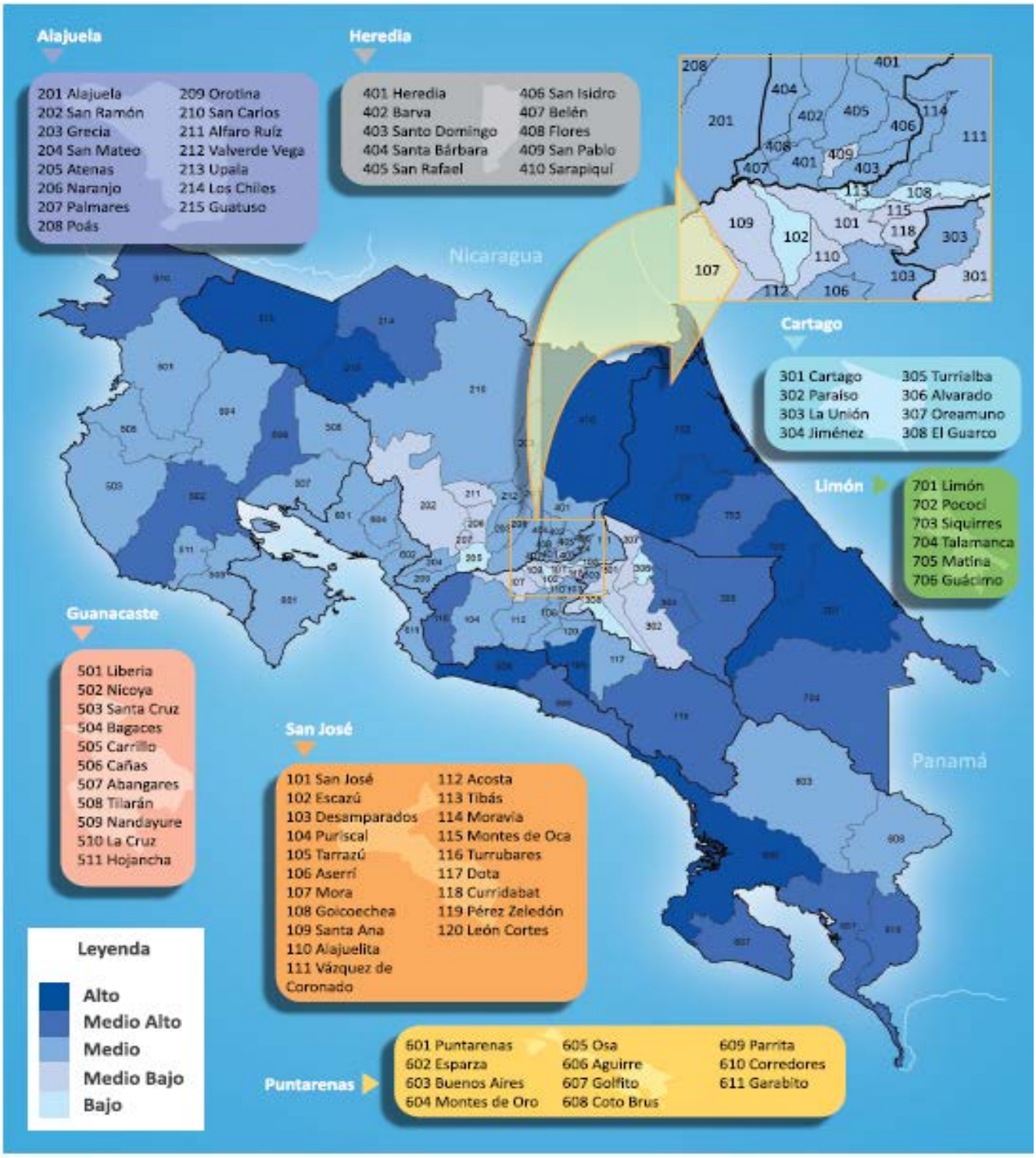
Coherently, for the summer period, in those places where a greater increase in temperature is projected, a decrease in rainfall is expected. On the other hand, for winter an increase in evaporation due to more warming, may lead to more intense rainfall even when the annual rainfall may decrease.

Ilustration 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)

Ilustration 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:

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 hot 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 trend in the last 40 years suggests the 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.
- ✓ *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).

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).

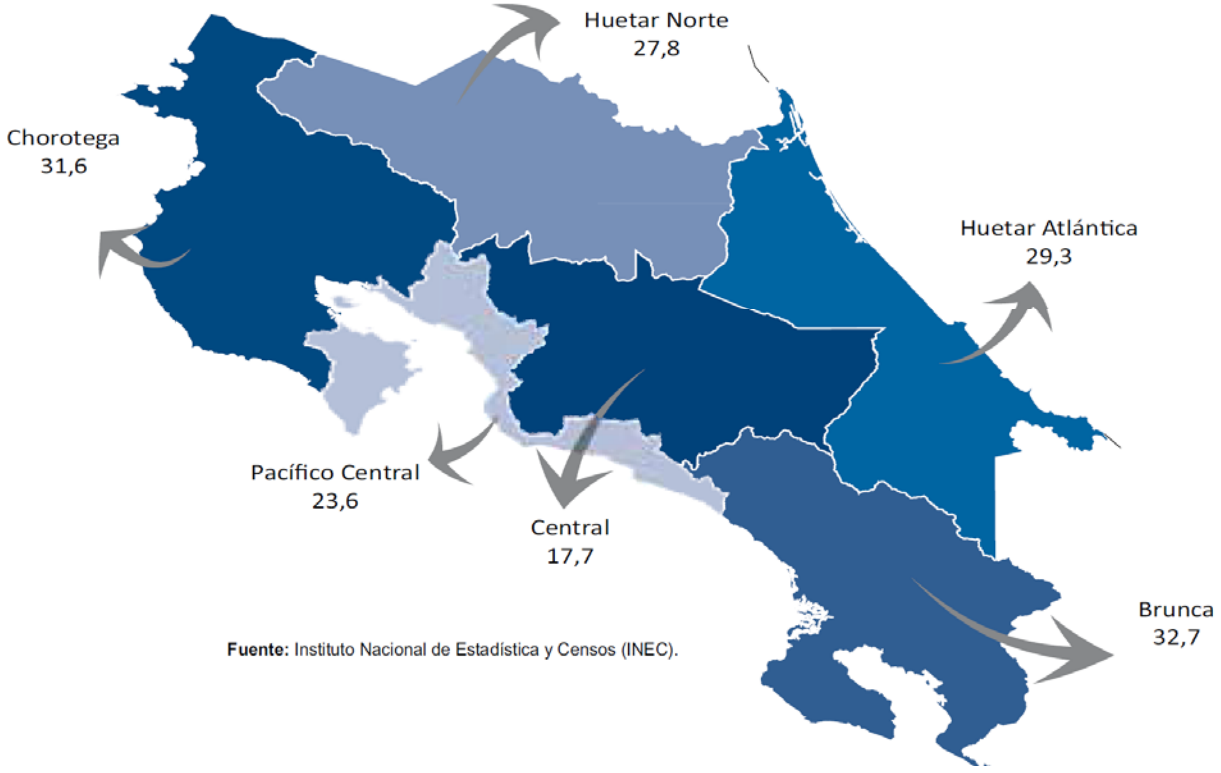
SOCIOECONOMIC VULNERABILITY:

According to an analysis made by CEPAL 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*

Ilustration 8 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 Statistics and Census), 2011

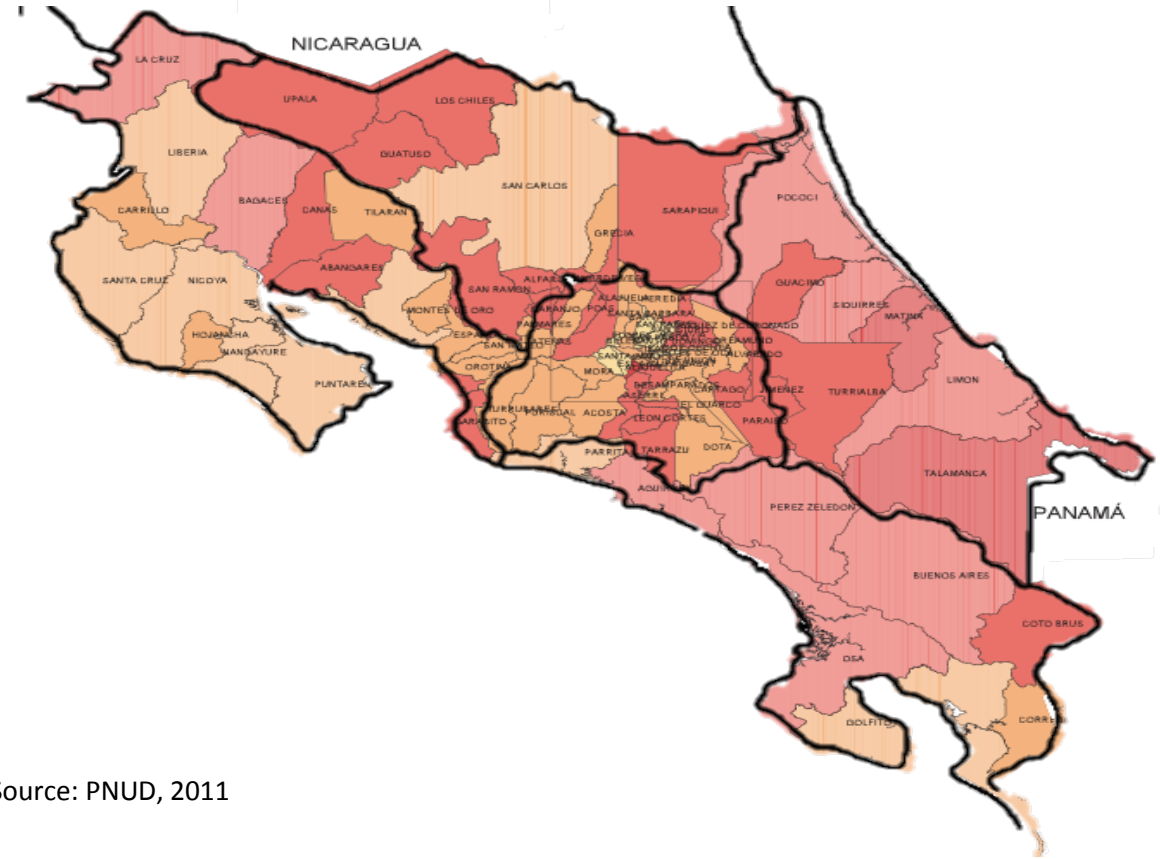


Fuente: Instituto Nacional de Estadística y Censos (INEC).

Desarrollo –IDCR (International Centre of Research for Development) 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.

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

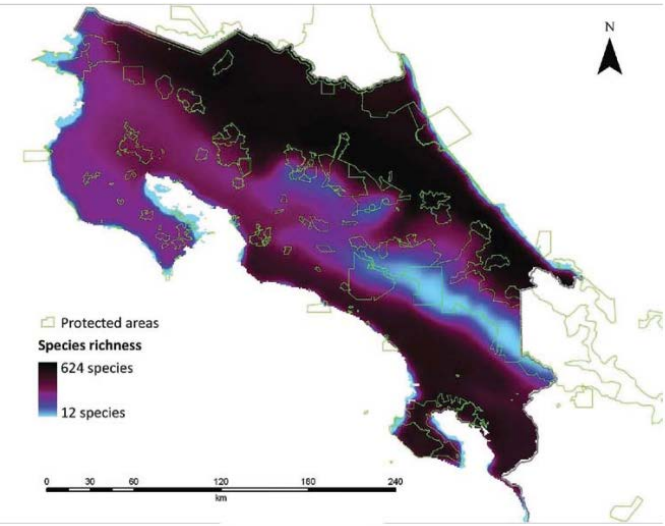
Ilustration 9 Human Development Index per District 2011



Source: PNUD, 2011

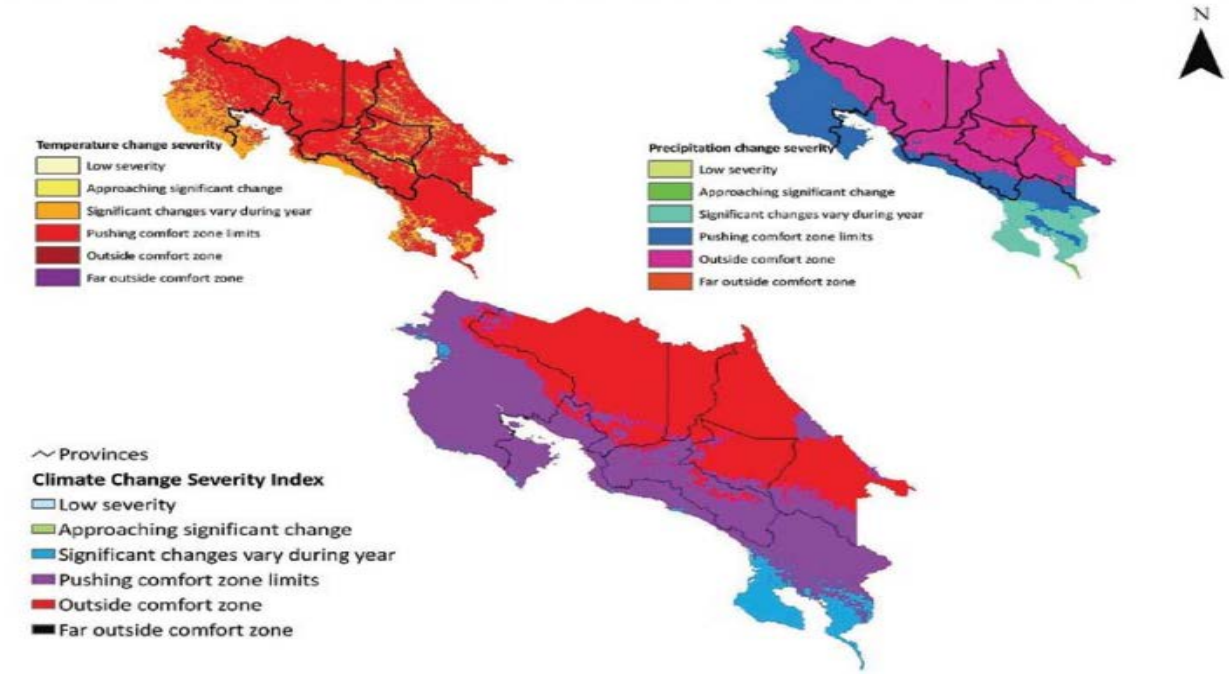
This socioeconomic vulnerability of Central America is intensified due to its geoclimatic location in an isthmus that serves as bridge between two continents, that is rich in biodiversity and variety of ecosystems, located between two oceans: the Pacific and the Atlantic, with their corresponding climate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

Ilustration 10 Species Richness: Costa Rica



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".

Ilustration 10 Climate Change Severity Index for Costa Rica (Towards the 2020s)



EXPECTED IMPACTS OF CLIMATE CHANGE-CHALLENGES TO BE ADDRESSED

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.

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

- Water resources:
    - 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.
- 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 would 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
    - 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.

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

	Current Vulnerability	Future Vulnerability	Biodiversity	Significant Agricultural Areas	Energy-producing Areas	Vulnerable Coastal Areas	Poverty	HDI	Priority
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	Medium-high	HIGH
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	Low	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	Medium-low	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	Low	MEDIUM-HIGH
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	Medium-high	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 - Onion - Potato	La Garita, Rio Macho, Cachí, Alberto Echandi, Toro I, Angostura, Peñas Blancas	No coastlines	17.7	Medium-high	MEDIUM LOW

Source: Own Creation.

Adaptation

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.

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.

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.

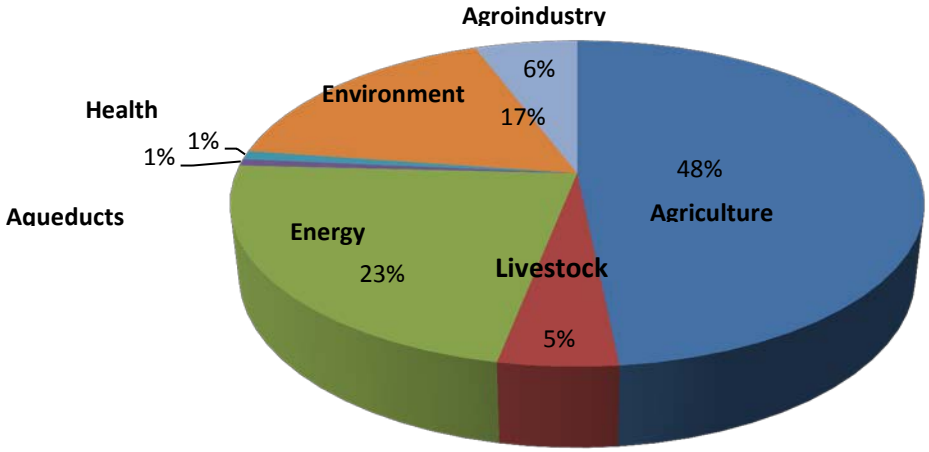
INTERVENTION COMPONENT: AGRICULTURE

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) plagues 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 have been located. 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)

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.

Ilustration 10 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.

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, which represented 7.1% of the GDP. In that year, the value added for agribusiness was 1,161,594,000.000 colones 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)

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)

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 Chart of 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.

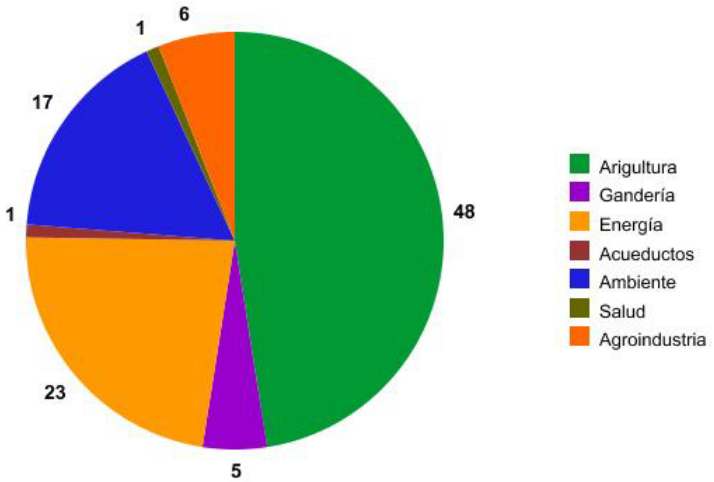
Agriculture is distributed according to the purpose and properties of each type of soil. For example, it is possible to find the production of staple grains in the *Chorotega* Region in the west of the country, *Huetar Norte* Region in the north of the country, and the *Brunca* Region in the southeast 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.

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.

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:

Ilustration 11 Chart of Percentage Distribution of Losses per Sector due to Drougths (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-MIDEPLAN.

Regarding Illustration 11, it is possible to highlight that the most affected sectors are the agricultural, energy, and environmental sectors. In each of those cases, droughts affect the main factor from which each activity is developed. On the other hand, regarding risks due to extreme rainfall and flooding, it is important to highlight that the regions indicated i Illustration 8, 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.

This leads to a key discussion when covering the topic of agriculture: food and nutritional safety. 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.

> *"Complying with the principles of food and nutritional safety has been complicated due to the limitation of foods 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 safety of foods. Besides, another aspect to take into account is the decrease of the economic capacity 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)*

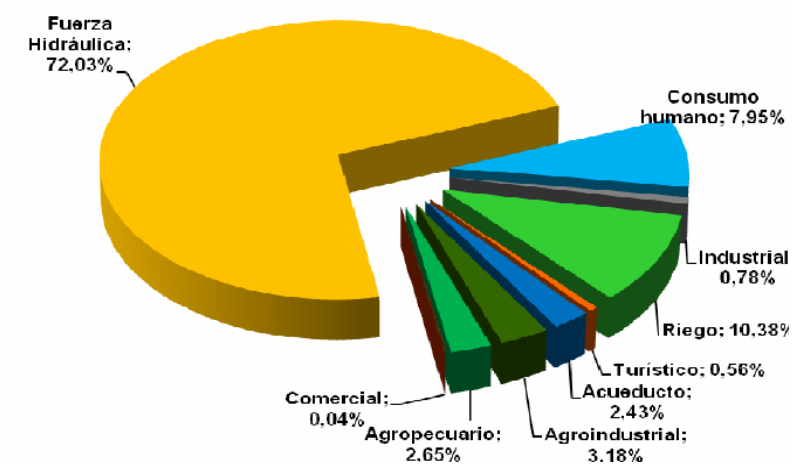
It is important to mention that the importance of the agricultural sector is part of a set of fields in Costa Rica: the economic field – based on the value of the production and income at a national level; the labour field – with the number of workers and families that depend on this income; the

social and nutritional field –for dealing with the Costa Rican food and nutritional safety; and the environmental field –for referring to the relevance of the environment where the agricultural production is developed and the adverse effects of climate change that threaten it.

INTERVENTION COMPONENT: WATER RESOURCE-COASTLINES

In order to fully illustrate the importance of this resource, the following graph allows detailing the uses of the water flow in Costa Rica.

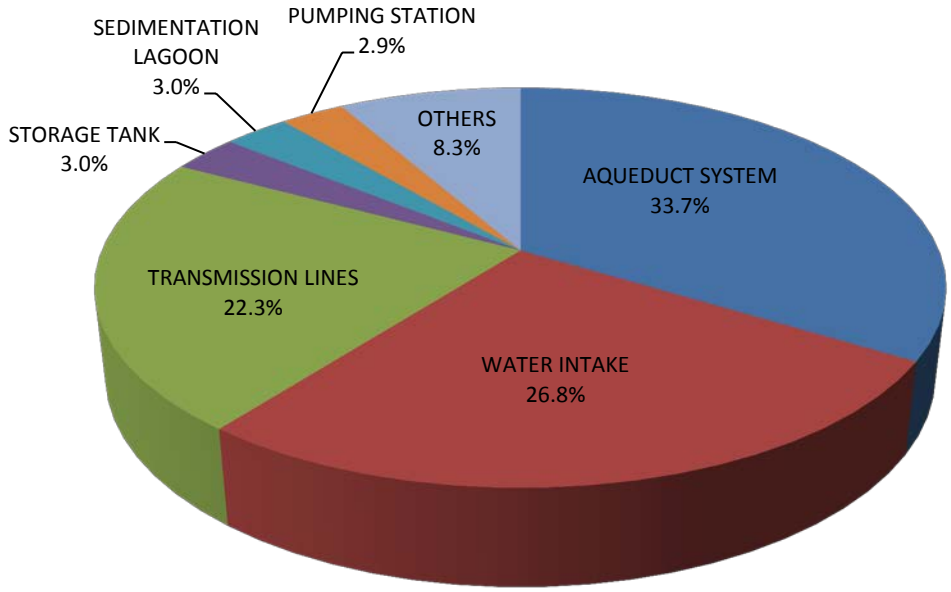
Illustration 1 Graph about the Percentage Distribution of Uses for the flow granted under concession at a national level.



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

In this way, it can be affirmed that, based on Illustration 13, 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.

Ilustration 12 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:**

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.

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

> *"(…) 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)

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.

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:

> *"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)*

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 this reduction is significant when taking into account the economic activities that are developed there. Therefore, by taking the aforementioned into account, 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**

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.

> *"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 centimetres. This would affect 105 hectares and 60% of the current residential sector in this port would be under water."*

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 5 also presents the importance of fisheries areas in terms of labor force with Costa Rican along with agriculture, around 14% of GDP.

Ilustration 13 Image of Puntarenas: scenario a 2010 - 2100

Fuente: IMN

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."*

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).

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.

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.

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 possibility (a.o. through its Board members) and experience to link community based experience and practice to local and national level policy making.

Fundecooperacion's goal 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 approved 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.

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 in order to have a meaningful impact on the territory and be able to fulfil 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.

- The training 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 2009, and it will be governed by the general acting principles that improve sustainable development, awareness, equity, participation, and consultation.

Programme Objectives:

List the main objectives of the programme.

Support the construction of the adaptation capacity of Costa Rica 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. Increase the adaptation capacity and the reduction of vulnerability to climate change in the agricultural sector.
2. Strengthening coastal communities most vulnerable to climate change and improving the management of water resources in order to build resilience.
3. Improve the capacity of communities, producers, institutions, and stakeholders for the 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.

PROGRAMME COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US$)
1. Component 1: Agricultural sector Objective: Increase the adaptation capacity and the reduction of vulnerability to climate change in the agricultural sector.	1. Improve long-term and sustainable production of agricultural resources that promote food security and sustainable livelihoods	1.1. Traditional mechanisms, including conventional agro ecosystem management practices adapted.	3.16
	2. Generate, validate, and share technologies that reduce the vulnerability of production systems of small agricultural producers (to improve nutritional quality of crops) Develop strategies that offer multiple benefits: • Agroforestry systems with multipurpose (conserve soil and water, increases biodiversity), organic agriculture, low cost technologies. • Improved livestock forage quality, • Reduce the demand of water for irrigation • Establishment and support of seed banks, • Increasing organic materials on farms.	2.1. Current agricultural productivity strengthened in response to climate change in order to meet trends in food production and food security. 2.2. Reduction of money losses for beneficiaries. 2.2. Reduction of large-scale land, soil, and water degradation, 2.3. Technical design of sustainable production that promote food security and sustainable livelihoods.	

	3. Support the adoption of the technologies generated and shared in the local communities: • Provide funding to agricultural producers to implement sustainable land management practices and implement climate change adaptation strategies: through a payment for ecological services (PES), grants and / or credits	3.1. Reduction of hazards by increasing the preparation of communities. 3.2. Overall increase in productivity and decrease of negative impacts due extreme climate effects in farms. 3.3. Increase the use of technologies with tolerance to changes related to CCG (drought, heat, rainfall, plagues, and others) 3.4. Systematic follow-up of CC and its impact on agriculture	
	4. Systematic review and interchange of experiences among producers (emphasis on small and medium-sized enterprises) regarding the adaptation to climate change. Participation of research institutions and participative extension and systematization of the experience in order to obtain the lessons learned for the region. • Support and follow up to producers to develop their own strategies and share their ideas • Workshops among communities and beneficiaries to exchange knowledge and experiences.	4.1. Improved knowledge, a catalogue of good practices, innovative instruments, and lessons learned regarding adaptation. 4.2. Increased knowledge of climate impacts and adaptation measures for agriculture.	
1. Component 2: Water-Coastline Sector: Objective: Strengthening coastal	1. Local water management associations in rural communities improve management (info and tech) of recharge zones for aquifers of strategic relevance)		3.2

communities most vulnerable to climate change and improving the management of water resources in order to build resilience.	2. Reducing gaps regarding the protection of areas that are important regarding water, infrastructure, and water treatment in case of climate change. Specific activities: • Protection of recharge zones and improvement of basic infrastructure. • Reforestation.	2.1. Increase of resilience of ecosystems that protect surface and underground water sources through the participation of communities in protecting critical ecosystems. 2.2. More protection of water and coastal ecosystems	
	3. Promote improvements that allow the efficient and effective use of water resources: • Reinforcement and adaptation of basic infrastructure (dikes, drainages systems, aqueducts, among others) against climate hazards (Beneficiaries: ASADAS and national water systems.) • Implementation of actions at the community level and rural peasants to reduce the use of water during droughts • Implementation of techniques to reduce the use of water	3.1. Promotion of Technologies for an Efficient Use of Water 3.2. Promotion of chains between activities implemented in water and productive activities on the ground.	
	4. Establish an integrated management of the coastal zone: • Coastal wetland protection and restoration (infrastructure) • Adapting fisheries management and strengthening capacity to deal with long-term climate • Support of rural livelihoods, food security and protection of biodiversity	4.1. Contributes to the support of 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, 4.2. Technical design of coastal protection measures 4.3. Coastal zones effectively managed.	
4. Component 3: Capacities. Objective: Improve the capacity of communities, producers,	1. Create early alert systems and recovery strategies for agriculture, water resources and coastlines in Climate Change.	1.1. Strengthened risk management system, and improvement of information about adaptation, climate rick and extreme events.	2

institutions, and stakeholders for the adaptation to Climate Change, and increase awareness for modifying the behavior regarding this topic.	2. Local training regarding efficiency and management of water resources in their different uses (human consumption, tourism, agriculture, and industry), climatically intelligent agriculture, and adaptation of coastal areas to climate change.	2.1. Reinforcement of Capacities in GIRH and CC for: ASADAS, Municipalities, Organizations of Irrigation Water Users, universities 2.2. Promotion of Technologies for an Efficient Use of Water and Techniques for Managing Rainwater.	
	3. Promote actions for creating capacities in the National Development Plan.	3.1. Dissemination of lessons learned from the pro 3.2. Public awareness campaigns on climate change in the three sectors designed and delivered by outreach trainers	
6. Programme Execution cost			0.86
7. Total Programme Cost			9.22
8. Programme Cycle Management Fee charged by the Implementing Entity (if applicable)			0.75
Amount of Financing Requested			9.97

PROJECTED CALENDAR:

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

MILESTONES	EXPECTED DATES
Start of Programme Implementation	January 2014
Mid-term Review (if planned)	July 2016
Programme Closing	January 2019
Terminal Evaluation	February 2015

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.

Investments in Adaptation: provide comprehensive support for the country's most vulnerable producers, and facilitate the adoption of adaptation measures identified through the *Plan de Acción Estrategia Nacional de Cambio Climático*. The support will consist on investment, technical assistance, and online training with this plan.

Components:

- Agriculture: all micro, small and medium-sized producers located in highly vulnerable zones. The programme will reduce the vulnerability in case of climate change in order to facilitate the adoption of the following types of adaptation measures:
    a) Implementation of technologies and adaptation improvements for CC that cover the efficiency and productivity in crops of products such as banana, sugar cane, coffee, livestock, pineapple, paddy rice. There is great potential to improve the efficiency in managing the services of ecosystems related to crops. These improvements will be achieved by implementing activities aimed at generating, sharing, and adoption technologies that reduce the vulnerability of productive units. Costa Rica has made some advance in this regards. By making efforts to understand prior interventions, it

has been possible to reduce vulnerability through sustainable and low-cost production technologies that have been previously validated at the field level. In this way, it is expected through the adaptation fund, the adoption of this kind of technologies in the selected vulnerable areas.

b) Reduction of vulnerability of the sector to impacts of Climate Change at a local level: more adaptation of productive systems needs to be translated into a reduction in the sensitivity of systems to climate changes (this is, less impact on the system) and better recovery capacity of the system to impacts. At the same time, both actions should be translated into less variability of production, specifically regarding losses due to climate variations as a consequence of climate change, excluding catastrophic events such as hurricanes, earthquakes, and others.

c) Adoption and use of technologies in productive systems (innovation): Proper management practices of agricultural use, including irrigation facilities, better soil management techniques, and the inclusion of structures for better recovery capacity.

- Water-coastal Resources: Concerns about the environmental impact caused by different activities –such as the deterioration of ecosystems of coastlines and the use of natural resources jeopardizes the safety of the water resource, its quantity, and protection; therefore, the systems show high vulnerability and low response capacity to events that put them at risk. Prioritized measures can be grouped in four lines of action:

  a) Protection of recharge zones, surface waters and groundwater. It is a priority to value the health of ecosystems that protect sources of water significance. And, based on these results, prioritize a strategy for their protection with the participation of local and national stakeholders. The identification of protection gaps in zones of water significance implies the creation of pilot and safety plans, and improvement of the resilience of the basin in order to improve the percolation, promote reforestation and agroforestry practices. These actions will allow operators to previously have measures and protocols to reduce vulnerability and improve the response capacity in case of these events.

  b) Strengthen coastal communities that are vulnerable to climate change. To do this, adaptation measures must be identified and executed for the sustainable use of the

natural capital according to the identified needs, by protecting ecosystems and promoting and respecting locally installed practices.

c) Promote technologies that allow the efficient and effective use of water resources: It includes measures that allow the effective management of water supply and demand.

- Reinforcement of Institutional Capacities:
  a) At a local level, this effort wants operators such as ASADAS that are rural water management associations (owned by communities), municipalities that manage aqueducts and Organizations of Irrigation Users of the most vulnerable areas to reinforce the environmental and risk management capacities by creating pilot plans and water safety plans.
  b) Regarding the development of coastal areas, the programme is directly related to reducing the effect of variability of sea levels into coastal communities, assessment of their impact on coastal populations, and the supply of water for human consumption.
  c) Moreover, it will be addressed to communities, producers, institutions, and stakeholders, specifically to those related to the production of staple grains of the Costa Rican basic household goods and **the basic food basket** (rice, beans, and corn).

Components 1 and 2, although they are different in focus, they mutually reinforce each other, specifically regarding the protection of living conditions and guaranteeing food safety, which results in the reduction of the vulnerability of the human population and the natural environment. At political level, both components are part of the *Estrategia Nacional de Cambio Climático* –ENCC (National Strategy of Climate Change). The programme have the potential to generate a series of environmentally beneficial effects such as soil conservation, soil fertility, and water availability. These two components are complemented with the approach for developing capacities (Component 3), which tries to guarantee that the programme outputs are kept through 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.

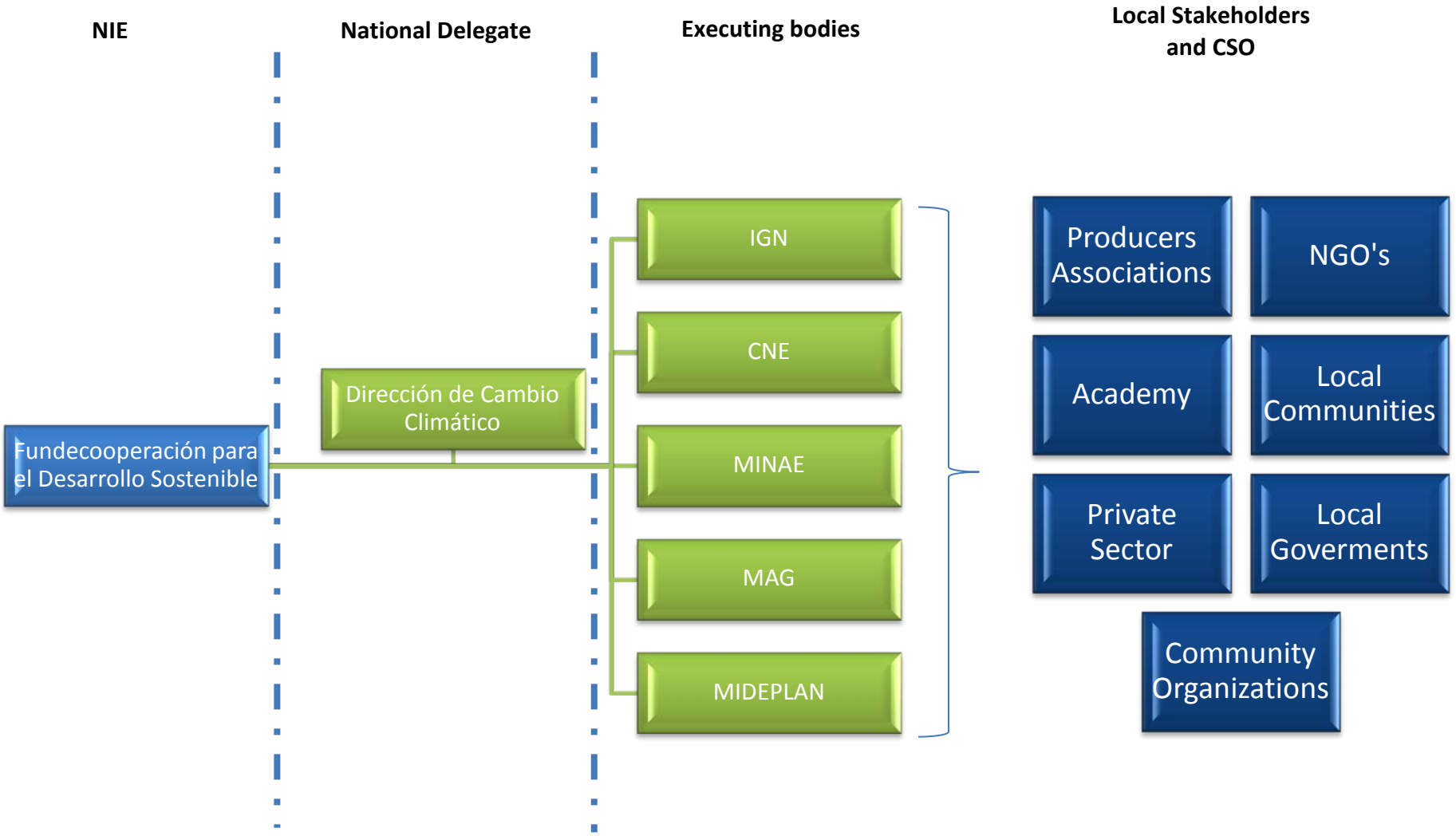
These measures aimed at reducing the sensitivity to climate change and variability. The programme has identified the vulnerability levels of the different areas in the country through a specific study made by the IMN –with well-known experience in studies regarding vulnerability, adaptation, and mitigation at national level. The programme's long-term output is the protection of living conditions and natural resources for the benefit of residents at beneficiary communities and for the country as well.

Programme Strategy

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.

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).

Illustration 2 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.

The programme will provide significant economic, social and environmental benefits to communities selected on table 8. 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)

Vulnerable groups benefiting from this project 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:

Benefits distribution: Project 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 communities mentioned in the following table; however it is expected to impact broader geographic area. As an example, the implementation of new agriculture methods that will allow the beneficiaries to use less water, increase productivity and improve results (although climate impacts continue). 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 an limited resource.

Table 8 Beneficiaries selected

Beneficiaries	Priority
Chorotega Region	
Guanacaste Province: Liberia, Nicoya, Santa Cruz, Bagaces, Carrillo, Cañas, Abangares, Tilarán, Nandayure, La Cruz, Hojancha.	HIGH
Huetar Norte Region	
Alajuela Province: Los Chiles, Guatuso	HIGH
Brunca Region	
San Jose Province: Pérez Zeledón. Puntarenas Province: Buenos Aires, Osa, Golfito, Corredores.	HIGH
Huetar Atlántica Region	
Limón Province: Limón, Pococí, Siquirres, Talamanca, Matina and Guácimo. Heredia Province: Sarapiquí.	MEDIUM-HIGH
Central Pacific Region	
Puntarenas Province: Puntarenas, Garabito. Alajuela Province: Orotina	MEDIUM-HIGH
Central Region	
San Jose Province: San José, Escazú, Desamparados, Turrubares. Cartago Province: Cartago	MEDIUM LOW

Source: own creation

Strategy:

1. **Build on existing capacity**

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 project 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.

It is important to mention that adaptative 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 sectors. 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 adaptative measures as soon as possible.

2. Participative, Consultative, and Agreed Process.

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.

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. Periodic political dialogues and consultations among the interested parties of partner countries will be supported by the results of the submittal of reports and evaluations of initiatives with a bottom-top approach.
- 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.

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

Initiatives part of this project 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 "Illustration 3 Organization Chart for Implementing the Strategy" the participation of local organizations, government, NGO´s and specially the compromise of local beneficiaries (individuals and organizations) make possible to preserve and even improve the initiatives.

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 the adaptation needs in the communities cannot be address with the programme, for this reason the component 3 pretends, through the creation of capacities and knowledge management, to extract lessons

learned and best practices that 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.

The programme interventions (the 3 components) imply two types of investments. Investments based on potential social, economic and environmental benefits. First, it is expected to dedicate concrete investments on infrastructure for the rehabilitation of key recharge zones, water treatment, and coastal wetland protection and restoration coastal and shoreline productive activities. This kind of investment is expected to generate long-term benefits in terms of resilience.

Second, interventions related with knowledge management and creation of capacities is 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.

During the implementation of the programme, it is expected to have counterparties 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.

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

- It is expected that the direct beneficiaries and main participants of the programme have assets 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.)

- Moreover, executing organizations will also provide their knowledge, networks, skills, facilities, etc. for executing 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, and help the development of the 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 mobilisation 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 hazard events through greater awareness and knowledge while the ordinary expenses to finance the impact of CC post investment will be reduced.

Operationally, the resources of the Adaptation Fund will be carefully managed to reach the efficiency and the quality-price relation. Products and services acquired will be governed by rules established by the AFB.

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.

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 GEI 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.

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 GEI that are not controlled by 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 GEI 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

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

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

Building codes and other construction, labor codes as well as the relevant sectoral laws and regulations that include adaptation measures from the inception of the infraestructure projects will also be undertaken.

This programme aims at becoming the reference regulatory framework regarding water resources, when taking into account the proclamation date of previous laws.

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

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.

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 9.

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.

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

The component of knowledge management (component 3) is a priority for the country to be able to replicate initiatives regarding adaptation to climate change and thus generate even more impact at a 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 the creation of material required for creating capacities and the posterior awareness for each project supported by the programme. Moreover, the generation of information will be used to raise awareness in the communities.

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 on-board lessons.

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.

The programme will include the documentation of:

- Good adaptation practices to reduce vulnerability and increase resilience
- Methods and techniques for protecting water resources
- General documentation of the programme.

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.

Fundecooperación, along with the *Dirección de Cambio Climático* (Climate Change Direction – the Authorized Delegation 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).

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.

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.

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 9 Initiatives on Climate Changes

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
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.

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 10 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)	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
Acueducto El Tanque	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)		

Source: Own Creation.

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.

For development of the full proposal, it is expected to implement additional stakeholder consultation processes (in September-October 2013).

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

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[1] (…). 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 11 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 10 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

[1] 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 12 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: Increase the adaptation capacity and the reduction of vulnerability to climate change in the agricultural sector.

Baseline – without the resources from the Adaptation Fund

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:

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:

- ✓ 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:** Increase of resistance to climate by reinforcing the protection of coastlines and by improving the water management.

Baseline – without the resources from the Adaptation Fund

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:

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: Capacities. **Objective:** Improve the institutional and local capacity in reducing the risk of disasters in specific vulnerable areas, and increase awareness for modifying the behavior.

Baseline – Creation of Capacities

The lack of knowledge 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 programmes 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:

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 rick and extreme events will enable to monitor key indicators of climate change and to provide best available technical advice to future activities.

The project will also support additional capacity building to enable beneficiaries to maintenance their activities after the programme. This adaptation cost will also support the costs of capacity building for the development of adaptation based on ecosystems.

Although this project is not expected to address all of the sectors needs, it will help in covering the costs of making possible 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 avoiding the adverse impacts of extreme climate changes in vulnerable areas due to receive increased or decreased of precipitation (by improvement of infrastructure on coastal communities and water management areas example ASADAS).

This project will therefore support the additional costs of rehabilitating fragile ecosystems. As it is shown in the “Illustration 4 Organization Chart for Implementing the Strategy” this project 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 shock.

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

By taking into account the difference among the three main components for developing the proposal: 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.

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.

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.

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, 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.

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.
- ✓ 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, it is expected that the appropiation of the programme from the beneficiaries will make possible to continue its implementation even when the intervention of the programme is over.
- ✓ Institutionally: it is expected the participation of several sectors 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.

Once the aforementioned has been covered, it is important to note that the sustainability of the proposal has different sources established from its formulation and from which its maintenance is possible. 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. By having other support sources, the actions promoted may have greater incidence on the adaptation to climate changes and its adverse effects.

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[2].

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.

[2] 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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PART IV: endorsement by government and certification by the Implementing Entity

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[3] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

William Alpízar Zúñiga *Climate Change Office Director* *Ministry of Environment and Energy*	Date: *April 29th 2013*

B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (National Development Plan, a National Strategy of Climate Change, a Carbon Neutral Country Program, a State Policy for the Agriculture and Food and an Action Plan for Climate Change) and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.
Marianella Feoli Implementing Entity Coordinator Fundecooperación para el Desarrollo Sostenible.

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

Date: *April 29th 2013*	Tel. and email (506) 2225-4507 mfeoli@fundecooperacion.org
Project Contact Person: *Marianella Feoli*	
Tel. and Email: (506) 2225-4507 mfeoli@fundecooperacion.org	

San José, April 29th, 2013
DCC-083-2013

Letter of Endorsement by Government

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

Subject: Endorsement for **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**

On behalf of the Ministry of Environment and Energy, through its Office of Climate Change and in its capacity as designated authority for the Adaptation Fund in Costa Rica, I confirm that the concept note proposal agrees with the government's priorities in implementing adaptation activities to reduce the adverse impacts and risks posed by climate change in Costa Rica.

The proposal has been prepared in a participatory, consultative and consensus-seeking manner, through various workshops that brought together many relevant actors and knowledge that is available in the country.

Accordingly, I am pleased to endorse the above programme concept proposal. If approved, the programme will be implemented by Fundecooperación para el Desarrollo Sostenible and executed by the National Ministry of Environment and Energy (MINAE), Ministry of Agriculture (MAG), Ministry of National Planning and Economical Politics (MIDEPLAN), National Emergency Commission (CNE) along with the academia, private sector, NGOs, government and local communities.

Sincerely,

William Alpízar, Director
Office for Climate Change
Ministry of Environment and Energy

MINISTERIO DE AMBIENTE, ENERGÍA Y TELECOMUNICACIONES
MINAET
DIRECCION DE CAMBIO CLIMATICO
COSTA RICA

ID/on.b

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