



## ADAPTATION FUND

# PRE-CONCEPT FOR A REGIONAL PROJECT/PROGRAMME

Title of Project/Programme:	Reducing climate vulnerability and flood risk in coastal urban and semi urban areas in cities in Latin America
Countries:	Chile and Ecuador
Thematic Focal Area <sup>1</sup> :	Disaster risk reduction and early warning systems
Type of Implementing Entity:	Regional Implementing Entity (RIE)
Implementing Entity:	CAF, Development bank of Latin America
Executing Entities:	Ministry of the Environment (Chile), Ministry of the Environment (Ecuador)
Amount of Financing Requested:	14.989.029 (in U.S Dollars Equivalent)

**Project / Programme Background and Context:** Latin America (LA) is the most urbanized region in the world, with 80% (UN Habitat, 2012) of its almost 600 million people living in cities, and with 111 million people living in informal settlements, in conditions accentuated by poverty and inequality that make them highly vulnerable to disasters. Many of the cities in the Latin American region are experiencing rapid growth and frequently without any planning (Planet of Cities, 2015), often located on the coasts, in ecosystems that experience quickly climate change's adverse effects (IPCC, 2007)).

This proposed project focuses on reducing vulnerability in the face of flooding in three (3) urban coastal settings in Latin America, promoting the exchange of information and lessons learned, building networks and the development of a culture of adaptation solutions in coastal urban areas throughout the region. The urban settings would include Antofagasta, and Taltal in Chile, and the city of Esmeraldas in Ecuador.

The cities selected have a high risk profile in the face of mass movements provoked by intense rainfall. The exposure of these cities to the effects of climate change influences their vulnerability. The city of Esmeraldas is located on the northern coast of the Pacific Ocean, at the mouth of the Esmeraldas River. Antofagasta and Taltal, by locating in the foothills of the *Cordillera de la Costa* are under risk from flooding, exposing their populations, infrastructure and urban features.

Esmeraldas in Ecuador, with a population of 174,125 inhabitants, faces risks of losing between 3 and 6% of the city's infrastructure to sea-level rise. More than 80% of the population in the area is under threat from at least one of: seismic events, landslides, or floods. Antofagasta is home to a population of 390,832 inhabitants and Taltal to 10,322 (estimate 2014, National Institute of Statistics, INE, for its acronym in Spanish). According to a study done by National Emergency Bureau of the Ministry of the Interior and Public Security of Chile (ONEMI, 2015), the historical analysis has allowed for determining 21 torrential rain events that unchained mass wasting or movements in the cities of Antofagasta and Taltal. The greater part of these events is associated with the El Niño phenomenon, which corresponds to the warming phase in the Southern Oscillation (ENSO), which constitutes an extreme state in ocean-atmospheric conditions in the Pacific Basin (Arntz and Fahrbach, 1996).

In 1991 a landslide occurred in the city of Antofagasta which occasioned the death of 92 persons and economic losses in the health, education and infrastructure sector (CEPAL, 2007). This fact marked a milestone in public management, giving rise to the construction of alluvial control channels in various ravines in the city and in other locales on the coast. In 2015, there were three landslides, in Antofagasta and Taltal, which caused damage to infrastructure and housing, as well as provoking the death of six persons.

**Table 1. General Vision: Number of disaster related to the climate in Ecuador and Chile, and their economic and human impacts 1980 and 2013.**

COUNTRY	# DISASTERS	TOTAL ECONOMIC LOSS (USD 1000s)	AVERAGE YEARLY LOSS (AS A % OF GDP)	# FATALITIES	# PERSONS AFFECTED	AVERAGE YEARLY # PERSONS AFFECTED (PER 1000 INHAB)
Chile	30	2317934	0.034	653	1110352	2.63
Ecuador	30	1983881	0.095	1066	915104	2.42

Source: Vulnerability and Adaptation to Climate Change Index in the Latin American and Caribbean Region, elaborated for CAF by Maplecroft (2014). <http://scioteca.caf.com/handle/123456789/509>

<sup>1</sup> Thematic areas are: Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.

Table 1 shows the similarities between Chile and Ecuador regarding the number of disasters related to the climate in the period covering 1980 to 2013, likewise, it can be noted that, although there are differences regarding incomes and gross domestic product (GDP) in both countries, on average, the yearly number of affected persons due to said disasters is very similar: Chile 2.63% and Ecuador 2.42%.

**Table 2. Vulnerability Index and its components**

CITY	VULNERABILITY INDEX	EXPOSURE INDEX	SENSITIVITY	ADAPTIVE CAPACITY INDEX
Antofagasta	8.48	9.31	5.76	9.40
Esmeraldas	1.94	3.61	2.34	4.44

Source: Vulnerability and Adaptation to Climate Change Index in the Latin American and Caribbean Region, elaborated for CAF by Maplecroft (2014). <http://scioteca.caf.com/handle/123456789/509>

According to the Vulnerability and Adaptation to Climate Change Index in the Latin American and Caribbean Region (CAF/ Maplecroft 2014), on a scale of 1 to 10 (the low end points toward extreme vulnerability, and the high end to low vulnerability), Esmeraldas presents a vulnerability index of 1.94 (extreme). The vulnerability index for the city of Antofagasta placed at 8.48. No data for Taltal is recorded, which opens an opportunity for coastal cities to share experiences in order to increase their resilience to the adverse effects of climate change within the framework of this project.

It is evident that the cities in Chile demonstrate less vulnerability, and this is in part due to the fact that adaptive capacity indices are influenced by the GDP levels (in 2012, Chile had the highest per capita GDP in Latin America). However, the adaptive capacity is composed of diverse elements related to institutional capacity, technical capacity, and natural resources security.

For the CAF, coordinating a project that requires the reduction of vulnerability in coastal urban centers defined by diverse conditions and heterogeneous realities is a challenge, as well as an opportunity to identify and analyze the variables that ought to be adjusted for the success of the measures to be implemented, which goes far beyond simply having the necessary financial resources, and this is demonstrated when differences in the vulnerability indices are observed in the data but similarities also for being small and mid-sized coastal cities, exposed to similar risks and having similar management options. On the other hand, the connection with initiatives in progress, such as the CAF's Cities with a Future, will permit this linkage for continuity in the medium and long term.

Additionally, the associations between cities and international organizations are key for bringing together necessary capacities and learning from these experiences, in order to confront the impacts caused by a changing climate in Latin America in the most effective manner, seeking also to replicate the experience in other coastal population centers in the Southeast Pacific.

**Project / Program Objectives: Reduce the vulnerability in the face of floods due to the effects of climate change in three coastal cities located in Latin America, promoting the exchange of information and lessons learned, building networks and the development of a culture of adaptation solutions in coastal urban areas throughout the region.**

**Component 1. Priority actions to increase resilience. Objective: Reduce the vulnerability of communities with the greatest risk of landslides due to flooding. The actions are:**

- Landslide control works in prioritized micro-basins and currently with a significant population density dwelling in the alluvial fan or debris cone.
- Improvement in the emergency network on the shoreline which currently monitors precipitation in three (3) stations located in the city of Antofagasta.
- Implementation of signage in areas with alluvial risk and along evacuation routes.
- Implementation of an Early Landslide Warning System.
- Installation of an Early Climate Warning System (emergency room).
- Complement antecedents associated with Antofagasta's Rainwater Master Plan.
- Design, feasibility analysis and implementation of the adaptation measures.

**Component 2. Reinforcement of capacities. Objective: Train local communities and institutions through the following actions:**

- Implementation of an educational program and dissemination of information on landslide risks.
- Implementation of a pilot project based on the "Narrators" project being developed in the city of Nishinomiya, Japan.
- Providing technical planning tools to improve response ability.
- Awareness campaign (floods and landslides).

**Component 3. ICTs and partnership between coastal cities in Latin America. Objective:** Promotion of a regional platform through the partnership between coastal cities, as a key element for the execution of successful measures in matters related to climate change adaptation. The platform will serve as a space for sharing experiences and learning about concerns and needs of the cities in these countries have, information that will serve both the coastal cities as well as the CAF, in its role as a development bank, to orient key participating stakeholders for accessing diverse sources of financing, with special emphasis on regional projects. This component's actions are:

- Development of a communications system
- Regional exchange visits to demonstration sites
- Creation of an integration committee

### Project / Program Components and Financing:

Project Components	Expected Outcomes	Expected Outputs	Countries	(US\$)
<b>Component 1. Priority Actions for increasing resilience.</b>			Chile, Ecuador	<b>11,805,351</b>
<b>SC 1.1.</b> Construction of alluvial control works and establishment of the designs necessary for reducing flooding and landslide risks	- Construction of works (rainwater channels, control works), in prioritized micro-basins. - Acquisition of software for analysis, design and prioritization (for example ArcGIS, Aquaveo WMS or Mike She and/or flood).	- Mitigation works for landslide control. - Updated Rainwater Master Plan incorporating micro-basins in Antofagasta and Taltal.	Chile <sup>2</sup> (Antofagasta and Taltal)	7,450,704 <sup>3</sup>
	- Reducing exposure of highly vulnerable coastal zones residents	- Design, feasibility analysis and implementation of the adaptation measures	Ecuador	2,260,000
<b>SC 1.2. Early Climate Warning System</b>	- Improvement of response ability.	- Installation of an Early Climate Warning System (Emergency Room)	Ecuador	380,000
<b>SC 1.3. Signage equipment and warning systems</b>	- Implement signage to orient the population's evacuation during emergencies due to landslide risk. - Installation of an early warning system for landslides.	- Acquisition and installation 500 signposts for landslide risk evacuation areas and routes - Acquisition and installation of 10 specific sirens.	Chile (Antofagasta and Taltal)	1,070,422
<b>SC 1.4. Emergency Network for the Shoreline, associated with the monitoring of meteorological parameters/ weather conditions</b>	- Improve the current shoreline emergency network (increase the quantity of stations and measurement parameters; implementation of meteorological radar). - Implement online platform for meteorological data.	- Optimized emergency network: 10 new stations, broaden monitoring parameters. - Meteorological radar system - Online platform in operation	Chile (Antofagasta and Taltal)	644,225
<b>Component 2. Reinforcement of capacities.</b>			Chile, Ecuador	<b>1,423,380</b>
<b>SC 2.1. Capacity strengthening of local residents</b>	- Replicate pilot program of the "Narrators" project from Japan. - Dissemination of materials and media plan.	- Implementation of pilot program with environmental stories	Chile (Antofagasta and Taltal)	563,380
	- Awareness-raising: local adaptation and climate risk reduction.	- Communication strategy. Awareness campaign (floods and landslides)	Ecuador	210,000

<sup>2</sup> The final number and type of work will depend on the results of the studies and costs associated to the built of the works required.

<sup>3</sup> Of the total, between 10-15% are considered for studies, the rest for mitigation projects for flood control.

Project Components	Expected Outcomes	Expected Outputs	Countries	(US\$)
SC 2.2. Capacity strengthening-local government.	- Providing technical planning tools to improve response ability.	- Socio-econ & relocation evaluation - Local staff training	Ecuador	650,000
ICTs and partnership between coastal cities in Latin America.		Chile, Ecuador		300,000
SC 3.1. ICTs and partnership between coastal cities in Latin America.	Guarantee the dissemination of lessons learned, Strategic opportunities and strategic partnerships generation.	Design/implement a communication system.	Chile, Ecuador	100,000
SC 3.2. Regional exchange visits to demonstration sites	Guarantee the direct contact and learning from the implementation processes.	Implement a series of process learning visits from interested countries.	Chile Ecuador; Visitors: Latam	100,000
SC 3.3. Integration Committee	Guarantee the exchange of experiences and lessons learned among project executors.	1 Annual report of evaluation, feedback and lessons learned from each project.	Chile, Ecuador	100,000
4. Project/Program Execution Cost				350,000
5. Total Project/Program Cost				13,878,731
6. Project/Program Cycle Management Fee charged by the implementing Entity (8%)				1,110,298
<b>Amount of Financing Requested</b>				<b>14,989,029</b>

Project Duration: 5 years (60 months)

## PART II: PROJECT / PROGRAM JUSTIFICATION

*The project / program components, particularly focusing on the concrete adaptation activities, how these activities would contribute to climate resilience, and how they would build added value through the regional approach, compared to implementing similar activities in each country individually.* Chile and Ecuador coincided on the advantage of joining efforts simultaneously towards shared, common, articulated approaches in technical, institutional and management issues in the frame of this project. Coincidences were found on the development and use of joint approaches, exchange of experiences, capacity building and cooperation mechanisms in subjects that go beyond political boundaries, and that call for local solutions to seek from wider integrated approaches. Among priority themes brought up the following were found: priorities measures to increase the resilience in similar coastal cities and reinforcement of institutional capacities.

*How the project would promote new and innovative solutions to climate change adaptation, such as new approaches, technologies and mechanisms.* An innovative factor stands out in the capacities reinforcement component. This one includes the realization of a pilot program in the city of Antofagasta to replicate the "Narrators" project that is being developed in the city of Nishinomiya, Japan. In 2013, a delegation of Japanese experts comprised by the NGO LEAF, Dr. Takahashi Manabu (geologist) and the University of Ritsumeikan in Kyoto, shared with relevant stakeholders in Chile the "Narrators" project's experiences. Through a workshop, the Japanese delegation emphasized how important it is that local communities come to know in a topographical sense the areas they live in, because "knowing your territory means saving your life". The principal motor behind the "Narrators" project are elderly residents who are selected to recount and describe where they live and to tell about their life experience and lessons learned from disaster events.

Another innovative factor is the use of ICTs to develop a system for mass communications that can serve as a tool for dissemination and the replication of experiences, for defining agreements and synergies among key stakeholders in various cities in Latin America, serving at the same time as a space for learning about opportunities that both CAF and other international funds offer both in matters of financing as well as climate change.

*The cost-effectiveness of the proposed project / program, explaining how the regional approach would support cost-effectiveness.* Cost-effectiveness analysis encompasses two alternatives: 1) that the adaptation measures are carried out in cities in Chile and Ecuador, aligned in this regional project or 2) that isolated projects be executed in cities

**Justification for requested funding, based on reasoning of the total cost of adaptation):** The cities have been assigned a strategic role in their specific regional development, for which the requirements for investment in different variables is a challenge. While it is true that adaptation actions are being increasingly positioned, the dominant planning culture does not yet prioritize them from a budgetary view, while risk exposure is maintained, and even increased due to the ongoing deterioration of ecosystems and anthropogenic systems. The investments proposed in this project, given their focus on adaptation actions, can contribute both to reducing the vulnerability of communities at risk, as well as to positioning in the planning and management schemes the value and prioritization of adaptive management for balanced development. Such investments have an opportunity value such as implementation under other financing frameworks may have to wait one or more administrative cycles (4 to 8 years), until its promoters succeed among their local authorities. Strengthening the capacities of the strategically positioned authorities is a way to boost the development of adaptation activities.

**The environmental and social impacts and risks identified as being relevant to the project/program:** The project has been categorized as B with respect to potential E&S impacts that it could generate. In the subsequent development of the proposal this will formally confirmed and the possible existence of pertinent E&S risks from project activities will be evaluated. At present, it is expected that there may be some risks in the following aspects: 1. Institutional and political instability; 2. Project acceptance on the part of the population.

### PART III: IMPLEMENTATION ARRANGEMENTS

*(At the pre-concept stage, this section should only briefly explain which organizations would be involved in the proposed regional project/programme at the regional and national/sub-national level, and how coordination would be arranged. The involvement of national institutions, and when possible, national implementing entities (NIEs), partnering in the project should be explained.)* Both Chile and Ecuador have considered the local governments as well as the institutions to be relevant in the formulation of the project's current initial concept. During the implementation phase, each country will proceed based on the structures established as committees and national risk management authorities. The creation of a committee with the participation of the indicated entities from each country is proposed with the main objective being that of monitoring the project's implementation.

### PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

- A. **Record of endorsement on behalf of the government<sup>4</sup>** Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project/programme. Add more lines as necessary. The endorsement letters should be attached as annexes to the project/programme proposal.

<p>Gladys Santis, Adaptation Officer, Climate Change Office, Ministry of Environment of Chile</p>	<p>Date: July 27, 2015 Reviewed on January 8, 2016</p>
<p> Daniel Vicente Ortega Pacheco, Minister, Ministry of Environment of Ecuador</p>	<p>Date: January 11, 2016 Reviewed on January 11, 2016</p>

- 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.

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.

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 (Regional Development Strategy of the Metropolitan Region of Santiago 2012-2021 (Chile); Regional Strategy for the Conservation of Biodiversity RMS 2015-20 (Chile); Plan for Adaptation to Climate Change within Biodiversity 2014 (Chile); National Plan for Good Living 2013-2017 (Ecuador); National Climate Change Strategy 2012-2025 (Ecuador) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.

*Ligia Castro*  
*Dirección de Ambiente y Cambio Climático*  
Implementing Entity Coordinator

Date: *January 8, 2016*

Tel. and email: [lcastro@caf.com](mailto:lcastro@caf.com)  
+57.1.743.7355

Project Contact Person: María Carolina Torres

Tel. and Email: [mctorres@caf.com](mailto:mctorres@caf.com) / 52 (55) 1102 6904.

## PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

- A. Record of endorsement on behalf of the government<sup>1</sup>** Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project/programme. Add more lines as necessary. The endorsement letters should be attached as annexes to the project/programme Disaster risk reduction and early warning systems proposal.

 Gladys Santis, Adaptation Officer, Climate Change Department, Ministry of Environment of Chile	Date: July 27, 2015 Reviewed on January 8, 2016
 Daniel Vicente Ortega Pacheco, Minister, Ministry of Environment of Ecuador	Date: July, 24, 2015 Reviewed on January 8, 2016

- 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 (Regional Development Strategy of the Metropolitan Region of Santiago 2012-2021 (Chile); Regional Strategy for the Conservation of Biodiversity RMS 2015-20 (Chile); Plan for Adaptation to Climate Change within Biodiversity 2014 (Chile); National Plan for Good Living 2013-2017 (Ecuador); National Climate Change Strategy 2012-2025 (Ecuador) and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
 Ligia Castro Dirección de Ambiente y Cambio Climático Implementing Entity Coordinator	
Date: January 8, 2016	Tel. and email: <a href="mailto:lcastro@caf.com">lcastro@caf.com</a> +57.1.743.7355
Project Contact Person: María Carolina Torres	
Tel. and Email: <a href="mailto:mctorres@caf.com">mctorres@caf.com</a> / 52 (55) 1102 6904.	

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.

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- A. Record of endorsement on behalf of the government<sup>1</sup>** Provide the name and position of the government official and indicate date of endorsement for each country participating in the proposed project/programme. Add more lines as necessary. The endorsement letters should be attached as annexes to the project/programme Disaster risk reduction and early warning systems proposal.

<p><i>Gladys Santis, Adaptation Officer, Climate Change Office, Ministry of Environment of Chile</i></p>	<p>Date: July 27, 2015 Reviewed on January 8, 2016</p>
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<p>I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (Regional Development Strategy of the Metropolitan Region of Santiago 2012-2021 (Chile); Regional Strategy for the Conservation of Biodiversity RMS 2015-20 (Chile); Plan for Adaptation to Climate Change within Biodiversity 2014 (Chile); National Plan for Good Living 2013-2017 (Ecuador); National Climate Change Strategy 2012-2025 (Ecuador) and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.</p>	
	
<p><i>Ligia Castro</i> Dirección de Ambiente y Cambio Climático Implementing Entity Coordinator</p>	
<p>Date: January 8, 2016</p>	<p>Tel. and email: <a href="mailto:lcastro@caf.com">lcastro@caf.com</a> +57.1.743.7355</p>
<p>Project Contact Person: María Carolina Torres</p>	
<p>Tel. and Email: <a href="mailto:mctorres@caf.com">mctorres@caf.com</a> / 52 (55) 1102 6904.</p>	

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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.



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**Letter of Endorsement by Government**



Government of Chile  
Ministry of Environment

Santiago de Chile, January 8, 2016

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

**Subject: Endorsement for Regional Project *Reducing climate vulnerability and risk of flooding in coastal urban and semi urban areas in Latin American cities***

In my capacity as designated authority for the Adaptation Fund in Chile, I confirm that the above regional project proposal is in accordance with the government's national priorities in implementing adaptation activities to disaster risk reduction and early warning systems of Chile.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project will be implemented by CAF-banco de Desarrollo de America Latina and executed by Ministry of Environment.

Sincerely,

Ms. Gladys Santis  
Adaptation Officer  
Climate Change Department  
Ministry of Environment of Chile



ADAPTATION FUND

**Letter of Endorsement by Government**

Government of Ecuador  
Ministry of Environment

Quito, 08<sup>th</sup> January, 2016

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

**Subject: Endorsement for Regional Project Reducing climate vulnerability and flood risk in coastal urban and semi urban areas in cities in Latin America**

In my capacity as designated authority for the Adaptation Fund in Ecuador, I confirm that the above regional project proposal is in accordance with the government's national priorities in implementing adaptation activities to disaster risk reduction and early warning systems of Ecuador.

Accordingly, I am pleased to endorse the above project/programme proposal with support from the Adaptation Fund. If approved, the project will be implemented by CAF-banco de Desarrollo de America Latina and executed by Ministry of Environment.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Daniel Ortega', written over a horizontal line.

Dr. Daniel Ortega  
Minister of Environment