Cartagena Competitiva y Compatible con el Clima

Plan 4C

A Competitive and Climate Compatible Cartagena
Executive Summary

Ahora sí CARTAGENA

ALCALDÍA MAYOR DE CARTAGENA DE INDIAS
Distrito Turístico y Cultural

TODOS POR UN NUEVO PAÍS
PAZ EQUIDAD EDUCACIÓN
MINAMBIENTE

Colombia 50% Mar
INVEMAR

Cámara de Comercio de Cartagena

CDKN
Climate & Development Knowledge Network

DIRECTORS

MINISTRY OF THE ENVIRONMENT AND SUSTAINABLE DEVELOPMENT – MADS

GABRIEL VALLEJO
Minister

PABLO VIEIRA-SAMPER
Vice Minister

RODRIGO SUÁREZ-CASTAÑO
Climate Change Director

OFFICE OF THE MAYOR OF CARTAGENA

DIONISIO VÉLEZ-TRUJILLO
Mayor of Cartagena de Indias

DOLLY GONZÁLEZ-ESPINOSA
Secretary of Planning of Cartagena

MARINE AND COASTAL RESEARCH INSTITUTE – INVEMAR

FRANCISCO A. ARIAS-ISAZA
General Director

JESÚS ANTONIO GARAY-TINOCO
Scientific Director (SCI)

SANDRA RINCÓN-CABAL
Administrative Director (SRA)

PAULA CRISTINA SIERRA-CORREA
Coordinator for Marine and Coastal Management Research and Information

CLIMATE & DEVELOPMENT KNOWLEDGE NETWORK - CDKN

CONSUELO ESPINOSA
CDKN Regional Director for Latin America and the Caribbean

CLAUDIA MARTÍNEZ-ZULETA
Country Engagement Leader CDKN Colombia

CARTAGENA DE INDIAS CHAMBER OF COMMERCE

JOSÉ ALFONSO DÍAZ-GUTIÉRREZ DE PIÑERES
Chief Executive

FABIÁN MORALES DE LEÓN
Communications and Events Manager

ADRIANA RAMOS-VELOZA
Regional Development Adviser

Plan 4C

A Competitive and Climate Compatible Cartagena

Executive Summary

Cartagena Competitiva y Compatible con el Clima

Ahora sí Cartagena

Alcaldía Mayor de Cartagena de Indias
Distrito Turístico y Cultural

Todos por un Nuevo País
Paz Equidad Educación
Minambiente

Colombia 50% Mar
Invemar

Cámara de Comercio de Cartagena

CDKN
Climate & Development Knowledge Network

Work Team

OFFICE OF THE MAYOR OF CARTAGENA DE INDIAS

Dolly González-Espinosa
Secretary of Planning of Cartagena

Francisco Castillo González
Adviser Secretary of
Planning of Cartagena

MADS

Mariana Rojas
Adaptation Group, Climate Change Office

INVEMAR

Paula Cristina Sierra
Coordinator for Marine and Coastal
Management Research and Information

Ángela Cecilia López
Manager of Information
Analysis for Planning (TIP)

Anny P. Zamora
Economist, Masters Candidate

Verónica Trujillo
Economist, Masters.

Venus Rocha
Topographic Engineer

Mallerly Ulloque
Social Communication Officer

CDKN

Claudia Martínez-Zuleta
Country Engagement Leader
- CDKN Colombia

Guillermo Llinás
Project Manager

Mathieu Lacoste
Communications Coordinator

CARTAGENA CHAMBER OF COMMERCE

Adriana Ramos
Regional Development Adviser

SUPPPORT GROUP

Arnaldo Barreto
Cartagena de Indias District
Mayor's Office

Oswaldo Becerra
Cartagena de Indias District
Mayor's Office

Zulay Luna
Cartagena de Indias District
Mayor's Office

Anabell Corvacho
Invemar

Mabellinis Osorio
Invemar

Cite as:
Office of the Mayor of Cartagena de Indias, MADS, Invemar, CDKN and Cartagena Chamber of Commerce. 2014. Plan 4C: A Competitive and Climate Compatible Cartagena. Executive Summary. Editors: Zamora-Bornachera, A. P., A. López Rodríguez, C. Martínez and M. Lacoste. Invemar General Publications Series No. 77, Santa Marta. 24 p.

Key words:
Climate change, vulnerability, climate compatible development, Cartagena de Indias, strategies, adaptation, mitigation

ISBN: 978-958-58875-2-7 (Online Version)
Design and Layout: John Khatib / Carlos González (ediprint.com.co)
Printed by: Ediprint Ltda.
Photograph credits: Corpoturismo, SPD, Invemar

Project for the integration of adaptation to climate change in the territorial planning and sectoral management of Cartagena de Indias (contract: TALA-0028b INVEMAR-CDKN, 2013).

INVEMAR was the entity responsible for implementation of the project. It is a non- profit organization dedicated to scientific and technological research, attached to the Ministry of the Environment and Sustainable Development, whose mission is to carry out basic and applied research in renewable natural resources and the environment on coasts and marine and oceanic ecosystems of national interest in order to provide the scientific knowledge necessary for the formulation of policies, decision taking and the preparation of plans and projects to lead to their implementation. Its aim is the sustainable development of resources, recuperation of the marine and coastal environment and improvement in Colombians' quality of life through the rational use of this scientific Institute's capacity and its articulation with other public and private entities.

This document is an output from a project commissioned through the Climate and Development Knowledge Network (CDKN). CDKN is a programme funded by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS) for the benefit of developing countries. The views expressed and information contained in it are not necessarily those of or endorsed by DFID, DGIS or the entities managing the delivery of the Climate and Development Knowledge Network, which can accept no responsibility or liability for such views, completeness or accuracy of the information or for any reliance placed on them.

Contents

Introduction

Plan 4C: A Competitive and Climate Compatible Cartagena positions Cartagena as the first coastal city in Colombia to have a long term vision and a framework of planning and action to achieve climate compatible development by 2040. It provides definitive responses with which to deal with the challenge of climate change through concrete strategies and actions to promote sectoral competitiveness in the long term, reduce poverty in the city and the islands and create opportunities for its citizens.

The planet's new climate projections are that an increase in temperature of 2°C in Cartagena de Indias will result in an increase of 60 cm in its sea level by the year 2040. The Inter-Governmental Panel on Climate Change (IPCC) predicts that it will increase by between 4 and 6%, which will raise sea level even more, as well as rainfall and droughts (IPCC, 2014).

Taking into account the vulnerability of the city today and its predictable future scenarios, what is needed is to re-think Cartagena de Indias. Cities that understand what the future climate will bring and prepare to deal with it will be more competitive. Taking steps today in order to be prepared for future conditions is much more cost-effective than waiting and then having to introduce costly, ill planned emergency measures.

The adaptation and mitigation measures proposed in Plan 4C offer the city and its islands an interesting range of possibilities and opportunities for the social and economic development of its population. In this regard, the Plan projects a Cartagena that is an icon in climate compatible development in which adaptation and mitigation measures are implemented to reduce vulnerability to climate change, improve public investment efficiency, the quality of life of its inhabitants and the competitiveness of its productive sectors.

It should be stressed that Cartagena de Indias is an emblematic city whose history is directly linked to the origin and development of Colombia and to the legacy that has resulted in its being

declared a World Heritage City. At present, Cartagena de Indias is one of the main cities of the Colombian Caribbean. Its port zone handles 60% of the country's maritime trade, with over 2,500 industries that contribute 6% of national GDP and growing investments in tourism that consolidate its position as one of the Colombian cities with the greatest international projection.

However, in spite of Cartagena de Indias being a city with important wealth indices, 32.7% of its inhabitants live in poverty and it is they who are most vulnerable to the impacts of climate change. Likewise, a great deal of its development has been supported by the transformation of its landscape: the sandy shores, marshes, canals, beaches, dunes, islands and mangrove swamps have become an urban conglomerate with buildings, hotels, industries, ports and the necessary road infrastructure, which, under the threat of climate change, require the re-thinking of Cartagena de Indias and the implementation of immediate actions.

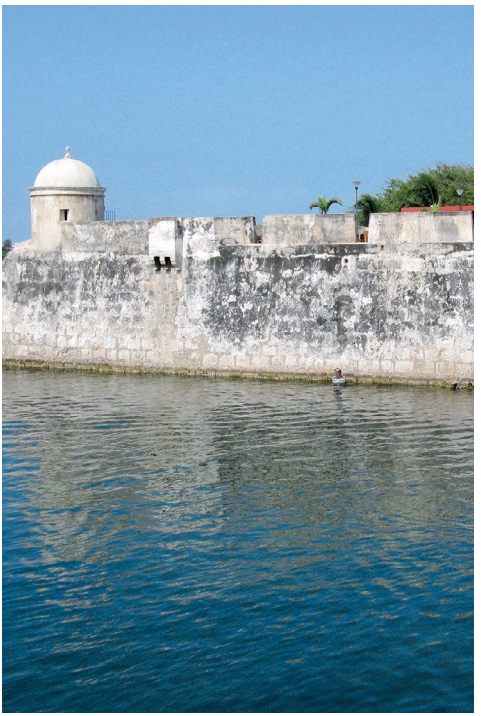
This is precisely what Plan 4C proposes, that is, to convert the risk of climate change into an opportunity for development; cities that understand the future climate and prepare to face it will be more competitive, efficient and sustainable. To achieve this, 5 strategies and 36 projects, which constitute the starting point for the adaptation and mitigation of climate change in the city, are proposed. They will require a strategy of articulation of the public, private and academic sectors at national, regional and district levels in order to generate shared and coordinated actions; moreover, it will need relevant and timely information in order for the right decisions to be taken.

Plan 4C is, in short, the result of two years' hard work between the municipal administration and the different actors of the city. It has involved more than 80 entities, both national and international, all of which have contributed innovative ideas as part of the search for solutions through which to respond to climate challenges in Cartagena and its islands. With this Plan, Cartagena has become the first coastal city to have created a long term vision in which the future climate will be an opportunity for economic development and the social wellbeing of its inhabitants.

The historic legacy of Cartagena de Indias

Cartagena de Indias, a World Heritage City (UNESCO, 1984) and its architectural wealth (the Historic Centre, San Felipe Castle and other military constructions of the XVL, XVII and XVIII centuries), are an important asset for Colombia and its tourism development. This heritage evokes the city's capacity for protection and adaptation in past centuries and projects the dimension that this "Heroic City" will have in the future.

Although the Spaniards who founded it were unaware of climate change, the inclement weather brought them to reinforce the city walls in order to protect the coastline, this legacy is enjoyed today. However, the climate and present circumstances require much more than this: it is no longer solely a question of city walls and infrastructure, but of changing the way its inhabitants live, think, feel and project the city.



At present, Cartagena de Indias is continuing to transform its location in order to claim land from the sea, an example of which is shown in Figure 1. What is today the Marina Park, a green zone of the city owned by the Ministry of Defense (right), used to be part of the internal bay of Cartagena in Colonial times, as we see on Don Antonio de Arévalo's plan of 1789 (at left). The railroad line (center) built at the start of the XX Century, reached the station located beside the Clock Tower, thus defining the route that is today Avenida Blas de Lezo (right).

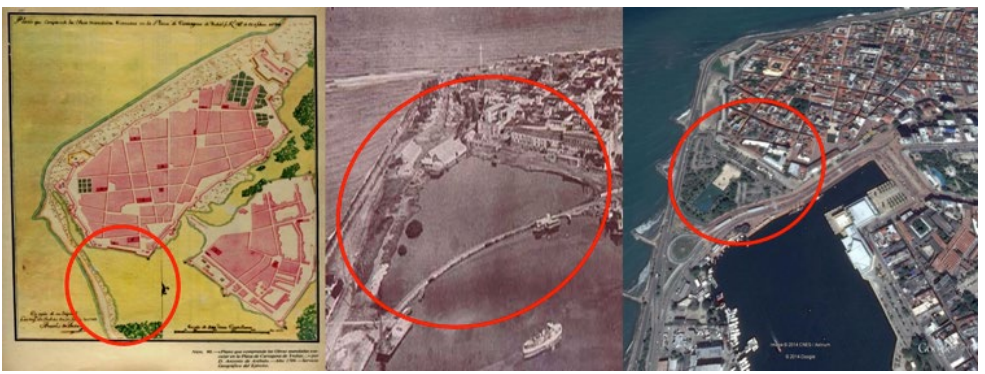


Figure 1. Changes in land use of the Marina Park: (left) copy of Don Antonio de Arévalo's plan of 1798 (IPCC, 2014); (center) railroad line in 1928 and (right) the 2013 Google Earth image of the Marina Park.

Cartagena de Indias today

The district of Cartagena de Indias includes a series of islands, peninsulas and interior bodies of water, which form the insular and continental area and give the city a unique identity based on its morphology. The surface area of the land in the district is 697.24 km^2, of which 87.45% is rural and 12.55% urban. It represents 95% of the total coastline of the Department, in which the most important source of sand for its beaches are sediments from the Magdalena River. The main dynamic activities of the Departmental economy, such as its ports, industry, trade and tourism, which represent 90% of regional GDP (SPD, 2013), take place in these areas.

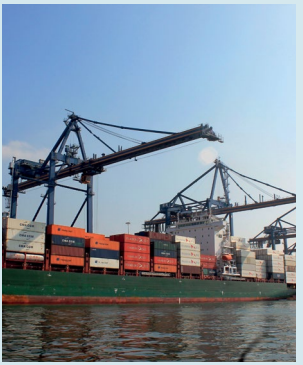
Administratively, it is the capital city of Bolivar Department, the most important Caribbean urban center and an important focus of population, which numbers 978,600 inhabitants, of whom 4.4% live in the rural area, where the most densely populated are El Islote and Isla Fuerte. In the urban area, 60.3% of the population of the city belong to strata 1 and 2, with poverty levels that in many cases fall within the range of abject poverty. These populations will be the most vulnerable to the future climate and have the highest growth rate, an example of which are those located around the La Virgen Marsh and on the island of Tierrabomba (Figure 2).

Figure 2. Vulnerable sectors of Cartagena de Indias: a) industrial sector; b) city neighborhoods; c) insular sector – Island of Tierrabomba; d) Historic Center; e) neighborhoods bordering on the La Virgen Marsh.

The main economic activities are related to the petro-chemical industry, ports, tourism, commerce and services. In view of this, adaptation to climate change is, without a shadow of a doubt, an indispensable factor to dynamize the city's level of competitiveness.

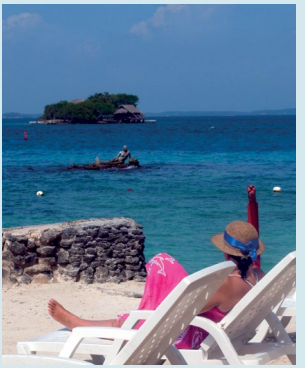
Industry

Industry is concentrated in the Mamonal zone, mainly represented by 2,539 companies. This sector produces 95% of the industrial GDP of Bolivar Department and contributes 6% to national GDP. The main areas of development here are: oil and derivatives, plastic, industrial raw materials, chemical products and, to a lesser extent, the food and beverages sector (CCC, 2013).



Ports

Cartagena's port structure is one of the most complete in Colombia, in which 60% of the total cargo in containers are handled. The privately owned public service docks – among which are the Cartagena Regional Port Company (SPRC) and the Mamonal Port Company, Compas and Contecar – handle close to 20% of the total cargo handled in Cartagena. The rest is handled directly by over 20 private docks belonging to the Mamonal companies. Cartagena has been gaining ground at national level and, as of 2000, has been the number one port on the Caribbean coast (Acosta, 2012).



Tourism, trade and services

With its rich historic and landscape, Cartagena de Indias is considered the tourism capital of Colombia. Apart from the heritage and sun and sand tourist attractions, which are its comparative advantage, the city has gradually created other tourist service lines, such as, for example, the organization of congresses, business rounds and visiting cruise ships, among others. According to CCC (2013), the tourist sector has 2,610 principal active companies with assets worth 1.6 trillion pesos. Tourism is the area of productive activity in which the largest number of companies identified in the Competitiveness Plan for the City and the Department are involved. The hotel occupation rate in 2013 was in excess of 65%.

The environmental conditions: the foundation of the city

The ecological heritage of the district of Cartagena de Indias is represented by a unique mosaic of ecosystems (Figure 3), which serve to sustain their local populations and have potential for protection from climate threats.

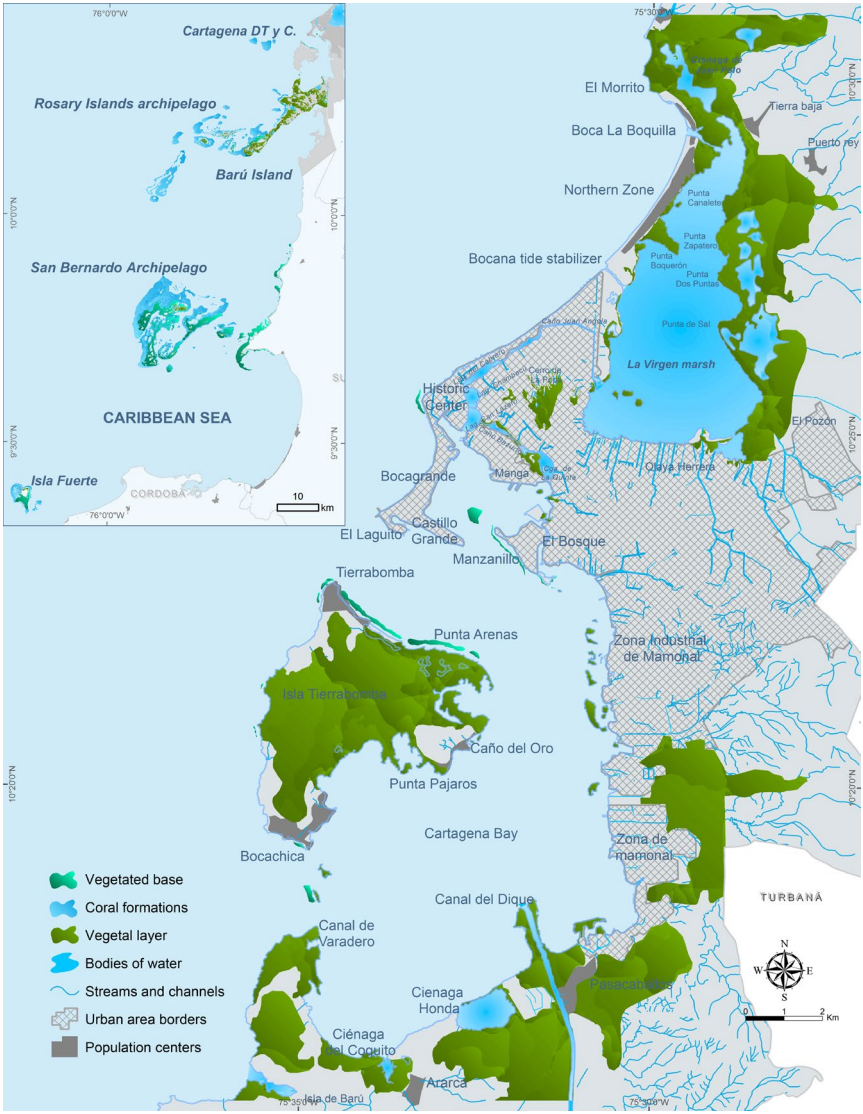
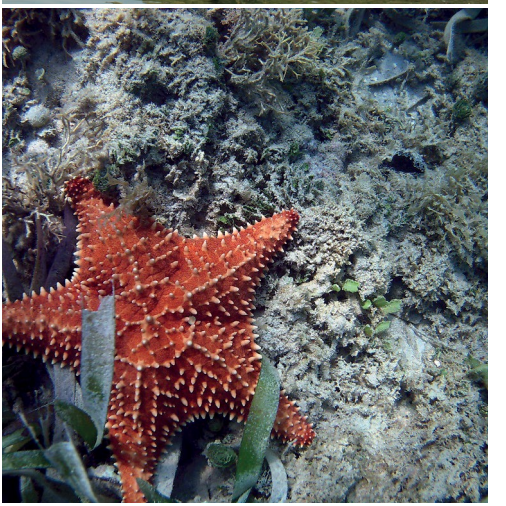


Figure 3. Main ecosystems in the District of Cartagena de Indias

Cartagena de Indias has grown mainly at the expense of coastal landscapes, such as spikes and bars (***espigas y barras***) and the filling of zones bordering on mangrove swamps. According to Correa (2005) and Posada and Henao (2008), this has created greater vulnerability of erosive processes along the coastline (which are sometimes 3 m/year) and phenomena of flooding caused by tides and extreme rainfall. The latter represent 43.3% of the events reported. The most susceptible sectors are Manga, the Center, Marbella, Bocagrande, Castillogrande, El Laguito and the zone of La Boquilla, La Virgen Marsh and Manzanillo del Mar. The city must become more aware that its natural heritage forms part of its main protection and resilience system. It is only by understanding the dynamics of the ecosystems that it will be possible to plan the city of both the present and the future.



The climate today and future scenarios

Cartagena de Indias, a coastal port and industrial, tourism and richly historical city on the coast of the Caribbean Sea, has itself experienced climate variations and their consequences. It lives under the permanent threat of the main climate phenomena, which include sea level rise, coastal erosion and extreme events, such as tidal waves, torrential rains and heat waves, which have historically caused disasters and damage to its inhabitants, economic activities and historic heritage.

Table 1. Cartagena: its climate today and in the future: Invemar et al. (2012)

Effects of climate change	Present (2010)	Future (2040	Aggravating factors
Sea Level Rise	14 cm	15-20 cm	Population growth Unfavorable living conditions Deterioration in biodiversity and loss of ecosystem functions
Heavier and more frequent rainfall	3%	30%	
Increase in land temperature	27.9°C	29.1°C	

Figure 4 shows a pessimistic scenario of an increase in sea level caused by climate change by the year 2040, in which it is notable that the zones bordering on the La Virgen Marsh, the city's tourism zone (Bocagrande, Castillogrande, El Laguito and the Historic Center), as well as the port and industrial zones, would suffer most flooding as a result of rainfall or Sea Level Rise (SLR). Erosion is another phenomenon that will increase as a result of climate change and will be a threat to the city's assets. Tierrabomba island, the city tourism zone, Playetas and Punta Gigante on Baru, Fuerte Island and the Rosario and San Bernardo archipelagos are the most vulnerable.

In general terms, if no adaptation and mitigation measures are introduced, by 2040, one of every five citizens of Cartagena could be affected by high tides; likewise, 27.5% of the population and 26.2% of houses could be flooded and affect the natural base (Figure 4). This would have serious implications for the competitiveness of the city, its economic development and the social welfare of its inhabitants.

70%	100%	26.2%	86%	86%	28%	35%
Areas of mangrove swamp under threat of flooding	Beaches under threat of erosion	Houses under threat of flooding	Historic heritage affected by flooding	Historic heritage affected by flooding	Industry under threat of flooding	Road infrastructure under threat of flooding

Figure 4. Severe flooding scenarios (SLR + moderate rainfall) projected to 2040

Strategies and measures for climate compatible development

Plan 4C is the road map with which to promote different actions to succeed, jointly, in motivating long term policies to allow the different administrations of the city to achieve climate compatible development results. This Plan envisions a Cartagena that is resilient, competitive and prepared for the effects of climate change by 2040 on the basis of certain axes, strategies and a portfolio of projects which must be implemented within the short, medium and long terms.

The vision of a climate compatible Cartagena de Indias as of today and for the next hundred years, leads us to consider the possibility of converting a climate challenge into a great opportunity to provide wellbeing for its citizens and prosperity and competitiveness for the city. This would also become a concerted effort between the public and private sectors to boost productive projects in the city (industry, ports, tourism) compatible with the climate of the future.

Planning for climate compatible development in Cartagena de Indias is based on three principal and three cross-cutting axes (Figure 5). The main axes are established in the form of strategies that materialize in programs and projects as a result of local actors' work. Each project has a cost, an area of intervention, one entity responsible for it and a duration and term of implementation.

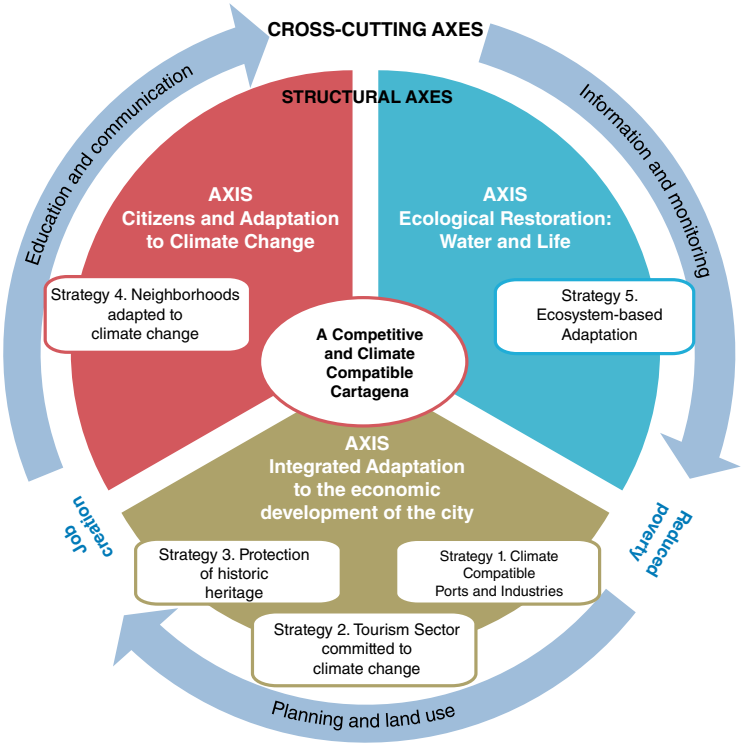


Figure 5. Axes and strategies identified for future development of a Climate Compatible Cartagena

What is sought by the Plan 4C strategies is to promote a resilient, well planned territory in accordance with an accurate analysis of risk and with a long term vision that points to the right way forward for the different sectors, both public and private, working in coordination for the Cartagena of the future. In general, it is inclined towards a city more productive, greener and more efficient in the use of existing resources, with islands, beaches, mangrove swamps and marshes in a symbiotic landscape, with La Virgen Marsh and the coastal wetlands that have recovered their fish populations, with tourists who appreciate their beauty and quality of life; it will also boost job creation and, thereby, a sustained and more equitable growth for everyone.

Vision of Plan 4C

By 2040, Cartagena de Indias will be recognized as a city that is a model of urban and coastal planning based on climate compatible development, where adaptation and mitigation measures will reduce indices of vulnerability to climate change, improve efficiency of public investment, the quality of life of its inhabitants and the competitiveness of its sectors.

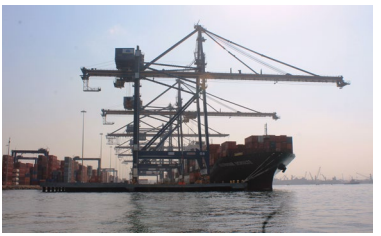
Axis of integrated adaptation to the economic development of the city

Strategy 1.

Climate Compatible Ports and Industries

Vision by 2040

By the year 2040, Cartagena will be a model port and industrial city prepared for climate change, in which innovative actions will be planned and implemented and articulated with the public sector, which will make it possible to reduce risks, strengthen the local economy and improve the sector's competitiveness within a framework of climate compatible development.



Portfolio of projects as part of the strategy for Climate Compatible Ports and Industries

Program	No.	Project
1. Energy efficiency	P-1	Estimate of the baseline for the implementation of technologies to reduce emissions in the Mamonal industrial zone
	P-2	Design and implementation of technologies for the reduction of emissions in the Mamonal industrial zone
2. Adapted buildings and infrastructure	P-3	Study of alternative coastal protections in the zone of influence of ports and industries in the bay of Cartagena
	P-4	Drawing up a pilot plan for coastal protection in the most critical erosion zone in the bay of Cartagena
3. Contributions to ecological integrity	P-5	Conservation of mangrove swamp areas in the interior of companies in the Mamonal zone as a measure for coastal protection and environmental conservation
4. Integral risk management	P-6	Strengthening capacities for adaptation to climate change at the corporate and community levels

Strategy 2.
Tourism sector committed to climate change

Vision by 2040

By the year 2040, the tourism sector of Cartagena de Indias will be committed to climate change and will be using this strength to increase its competitiveness as a destination, working hand in band with the public sector, which will guarantee the planning instruments and works necessary for the city to progress towards climate compatible development schemes.

Portfolio of projects part of the strategy for a tourism sector committed to climate change

Program	No.	Project
1. Hotel sector committed to climate change	P-7	Measurement of the carbon and hydric footprint in the hotel sector of Cartagena de Indias
	P-8	Design and implementation of actions to reduce the water and carbon footprint of the Cartagena de Indias hotel sector
	P-9	Development of a good climate change practices manual for the tourism sector
	P-10	Conservation of the mangrove swamp in the La Virgen Marsh to strengthen tourism competitiveness in its zone of influence
2. Tourism infrastructure adapted to climate change	P-11	Technical studies for the definition of coastal protection works in the Cartagena tourist zone (El Laguito-Marbell)
3. Support system for decision-making on climate change	P-12	Development of an online tool to support decisions that contribute to touristic planning with "Cartaclima" resilience criteria
4. Education on climate change for tourists and service providers	P-13	Outlines to encourage environmental responsibility on the part of visitors to the Rosario and San Bernardo Coral Reefs National Natural Park.
	P-14	Implementation of energy and hydric efficiency icons in hotels and on touristic interest sites in Cartagena de Indias
5. Marketing and promotion of climate change	P-15	Cartagena to host carbon zero events and a green convention center

Strategy 3.
Protection of historic heritage

Vision by 2040

By the year 2040, the historic heritage of Cartagena de Indias will be resilient to climate change. This will be made possible by carrying out actions within the framework of climate compatible development, maintaining its value as a World Heritage City and a Cultural Interest Asset for the people of Cartagena and visitors.

Portfolio of projects for the protection of the historic heritage of Cartagena

Program	No.	Project
1. Protection of assets of cultural interest from climate change	P-16	Studies, design and implementation of works for a solution to prevent floods in the Historic Center of Cartagena de Indias
	P-17	Plan for the implementation of maintenance and preservation techniques for the ancient and open air buildings that have suffered the effects of climate change
2. Greener Historic Center and buffer areas with reduced emissions	P-18	Installation of public lighting either efficient or using alternative energies in the Historic Center
	P-19	Creation of pocket parks in the zone of influence of the center and in the other BIC
	P-20	Green roofs and walls in public and private buildings to reduce temperature, absorb rainwater and CO^2 and creating landscape value at the same time

Axis of citizens and adaptation to climate change

Strategy 4.
Neighborhoods adapted to climate change

Vision by 2040

By the year 2040, the district of Cartagena will have adapted neighborhoods, with innovative designs that will be replicated in other vulnerable neighborhoods, thus becoming, at both national and international levels, an example of a model with which to overcome the challenges of climate change and sustainable development, with participation at the local level.

Portfolio of projects of the strategy for neighborhoods adapted to climate change

Program	No.	Project
1. Urban neighborhoods adapted to climate change	P-21	Selection, design and putting into operation of a model neighborhood that adapts to climate change
2. Community-based Adaptation in rural communities	P-22	Model project of houses adapted to climate change in island areas

Axis of Ecological Restoration: Water and Life

Strategy 5.
Ecosystem-based adaptation

Vision by 2040

By 2040, the district of Cartagena de Indias will have taken advantage of the city's ecosystems and its insular areas as a climate change adaptation and mitigation measure, by restoring its ecological heritage and rescuing its landscape, economic, social and environmental values.

Portfolio of projects of the strategy for ecosystem-based adaptation

Program	No.	Project
1. Resilient ecosystems	P-23	Private mangrove swamp modular pilot project as a strategy for adaptation to climate change on Tierrabomba Island
	P-24	Demarcation of the La Virgen Marsh wetland as an input for environmental land use and the management of future climate phenomena
	P-25	Restoration of the ecological structure with emphasis on the mangrove swamp in order to reduce the effects of climate change on the Rosario and San Bernardo archipelagos and Fuerte Island
	P-26	Recuperation of beaches using external supply and direct supply from dredging
	P-27	Recuperation and re-population of island coral reefs
2. Promotion of ecological connectivity	P-28	Design and implementation of biological corridors (land and marine) to maintain and increase the ecological connectivity of the islands
3. Habitat and reduction of emissions	P-29	Tree planting in population centers in order to establish green barriers to serve as protection against extreme events and provide shade from the sun for the communities

Cross-cutting axes

Information and monitoring

Vision by 2040

By 2040, Cartagena de Indias will have space for climate action, observation and thought, working in coordination with different public and private actors to generate information for governments and citizens, thus contributing to adaptation and mitigation of climate change.

Portfolio of projects of the information and monitoring cross-cutting axis

Program	No.	Project
1. Information on Climate Change within everybody's reach.	P-30	Development of an application for smart phones with up to date meteorological information on the city (including the Rosario and San Bernardo National Natural Park)
	P-31	Population ecology of vectors of diseases and their relation to climate change in the city of Cartagena de Indias
	P-32	System of information on present and future climate risks for Cartagena de Indias
	P-33	Bio-physical and socio-economic inventory of the coastal zone of the district

Education and communication

Forecast for 2040

By 2040 the people of Cartagena will be educated and sensitized to the causes and effects of climate change and will be aware of adaptation and mitigation measures. This knowledge will be the main input for decision-making at local level and for citizens to become involved in their own development through climate compatible schemes.

Portfolio of projects under the educational and communication cross-cutting axis

Program	No.	Project
1. Raising climate change awareness of citizens	P-34	Social campaign with recognized inhabitants of Cartagena to raise awareness of climate change
	P-35	Educational campaign to promote conservation of mangrove swamps
2. Education for the climate of the future	P-36	Climate change as a cross-cutting axis in the Praes, Praus and Procedas

Planning and land use

A series of projects have been identified at both national and local levels that would complement the strategies proposed in this Plan; some of them are in the process of implementation and others in that of preparation (Table 2). It is necessary to articulate the different projects with the strategies and measures proposed in the Plan, seeking coordinated, effective management through joint efforts on the part of all the actors (national, regional, Departmental and local) which exert influence over the territory.

Table 2. City projects that complement the management of climate compatible development

No.	Project	Entity responsible
1	Certification of Cartagena de Indias as a sustainable tourism destination	Corpoturismo, hotels in the city
2	Alternative modes of transport that do not produce emissions for travel within the walled city, discouraging the use of vehicles	Office of the Mayor of Cartagena, Transit and Transport Administrative Department
3	NAMA of the tourism sector	MADS
4	Project for purification of the internal bodies of water of Cartagena (Axes 1, 2 and 3)	Edurbe
5	Hydro-sanitation connections in the south eastern zone of Cartagena de Indias	Corvivienda
6	Campaign to raise citizens' awareness of an environmental culture	EPA
7	Restoration of the El Dique Channel	Adaptation Fund, MADS, Ministry of Finance and Public Credit
8	Cartagena Rainwater Drainage Master Plan (phases I and II)	Office of the Mayor of Cartagena DAVD
9	Cartagena Rainwater Drainage Master Plan (phase III)	Office of the Mayor of Cartagena DAVD
10	Construction of Bicentenario Avenue	Office of the Mayor of Cartagena
11	Maintenance of the present drainage system of the Historic Center	Office of the Mayor of Cartagena
12	Avenida Rafael Nuñez Linear Park, taking advantage of the lagoon, the mangrove swamp ecosystem and, at the same time, respecting the wall alongside the corridor	Office of the Mayor of Cartagena
13	Creation of green corridors with native species in the Historic Center	EPA, IPCC
14	Remodeling the Marina Park	National Navy
15	Development of engineering work as a measure to control coastal erosion on Tierrabomba island	Office of the Mayor of Cartagena
16	Pilot project for education in the adaptation and mitigation of climate change as a contribution to strengthening environmental higher education and training in the educational institutions of the area of influence of the Rosario and San Bernardo Coral Reefs National Natural Park	National Natural Park
17	Urban tree planting master plan to reduce heat islands in the city.	EPA
18	Termination of the Perimeter road	Office of the Mayor of Cartagena
19	Works for the prevention of encroachment of the sea in Bocagrande and Castillogrande	Office of the Mayor of Cartagena
20	Coastal Protection Master Plan	MADS

Financing Plan 4C

It is estimated that the adaptation and mitigation proposals in Plan 4C will cost COL$147,125 million during the 2014 – 2024 period (Figure 6). This amount does not include the estimate of costs of the city and nation projects mentioned in the planning and land use cross-cutting axis, whose cost will be COL$ 1.4 trillion. It is estimated that the total cost of adaptation of the city of Cartagena, including the city projects, would be of the order of COL$1.5 trillion (current in 2014).

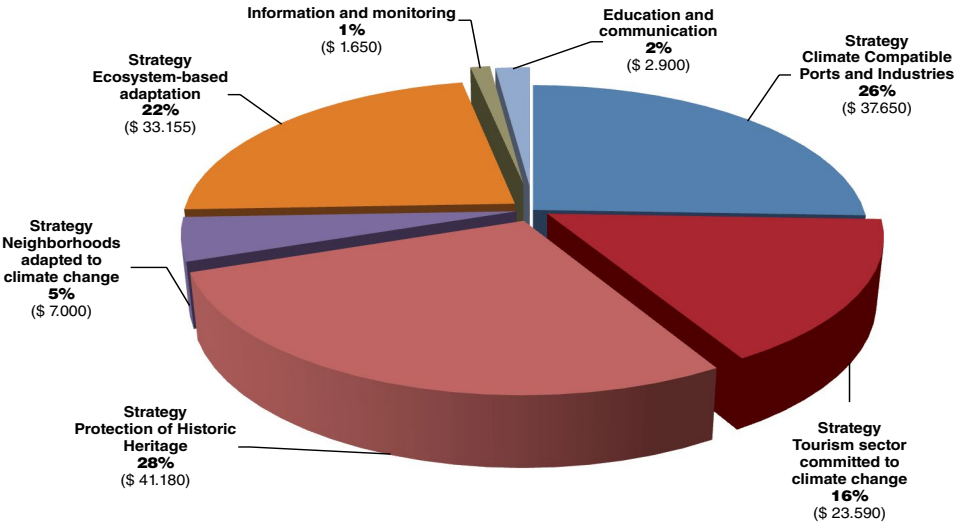


Figure 6. Distribution of amounts of investment required for Plan 4C by axes and strategy, 2014-2040 (figures in millions of pesos)

To guarantee the effectiveness of this Plan, the amounts of investment must be reviewed regularly in light of the evaluation and monitoring stipulated in the Plan. Likewise, the scaling of pilots will require investments not yet calculated.

Financial options

The putting into operation and financial sustainability of Plan 4C require a long term strategy which will include the different city administrations. It is noteworthy that a large part of the Plan 4C resources will be administered by the district of Cartagena de Indias as part of its function as paymaster of the territory and works manager for the economic and social development of the city. For the purpose, the creation of the Cartagena District Climate Change Fund (FDCCC) is being considered as a measure that can be introduced by the present Administration in order to guarantee future resources for Plan 4C.

Plan 4C must also be articulated with other public and sectoral management processes, thus uniting efforts of the different entities in order to progress in climate compatible development. In this regard, the following are highlighted:

- Territorial Land Use Plan and District and Departmental Development Plans.
- Integral Risk Management Plan.

- Environmental authorities environmental management plans.
- Coordination with the National Climate Change Plan.
- Land use and integral management plans for the hydrographic basins and coastal zones.
- Among others.

Private resources are also an option for the financing of Plan 4C, whether at the level the company's own internal investment or of its foundations (national and international) or through financing with second tier, multilateral or commercial banking (national and international).

Likewise, international climate finance provides an opportunity to apply for resources for Plan 4C. It is estimated that the annual flow of climate finances worldwide is around US$100 billion (IDB et al., 2014). In this sense, bilateral cooperation mechanisms, the United Nations Framework Convention on Climate Change (UNFCCC), Official Development Assistance, the multilateral funds and carbon markets provide options to find resources.

Implementation of Plan 4C

The implementation and accompaniment of the Plan require the staging of efforts and public and private resources, which may be obtained by the Cartagena Climate Action Center (CACC). The latter is conceived as an organism that ensures due implementation of, and compliance with the Plan, providing it with functional institutionality as a key determining factor for its success. It is envisioned as an intermediary that will provide permanent support for the District of Cartagena. It must also coordinate actions between the public and private sectors and other key actors identified for the projects, ensuring that each of them assumes its role and undertakes the actions assigned to it therein. The operative structure of the CACC is shown in Figure 7.

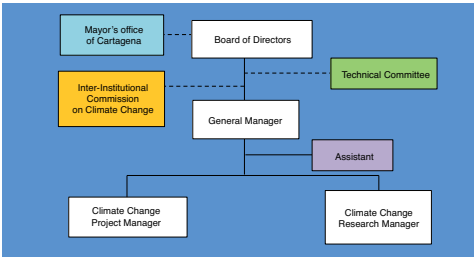


Figure 7. Operative structure of the Cartagena Climate Action Center

The Inter-Institutional Commission on Climate Change (CICCC) was created in January 2013 to complement this entire process and it continues to function. It was designed as an advisory body that would meet in spaces for discussion and debate on subjects relating to the said phenomenon, of which key actors, representatives of different sectors of the different political, public, private, entrepreneurial, academic, sectoral, social and institutional sectors of the city of Cartagena are members (Figure 8).

Sub-commissions within the Commission itself have been proposed (one for each of the structural axes of the Plan), in order to facilitate discussion, follow-up and decision taking for follow-up and monitoring of each of the Plan 4C structural axes, taking into consideration that, because of their cross-cutting nature, different actors come together and have different responsibilities in each of the axes.

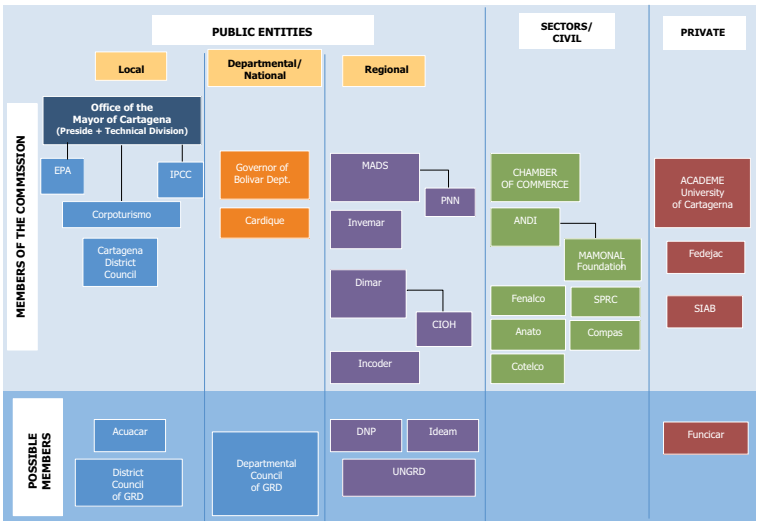


Figure 8. Actors of the Inter-Institutional Commission on Climate Change

Conclusions

The formulation of Plan 4C: A Competitive and Climate Compatible Cartagena, has been a great opportunity for the City, its administration and entities, both public and private, as well as civil society. They have begun to think and act in advance of the challenges of climate change, transforming it into opportunities for development, innovation and competitiveness.

The strategies of Plan 4C have become the road map for the promotion of actions that, taken as a whole, motivate long term policies, in which the different administrations of the city will add results favoring climate compatible development. It has also united efforts between the public and private sectors to boost the city's productive projects (industry, ports and tourism).

The challenge is to achieve a greener Cartagena, more efficient in the use of its resources, with beaches, mangrove swamps and marshes in symbiosis with the landscape, with industries and ports that become more resilient and innovative day by day, with clean waters flowing through climate-smart drains and channels, with the La Virgen Marsh and the coastal wetlands recovering their fish population, the Historic Center adapted to the climate of the future, more tourists who appreciate their beauty and the quality of life, thus promoting job creation and sustained, more equitable growth for everyone.

Plan 4C has now become the first Climate Change Plan for a Coastal City in Colombia and is therefore an example to be followed by other cities and regions. The Plan contains a long term projection which will be followed by future administrations and become the road map to promote climate compatible development.

Bibliography

Acosta, K. 2012. Cartagena, entre el progreso industrial y el rezago social. Banco de la República, Centro de Estudios Económicos Regionales (CEER). Cartagena, Colombia. 64 p.

BID, Pnuma, World Bank Institute, Uned Riso Centre, PNUD y Fundación Torcuato Di Tella. 2014. Financiamiento Climático. Finanzas y Carbono. Disponible en [http://finanzascarbono.org/financiamiento-climatico/]. Recuperado en junio de 2014.

Cepal. 2012. Valoración de daños y pérdidas. Ola invernal en Colombia, 2010-2011. Misión BID-Cepal. Comisión Económica para América Latina y el Caribe. Bogotá. Disponible en [http://www.cepal.org/colombia/noticias/documentosdetrabajo/7/49587/Libro_Ola_invernal_en_Colombia_BID_CEPAL.pdf]. Recuperado en enero de 2014.

CCC. 2013. Las 200 empresas más grandes de Cartagena, 2012. Centro de Estudios para el Desarrollo y la Competitividad (Cedec). Cartagena, Colombia. 50 p.

Gobernación de Bolívar. 2011. Balance de Gestión sobre la atención a la emergencia invernal por el Fenómeno de La Niña 2010-2011 en Bolívar. Gobernación de Bolívar, Colombia Humanitaria. Cartagena, Colombia. 32 p.

Invemar 2003. Programa holandés de asistencia para estudios en cambio climático: Colombia. Definición de la vulnerabilidad de los sistemas bio-geofísicos y socioeconómicos debido a un cambio en el nivel del mar en la zona costera colombiana (Caribe continental, Caribe insular y Pacífico) y medidas para su adaptación., in Programa para Investigación Marina y Costera - GEZ, M.P. Vides, Editor. Santa Marta, Colombia. p. VII Tomos, Resumen Ejecutivo y CD Atlas digital.

Invemar. 2008. Capacity building to improve adaptability to sea level rise in two vulnerable points of the colombian coastal areas (Tumaco-Pacific coast and Cartagena – Caribbean coast) with special emphasis on human populations under poverty conditions. Technical Report NCAP Colombia Project. ETC Project Number 032135. Vides M.P. (Ed). Marine and Coastal Research Institute. Invemar. Santa Marta, Colombia.290 p.

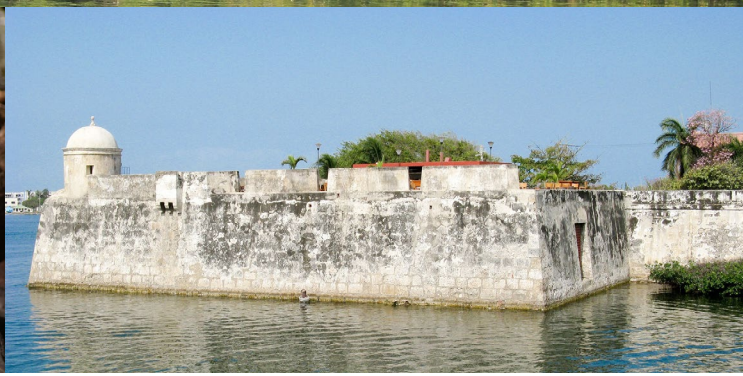
Invemar, MADS, Alcaldía Mayor de Cartagena de Indicas y CDKN. 2012. Lineamientos para la adaptación al cambio climático de Cartagena de Indias. Proyecto integración de la adaptación al cambio climático en la planificación territorial y gestión sectorial de Cartagena de Indias. Serie de Publicaciones Generales del Invemar No. 55, Santa Marta, Colombia. 227 p.

IPCC. 2014. Summary for policymakers. 1-18 p. En: Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel y J. C. Minx (Eds.). Climate change 2014, mitigation of climate change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, Reino Unido y Nueva York. Disponible en [http://mitigation2014.org/report/summary-for-policymakers]. Recuperado en mayo de 2014.

Posada, B. y W. Henao. 2011. Diagnóstico de la erosión costera del territorio insular colombiano. Serie de Publicaciones Especiales del Invemar No. 13, Santa Marta, Colombia. 200 p.

List of acronyms

Acuacar	Public-Private Water Company of Cartagena
Anato	Colombian Travel and Tourism Agencies Association
ANDI	National Association of Industrialists
BID	Inter-American Development Bank
CACC	Cartagena Climate Action Center
Cardique	Canal del Dique Autonomous Regional Corporation
CCC	Cartagena Chamber of Commerce
CDKN	Climate & Knowledge Development Network
Cepal	Economic Commission for Latin America and the Caribbean
CICCC	Inter-institutional Commission on Climate Change of Cartagena
CIOH	Caribbean Oceanographic and Hydrographic Research Center
UNFCCC	United Nations Framework Convention on Climate Change
Compas	Associate Company of Ports
Corpoturismo	Cartagena de Indias Tourism Corporation
Corvivienda	Fund for Housing of Social Interest and Cartagena District Urban Reform
Cotelco	Colombian Association of Hotels and Tourism
DAVD	Cartagena District Cartagena Evaluation Administrative Department
Dimar	Maritime Directorate
DNP	National Planning Department
Edurbe	Bolivar Urban Development Company
EPA	Cartagena Public Environmental Establishment
FDCCC	Cartagena District Climate Change Fund
Fedejac	Cartagena District Federation of Community Action Committees
Fenalco	National Federation of Merchants
Funcicar	ProCartagena Foundation
GRD	Disaster and Risk Management
Ideam	Colombian Hydrology, Meteorology and Environmental Studies Institute
Incoder	Colombian Rural Development Institute
Invemar	Marine and Coastal Research Institute
IPCC	Inter-governmental Panel on Climate Change
IPCC	Cartagena Heritage and Culture Institute
MADS	Ministry of the Environment and Sustainable Development
Plan 4C	A Competitive and Climate Compatible Cartagena
PNN	National Natural Parks Unit
Praes	Schools Environmental Programs
Praus	Universities Environmental Projects
SIAB	Bolivar Engineers and Architects Society
SPD	Secretaría de Planeación Distrital
SPRC	Cartagena Regional Port Society
UNGRD	National Unit for Disaster and Risk Management
SLR	Sea Level Rise



Ahora sí CARTAGENA

ALCALDÍA MAYOR DE CARTAGENA DE INDIAS
Distrito Turístico y Cultural

TODOS POR UN NUEVO PAÍS
PAZ EQUIDAD EDUCACIÓN

MINAMBIENTE

Colombia 50% Mar
INVEMAR

Cámara de Comercio de Cartagena

CDKN
Climate & Development Knowledge Network