Gobierno de Reconciliación
y Unidad Nacional
El Pueblo, Presidente!

NORTH ATLANTIC REGIONAL COUNCIL INDEPENDENT
AUTONOMOUS REGIONAL GOVERNMENT NORTH ATLANTIC
FORESTRY AND ENVIRONMENTAL ADVISORY COMMITTEE

STRATEGY
of the North Atlantic Autonomous Region (RAAN)
CLIMATE CHANGE

CELEBRATING TWENTY YEARS
GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

Cruz Roja Nicaragüense
Cruz Roja Holandesa

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MARENA
Ministerio del Ambiente
y los Recursos Naturales

TEAM PARTICIPATING IN THE DEVELOPMENT OF THE STRATEGY OF THE AUTONOMOUS REGION NORTH ATLANTIC CLIMATE CHANGE

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GLOSSARY

- CADPI: Center for Empowerment and Development of Indigenous Peoples
- CARENA: Committee on Environment and Natural Resources
- CCFA: Forestry and Environmental Advisory Committee
- SDC: Swiss Cooperation
- CRAAN: Regional Council of the North Atlantic Autonomous
- EDFOR: RAAN Forestry Development Strategy
- FUNICA Foundation for Technological Development in Agriculture and Forestry of Nicaragua
- GIZ: German Development Cooperation
- GRAAN: Autonomous Regional Government of the North Atlantic
- GVC: Civil Volunteer Group
- GTI: Indian territorial government
- INAFOR: National Forest
- INPESCA: Nicaraguan Institute of Fisheries and Aquaculture
- INTA: Institute of Agricultural Technology
- IPCC: Intergovernmental Panel on Climate Change
- MAG: Ministry of Agriculture and Forestry
- MARENA: Ministry of Environment and Natural Resources
- MINED: Ministry of Education
- MOH: Ministry of Health
- OXFAM GB: British Cooperation
- POF: Forest Management Plan
- RAAN: North Atlantic Autonomous Region
- SERENA: Ministry of Natural Resources and Environment
- SEPLAN: Ministry of Planning

PRESENTATION

The council and the North Atlantic Autonomous Government, framed in the identification and incidence of relevant issues that occur within the regional jurisdiction and specifically with the issue of climate change, presents the work done by technicians regional, national bodies and cooperation agency who initiatives articulated in Forestry and Environmental Governance, have identified and defined a common agenda that has allowed the development of actions with different social, economic, cultural and environmental, a document containing the strategy of the North Atlantic Autonomous Region (RAAN) climate change, which will allow us to influence the subject and achieve the national joint function necessary to adapt and mitigate adverse effects of climatic changes that are affecting natural conditions of human life and ecosystems and species that interact in the region and guarantee the conditions of survival of the species.

This effort constituted a strong technical and scientific work, when analyzing situations that led to the definition of strategies that allowed us to consider perspectives from social, economic and environmental specific elements that would ensure that all actors have a long term vision the actual situation of different sectors, if we make actions that allow us to adapt and mitigate these effects of climate change.

We regard this as exceptional technical effort and we allow governments to move forward as well-defined routes, making an impact in the field and contributing to the results of adaptation and mitigation at all levels, from survival mechanisms of the human species in this process, affecting the country and the world.

We thank everyone who made this effort possible Planning and assure you that the North Atlantic Autonomous Region, in its professionalization and advocacy initiative in working continara Coordinated processes, sorted and oriented to results for the benefit of, its municipalities, territories and Indigenous Communities within the North Atlantic Autonomous Region.

Carlos Alemán Cunningham
Presidente JD- CRAAN

Reynaldo Francis Watson
Presidente CCF- A RAAN

RESOLUTION OF CRAAN

INDEPENDENT OF NORTH ATLANTIC REGIONAL CONSEJON AUTONOMOUS REGION NORTH ATLANTIC

Resolution no.29-08-02-2012

Regional autonomous council of north Atlantic, in use in exercise of the powers give the political constitution of the Republic, the Statute of Autonomy (Lawn ° 28) and its regulations, half ambient General law and natural resource, regulation otters internal regulations related to the subject, gives the following Resolution on:

"ADOPTION OF THE STRATEGY OF THE FEDERAL REGION North Atlantic (RAAN), CLIMATE CHANGE"

I

Confirmed that the arto.8, the Autonomous Regions established in Law 28 "Statute of Autonomy" are legal persons in public law that are as appropriate, policies, plans and national standards, and tenant through its administrative bodies to promote the attribution regional use and enjoyment of the waters, forests, lands and defense of its ecological system.

II

That Arto.23 sets as attribution Regional Council, 1) Regular resolutions and ordinances by the incumbent regional issues with arto.8, 'Status, which must be in harmony with
Political Constitution and laws of the Republic of Nicaragua

III

That the Regional Council Autonomous North Atlantic is an instance of to made decision, that one of its functions is to encourage work processes task starting at different institutions and sectors in the RAAN, aimed at achieving knowledge and results ordered that improve interventions on topics of interest, and that with the efforts of all sectors and levels in the search results, specifically on the issue of climate change, focus on adaptation and mitigation, through an effective planning tool systematic to combat poverty, cause by resilience drastic change of climate and anthropic scenario of improving the quality of life of the population of the Autonomous Atlantic region (RAAN).

IV

What is important to establish the principles on which this strategy is grounded oriented, self-determination of indigenous peoples and ethnic communities in the administration and management of its resources against climate change, without political and religious creed, honesty, Transparency, multiculturalism, culture penance, integrity, gender equity, respect for the rules positive and customary autonomy, the free prior and informed consent, Harmonious coexistence and identity.

NORTH ATLANTIC REGIONAL COUNCIL INDEPENDENT
AUTONOMOUS REGION NORTH ATLANTIC

V

CRAAN that recognizes and supports the work developed from the instance of Forestry and Environmental Governance in the RAAN, established in the figure of the CCF-A-RAAN, as artifice driver of regional concentration on relevant issues as reflected proactive driver of change bringing together all government institutions, regional institutions, municipalities, Territory Indigenous, social and economic sectors as well as to the cooperation and programs interested in contributing to processes and logical order, necessary for the development of the region.

SO RESOLVED
ONLY:

APPROVE THE STRATEGY Atlantic Autonomous Region
NORTH (RAAN), CLIMATE CHANGE.

Chapter I: General Provisions

Arto.1. - The municipalities and indigenous territories that are located in the RAAN autonomous region, to implement this planning tool, may issue as their skills and attributes, ordinances and regulations conducive to achieving its objectives under forest sector governance and environmental oriented adaptation and mitigation of climate change action.

Arto.2. - Are an integral part of this Resolution Regional Strategy Paper of the North Atlantic Autonomous Region (RAAN) agreed and validated within the forestry and environmental advisory committee (CCF-a) of the RAAN.

Arto.3. - For purposes of this resolution, the Regional Strategy against Climate Change RAAN, is defined as an instrument that is part of the state policy in the context of sustainable development and that involves taking concerted decisions of the social actors, economic, political and technical for the orderly, coordinated and focused on tangible results and measurable actions

to be undertaken within the region and within the framework of this instrument that identifies strategic lines and actions within the issue of adaptation and mitigation of climate change effects the situations generated by anthropogenic and natural to the different productive and economic sectors the region.

NORTH ATLANTIC REGIONAL COUNCIL INDEPENDENT AUTONOMOUS REGION NORTH ATLANTIC

Chapter II: In the implementation of the Strategy to Combat Climate Change RAAN

Arto.4. - It mandates the Commission on Natural Resources Autonomous Regional Council and the Autonomous Regional Government, as well as to other state institutions, municipalities, Indian Territory, Social sectors, Economic, Cooperation and advocacy programs , define insertion mechanism in its planning, strategic elements of this strategy and development coordinated process between the parties, results-oriented needed to positively affect the impacts generated by the Climate Change in the region.

Arto.5. - It is established that for purposes of implementation of this Strategy, the autonomic Institutions CRAAN, mandating the Commission of natural resources and environment as well as the Ministry of Natural Resources and Environment CRAAN-GRAAN, develop mechanisms coordination to implement this planning tool, linked to the instance of CCF-A regional concentration RAAN, which must be developed specific planning processes, project portfolios, programs for the management and achievement of financial, material and technologies that allow the execution effectiveness of this strategy RAAN against Climate Change.

Arto.6. - The Citizen Participation, Governance and Gender in the process of implementation of this strategy must be guaranteed, design, implementation and evaluation of the activities that make up the plan and the zoning rules according to all reality objective municipality in the territory of the RAAN.

Chapter III: Forms of financing

Arto.7. - For the formulation of the project portfolio coordination instance of this strategy against climate change RAAN, shall coordinate with the municipalities in the region, the Ministry of Environment and Natural Resources and the forest advisory committee and environmental (CCF-A), and instances of cooperation. The portfolio must be made within six (06) months from the enactment of this resolution.

Arto.8. - The Council and Regional Government shall establish management processes which identify and establish budget to fund activities arising from this strategy and action plan every five years, in municipalities and territories that integrate this Strategy RAAN Climate Change.

NORTH ATLANTIC REGIONAL COUNCIL INDEPENDENT
NORTH ATLANTIC AUTONOMOS REGION

Chapter IV: Monitoring and control in the implementation of the regional plan

Arto.9. - As part of monitoring, tracking and monitoring the implementation of the strategy against climate change RAAN, instances of coordination defined CRAAN will be responsible for developing the monitoring activities, monitoring and control together with state institutions, municipalities, indigenous territories and Forestry and Environmental Advisory Council of the RAAN.

Chapter V: Transitional and Final Provisions

Arto.10. - This Resolution shall be effective Regional after its publication in any media site without prejudice to its subsequent publication in the Official Gazette.

Published and complied!

Given in Bilwi, Puerto Cabezas, home Administrative Council and Regional Autonomous Government-RAAN, the eight days of the month of February, Two Thousand Twelve.

Please therefore as Resolution, published and complied

PRESIDENTE
CRAAN
Carlos Alemán Cunningham
Presidente de la J/D CRAAN

PRIMER SECRETARIO
Roberto Wilson Watson
1er Secretario J/D CRAAN

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I. INTRODUCTION

Climate change is the change of climate attributed to human activity that changes the composition of the global atmosphere. Increased atmospheric concentrations of greenhouse gases (carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) and other gases, resulting from increasing emissions, intensifying the natural greenhouse effect of the atmosphere, determining greater warming in the earth. Emissions are caused by human activities, mainly by the use of oil, deforestation, industrial, farming and waste management.

Climate variability in our country has caused significant losses due to drought associated with El Niño and heavy rains associated with hurricanes and La Niña. Climate change may enhance the magnitude and recurrence of extreme events, disrupting the supply of drinking water, affecting food security and increasing future risk, especially for those vulnerable human systems associated with poverty, and the productive sectors of development (agriculture, water, energy, livestock, etc..).

Consistent with this problem, most countries have developed policies and mechanisms to reduce emissions of greenhouse gases and the emissions quota for each of the more developed and undeveloped and can be done with the mechanisms of joint implementation, for which there are two major proposals: that the developing countries to exploit these opportunities to achieve that technological progress comes from clean production and the other is to look as reducing global emissions.

Involvement of climate change on North Atlantic Autonomous Region (RAAN) is evident. Are undeniable negative effects of extreme events such as hurricanes, tropical storms and prolonged droughts including: flooding, coastal erosion, sedimentation of streams, rivers and lakes, impairment of coastal marine ecosystems, damage to agroforestry systems and food security of the population of the region and impacts to forest ecosystems.

The strategy of the North Atlantic Autonomous Region (RAAN) of Climate Change is an initiative of the Council and the Regional Government of RAAN, to fulfill its mandate under Law 28 and its regulations. The Regional Commission for Natural Resources and Environment and the Ministry of Natural Resources and Environment (SERENA) under the agenda of Forestry and Environmental Advisory Committee CCF-A, formed the Climate Change Technical Committee headed by Secretary of Natural Resources and Environment (SERENA), Secretary of Planning of the Regional Government (SEPLAN) with financial technical support MARENA, the Nicaraguan Red Cross, Netherlands Red Cross, OXFAM, CADPI, GIZ-German Cooperation Program International MASRENACE. Those who have joined forces and involved various actors as

communal authorities, territorial, municipal and representatives of: the central level institutions, universities, cooperation agencies and civil society who have contributed valuable elements to this strategy.

This planning tool and product management is a participatory process of the population and key actors in the municipalities, territories and communities, through workshops and consultation propositional, from the place on their network and are linked to the sectors: water Resources, Forest, Agriculture, Fisheries and management as a crosscutting ethnic and cultural adaptation of traditional knowledge - climate change mitigation, citizen participation, governance and gender.

In the construction of this instrument, we evaluate the variability and current vulnerability of the priority sectors, such as: Water Resources, Forest, Agriculture, Fisheries and Ethnic socio-cultural face of extreme events by variability and climate change. It also describes actions and mitigation measures, with an emphasis on adaptation to help reduce the vulnerability of the sectors identified as most vulnerable, which in turn promote the comprehensive and systemic management of ecosystems and sustainable use of resources natural, integrating the participation of men and women in the communities, agencies, local governments and institutions.

It has also identified key stakeholders with initiatives being undertaken in the region that are contributing to the reduction of vulnerability of the territory to climate change that should be strengthened to continuity. The Adaptation and Mitigation Strategy to Regional Climate Change, is a planning instrument applicable and Development in the Region and will serve as input to the strategy of the RAAS and the High Coco. Which will strengthen the guidelines of the national strategy and will have guidelines for municipalities and the constituent territories of the region.

II. BACKGROUND

Climate change has attracted the interest of most scientists and researchers, governments, companies and Aboriginal peoples. Milestones in these years are the very creation of the Intergovernmental Panel on Climate Change (IPCC), the celebration of the 1990 World Climate Conference, coinciding with the drafting of the First Assessment Report of the IPCC and especially so was symbolic, the celebration in 1992 of the World Conference on Environment and Sustainable Development (Earth Summit). Thereafter, and once understood the nature and most of the structural aspects of the problem, begin to establish the international legal instruments to combat global warming, especially from the Framework Convention on Climate Change United Nations Change (UNFCCC).

As you move the nineties appears the Second Assessment Report of IPCC (1995 and the Kyoto Protocol (1997), engagement in which he tries to shape the common goal of reducing the volume of emissions of greenhouse gases, mitigation of the causes of global warming. Internationally, the leading guide in terms of climate change is set by the various reports of the IPCC assessment known as: First Assessment Report (1990), Second Assessment Report: Climate Change (1995), Third Assessment Report: science, impacts, adaptation and mitigation (2001). The fourth IPCC report, it can be concluded that today we face a forced transformation of some of the structural and functional components of the physical environment and land that, indeed, as a result of human activity, the average temperature of Earth's surface has increased rainfall has changed but not evenly to the entire planet, the presence of ice and snow has fallen and the sea surface has increased. (Martín Vide, 2007).

In 2008, developed the Regional Forum on Climate Change and Risk Management in Bilwi with participation of key actors in the eight municipalities of the RAAN, between their results was the request of the participants that the region has its own Climate Change Strategy, it is here that the RHAs through its instance of Forest and Environmental Governance CCFA actions to promote the development of this instrument.

III. OBJECTIVES

3.1 GENERAL PURPOSE

Implement actions to mitigate the effects of climate change on key sectors and ecosystems, promoting joint mechanisms to ensure the implementation of adaptation and mitigation measures to contribute to sustainable development in the region.

3.2. SPECIFIC OBJECTIVES

- Contribute to the integrated management of natural forest, with emphasis on forest governance should be implemented at all levels.
- Contribute to the management and protection of surface and underground water resources and actions for the population has it.
- Contribute to the integrated management of the fisheries sector, providing adequate knowledge of the species, volumes and fishing sites, and the use of appropriate gear for the sustainability of the resource.
- Contribute to the improvement and diversification of agricultural production in the region.
- Contribute to the implementation of intensive farming and planting of improved pasture, and the establishment of livestock breeding family to family involvement.
- Form networks that allow synergy between different actors and social sectors of the territories of the region to implement joint actions to help reduce the effects of climate change.
- To promote awareness and dissemination processes of the guidelines and actions necessary for the effective appropriation of the climate change strategy.
- To contribute to reducing emissions of greenhouse gases, through the implementation of existing mechanisms for these purposes (CDM, REDD plus and others) and incentives to promote such a reduction.

IV. THEORETICAL FRAMEWORK, LEGAL AND INSTITUTIONAL

The United Nations Framework Convention on Climate Change has identified two strategies to address the adverse impacts of these changes. One is the strategy of adaptation, which is to create the capacity to resist the negative impacts on populations and in all terrestrial and aquatic ecosystems, and is related to the model of sustainable development to reduce vulnerability. The second is the mitigation strategy, which is responsible for reducing emissions of greenhouse gases and increased fixation and storage of carbon dioxide.

This strategy is based on Article 60 of the Constitution of the Republic of Nicaragua, who says The Nicaraguans have the right to live in a healthy environment is the obligation of the state and the preservation and rescue of Environment and Natural Resources, including water that are Heritage of the Nation and the State must promote economic and social development through the conservation, development and sustainable use.

Also falls under the General Law of Environment and Natural Resources (Law No. 217-96) which establishes standards for the conservation, protection, enhancement and restoration of the environment and natural resources within it, ensuring their rational use and sustainable. It also imposes an obligation to protect the community.

In other matters, the Statute of Autonomy (Law 28) provides for the regional allocation Promoting the rational use and enjoyment of the waters, forests, lands and defending its ecological system. On the other hand the law No. 445, in accordance with law No. 28, set the administrative system of indigenous peoples and ethnic communities, guaranteeing the right to protect, use and enjoy their natural resources.

The Law of Conservation, Development and Sustainable Development of Forestry Sector (Act 462), Art. 28 instructs the state to promote and encourage forest restoration and protection and conservation. This law also sends up a fund to encourage forest owners who opt for preservation and forest management in order to produce oxygen for humanity.

Sustainable development policy in Nicaragua Forestry sector, Decree 69-2008, among its objectives is to contribute to improving the quality of life for present and future generations of the Nicaraguan population, giving priority to families of small, medium farmers and forest regardless social, religious or ethnic, promoting sustainable development of forestry-oriented replacement of forest resources, avoided deforestation, forest management and community forestry rational with an entrepreneurial vision.

This instrument is referenced, the National Environmental Strategy and Climate Change formed by five strategic lines: Environmental Education for Life, Environmental Defense and Protection of Natural Resources, Conservation, Recovery, Collection and Water Harvesting, Mitigation, Adaptation and Management Risk from Climate Change and Sustainable Land Management, compliance with these guidelines will be the responsibility of the State together with civil society.

V. METHODOLOGY

The methodology used for the construction of the logical process followed this strategy:

- Getting Started: A First Regional Forum on Climate Change, held in 2008, subsequent meetings were held with different actors to agree on the initiative of SERENA-Graan to develop the strategy, coordinating with central level institutions in order to coordinate efforts support to begin construction of the Strategy.
- A technical committee was formed to support under the CCF-A, was established cooperation between the Graan, CRAAN and Nicaraguan Red Cross, German Technical Cooperation (GIZ) / MASRENACE, OXFAM GREAT BRITAIN, CADPI and MARENA.
- In the process of consultation and participatory workshops, the 8 municipalities were grouped into four blocks:
  - ✓ Bonanza and Rosita Prinzapolka (Headquarters).
  - ✓ Puerto Cabezas.
  - ✓ Waspam
  - ✓ Waslala, Mulukukú and Siuna (Headquarters)
- Review and systematization of secondary information:
  - ✓ Weather information to assess the variability of the North Atlantic Autonomous Region (RAAN).
  - ✓ Climate Change Impacts in the RAAN, case study Puerto Cabezas.
  - ✓ Case Studies. Climate Change. CADPI 2010.
  - ✓ Forestry Development Strategy of the RAAN. 2011.
  - ✓ Environmental Analysis of Potential and Constraints in the RAAN.
  - ✓ Community forestry in the RAAN.
  - ✓ Management Plan Proposed Biosphere Reserve Bosawas.
  - ✓ Proposal. Preparation Phase Plus REDD (avoided deforestation).
  - ✓ Environmental Policy in Nicaragua.
  - ✓ Climate Scenarios and Socioeconomic Nicaragua.
- Development and implementation of methodological tools for conducting participatory workshops for the analysis of the problems, consequences and impacts that have been made to municipalities and territories of the RAAN vulnerable to climate change, as well as their assessment of the socio-economic sectors and environmental concerned, measures and actions that have been implemented and the identification of measures agreed with key

stakeholders of the territories to reverse the vulnerability through adaptation mainly as priority sectors workshops were conducted in each of the aforementioned blocks .

- Realization of three participatory workshops: In the first consultation workshops were prioritized sectors, according to the problem and impact on Climate Change and the delimitation of the area of influence, vulnerability identification and analysis of the participation of key stakeholders present at the region (of the 8 municipalities, divided into 4 blocks).

  Office work of the Technical Committee on the systematization of information, ratification of the vulnerabilities found according to the priority sectors and identify additional vulnerabilities and identification of mechanisms and opportunities for the region that could be implemented as mitigation measures.

  In the second consultation workshops was a presentation of the information generated in the first workshops, these workshops are also agreed on the vision, mission, purpose and scope of the Strategy from the Worldview of Indigenous and ethnic groups in the RAAN, is identification and prioritized adaptation measures to climate change with their respective lines of action that government institutions should participate in its implementation, that organizations in the region, based on the territorial issue and found vulnerability.

- He developed a first draft report of the proposed Regional Strategy on Climate Change RAAN with input from the workshops.
- Workshop, the Technical Committee on Climate Change to support the review of draft Climate Change Strategy for the RAAN. This meeting will be held before the third workshop of consultation with experts.
- Workshop with experts who gave their contributions to the strategy, which were incorporated, and thus the draft document of the RAAN Regional Strategy stay rich.
- Regional Workshop Validation Strategy for Climate Change of the RAAN, with Regional Authorities, municipal, territorial and community Forestry Advisory Council (TLC) and donors, as well as key players in the 8 municipalities where the strategy was validated.
- Delivery CARENA final document for approval in the CRAAN.
- Unanimous approval by the full Regional Autonomous Council in regular session, with which it is formalized as a regional planning tool.
- Translation and publication of the strategy in its different versions.

VI. BIOPHYSICAL CHARACTERISTICS OF THE RAAN

6.1. Location

The North Atlantic Autonomous Region (RAAN) occupies a vast territory between the Rio Coco and Wangki, administratively this fall by 8 towns: Puerto Cabezas (regional government headquarters), Waspam, Bonanza, Rosita, Siuna Waslala Mulukukú and Prinzapolka.

Map No 1: Municipalities of the North Atlantic Autonomous Region

Its boundaries are: on the north by the Republic of Honduras, on the south by the South Atlantic Autonomous Region (RAAS), the east by the Caribbean Sea (Atlantic Ocean) and on the west by the departments of Matagalpa and Jinotega.

6.2 Physiography and geomorphology

According to the Forest Management Plan (2009), in the RAAN are 3 physiographic areas:

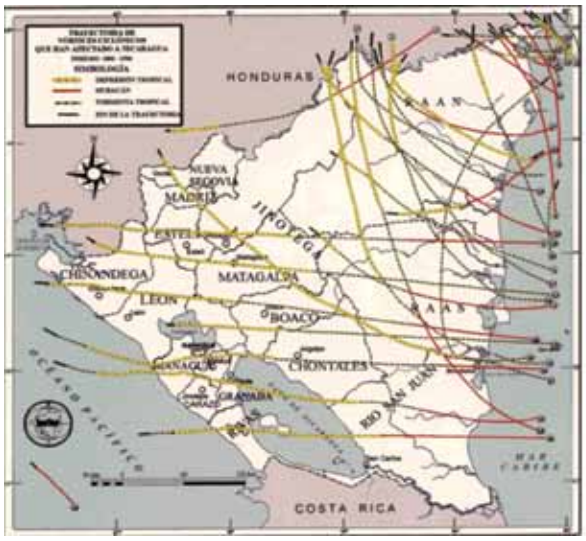
- Plain physiographic province of the Atlantic: It occupies about 73% of regional territory consists of plains and low to intermediate (up 200msnm), with predominantly flat relief undulating slope less of 15%.
- Atlantic County foothills: Also known as hills and mountains from 100 to 700 meters. It extends for approximately 15% of the RAAN. The province includes areas with elevations between 100 and 700 meters, the terrain is moderately steep dominant at very steep slopes vary between 15 and 75% (sometimes more). The geological materials are Tertiary volcanic surface; soils are fertile and have good drainage. His greatest representation is in the mining sector and partly triangle in the municipalities of Puerto Cabezas and Waspam. (Environmental Analysis of potentials and constraints in the North Atlantic Autonomous Region 2009).
- Interior highlands province: Located on the western edge of the territory of the RAAN, along the border with the department of Jinotega and Matagalpa covers an area of approximately 12% of the RAAN. The relief of this area is moderately inclined to very steep, with slopes generally range from 5 to 50% (although there are areas with slopes greater) and elevations from 100 to over 1,000 meters. The surface geological materials include intrusive rocks, metamorphic rocks and colluvial and fluvial sediments. The soils have good drainage to moderately good.

6.3. Climate

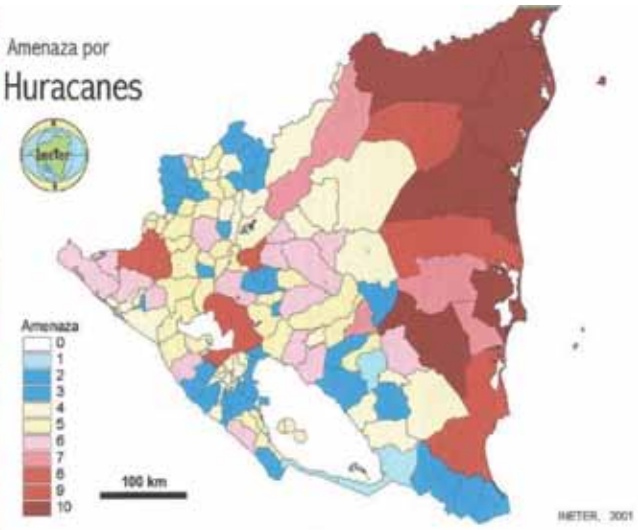
In the North Atlantic Autonomous Region Monsoon climate predominates in the plain, covering the town of Bilwi and extending to the mining triangle, Bonanza and Cape Gracias a Dios. Record is characterized by a rainy period of 9 or 10 months, with average annual rainfall of 2,000 mm. to 4.000 mm. The rains fall in March and April. The annual average temperatures ranging from 25 ° C and 26 ° C. (Guerrero F. Analysis of the North Atlantic Weather 2010)

The RAAN to be located across the Caribbean in the hurricane formation area is constantly affected by these weather events (tropical depression, tropical storm and low pressure systems), mainly during the period of greatest activity that begins in June and ends November 30.

The RAAN is exposed to threats from hurricanes and floods due to climatic conditions that arise. For more information View Maps No 2 and No 3.



Map No 2: cyclonic vortices



Map No 3: Hurricane Threat Levels. Source INETER 2001 INETER 2001

Small towns and communities are exposed to high levels of risk, the poor state of housing, lack of infrastructure and other factors that influence vulnerability. . From 1998, after Hurricane Mitch, the frequency of hurricanes rises as Alma (2002), Isidore (2002), Beta (2005), Felix (2007) and Ida (2009). This region is subjected to high levels of risks Natural Resources and Biodiversity. Maps 2 and 3, you can see that in this region there is a high risk of these weather phenomena.

6.4. Soil characteristics

The soil structure is closely related to Eco regions defined territory. Thus soils that develop in the plains, east of Wawa River are characterized by their lack of nutrients (nitrogen, potassium, phosphorus and calcium), with an absence of organic matter and acidic ph. This defines the

soils of this region for a natural vocation forest, mainly. While west of Wawa River are located in mountain regions where the largest biological reserves remaining timber and agriculture and livestock on hillsides and valleys, here predominantly basic grains, bananas, root crops (cassava, malanga, taro, etc.).

On the other hand, soils of river banks have accumulations of alluvial sediments suitable for agriculture and livestock, where the uses of perennial crops, especially fruit species, have an excellent result. However, the area is very limited by what can not be used intensively, at any time of year.

These features have been described that place a high vulnerability to the soils of the RAAN in their use, as these are restricted in relation to the diversity of use due to its natural vocation. (Impact of Climate Change on North Atlantic Autonomous Region, RAAN, case study, Puerto Cabezas. Nicaraguan Red Cross 2010).

6.5. Characteristics of forest cover

The North Atlantic Autonomous Region (RAAN) has a surface area of 32,819.68 km2, of which 23,430.56 km2 are natural forest, representing the largest area of forest in the country, accounting for 41.69% of the forests of Nicaragua, both pine as broadleaf, however has one of the most vulnerable areas subject to flooding and 1,192.99 km2.

The following Table 1, one can see in detail the different types of forests of the RAAN

Types of Forests	Extension has	%
Open hardwood forest	354,864.54	11.04
Closed broadleaf forest	631,286.28	19.63
Forest lying	563,719.65	17.53
Mangrove swamp	23,803.20	0.74
Palmas	256.97	0.01
Bamboo	99.93	0.00
Subtotal	1,574,030.58	48.95
Open pine forest	201,849.09	6.28
Pine closed	51,018.21	1.59
Subtotal	252867.30	7.86
Grand Total	1,826,897.88	56.82

Source: POF-RAAN INAFOR 2010

The forestry potential in the region is divided into three main Eco regions: - Northeast of Puerto Cabezas municipality extends the savanna composed of pine (Pinus caribaea) to the municipality of Waspam, adjacent to the territory of Honduras, extends southeast the pine hardwood forest associated with understanding the Wawa river basin and broadleaf forests extend west to the left margin Kukalaya river and the coastal area are located mangroves and swamp vegetation.

6.6. Characteristics of Animals

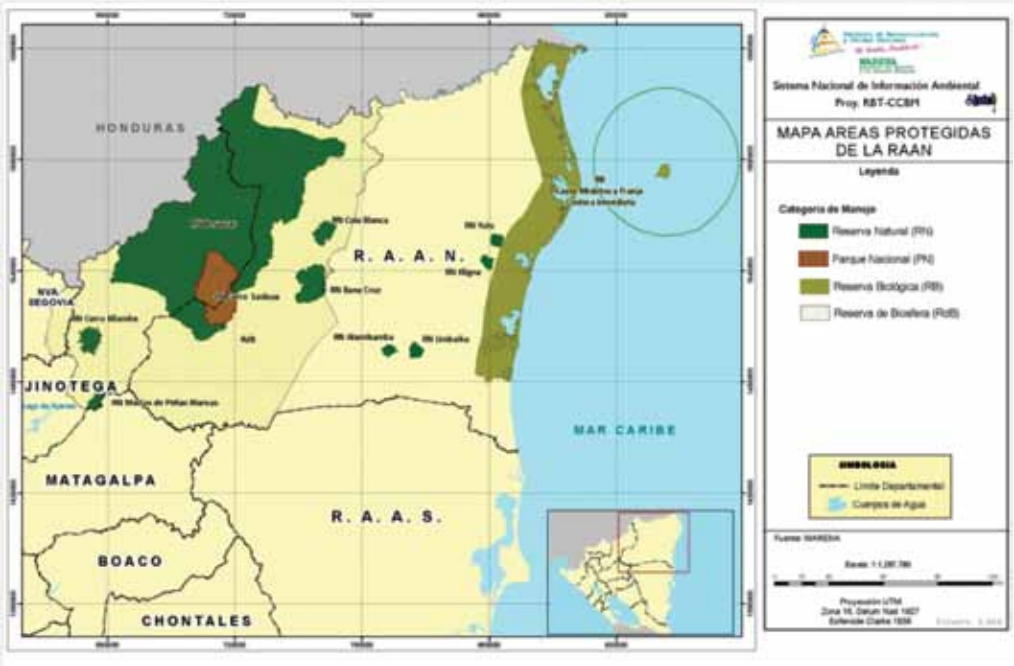
The fauna is very varied. In western parts of the region, and the mining triangle in the northwest where there are only broadleaf forest wildlife species such as wild boars, pumas, monkeys, tigers, alligators, macaws, parrots, tapirs, deer, among others, have a broad mobilization in their territories. However, these species are threatened with extinction due to indiscriminate capture made by poachers, who market them as pets, meat or fur. In the plains, the dominant land animal is very low.

In relation to coastal marine wildlife exploitation is related to shrimp, lobster, fish, turtles, crabs, among others.

In conclusion, the RAAN is a region of extensive corridors and refuges of biodiversity which is threatened by environmental degradation, by the advancing agricultural frontier, the lack of environmental education and conservation culture, land invasions in protected areas, illegal transfer of precious wood and wildlife, and pollution from mining waste. (Socioeconomic characterization of the RAAN. FUNICA 2009).

6.7. Protected Areas

The North Atlantic Autonomous Region (RAAN) consists of 12 protected areas in the following management categories Biological Reserve (1), National Park (1) Nature Reserve (9) and Biosphere Reserve (1) with an area of 868.756 has.



Map No 4. Protected Areas in the RAAN • Source: SINIA MARENA 2009

6.8. Hydrological network and watershed

Of the 21 watersheds in Nicaragua, 13 drains into the Atlantic and of these five do to the RAAN.

The region has a considerable expanse of wetlands (marshes and mangroves) that last all year, in the area of coastal and humid forests. Wetlands are estimated to reach an area of about 3,400 miles and some 34,000 hectares of mangroves in the lagoons and coastal areas. The latter are of vital importance to the preservation, contributing significantly in the retention of sediment and nutrient uptake for native wildlife.

Table 2. Major watersheds of the RAAN.

Watershed	Area in km ²	Porcentaje %
River Coco	24,959	51
River Prinzapolka	10,548	22
Wawa River	5,423	11
River Ulang	3,936	8
River Kukalaya	3,752	8
Total	48,618	100

VII. SOCIOECONOMIC CHARACTERISTICS OF THE REGION

7.1. Population

According to 2009 projections estimated that the population of the RAAN is a total of 394.792 inhabitants (INEC, 2005, INIDE 2008). The 49.6% of the women and 51.4% are men. This population is largely rural (72% of total).

Table No 3. Population of Municipalities

Municipality	Municipal Head	Estimates INIDE (2009)	Area (km²)	Population Density
Puerto Cabezas	Bilwi	82,548	5,984.81	13.8
Waspam	Waspam	55,586	8,808.81	6.3
Bonanza	Bonanza	83,115	1,897.94	43.8
Rosita	Rosita	28,324	2,205.42	12.8
Prinzapolka	Alamikanba	22,913	6,860.98	3.3
Siuna	Siuna	24,784	3,422.00	7.2
Waslala	Waslala	59,707	1,329.00	44.9
Mulukukú	Mulukukú	37,815	1,618.27	23.4
TOTAL		394,792	32,127.28	12.3

Source: INEC 2005, adaptation INIDE 2008

According to 2005 Census data, the overall regional population has experienced a growth of 17.0% in recent years. The municipality of Puerto Cabezas is the highest percentage of growth comes with a 29.5% during 1995-2005, followed by Siuna with 14.8%, 12.5% Rosita, Bonanza 11.9%, 8.5% and Prinzapolka Waspam as 7.3 %.

The North Atlantic population is characterized by multi-ethnic, predominantly of the Miskito population (45.0%), followed by Spanish-speaking mestizo 38.0%, then the Creoles who speak Creole English and are black with a 14.0% and finally, speaking Mayangnas Twahka and Panamahka, with a 3.0%. The Miskito population is concentrated in the municipality of Puerto Cabezas with 43.0%, followed by a 40.8% Waspam. In both municipalities live 83.8% of this ethnic group and to a lesser extent in Rosita (9.3%), Siuna (3.1%), Prinzapolka (2.3%) and Bonanza (1.5%).

7.6. Economic sector in the RAAN

The main basis of the subsistence economy of the region's primary production, especially in farming, fishing and followed by forestry, a sector is located in the secondary sector especially mining (metals and nonmetals) and another in the tertiary sector of the economy (trade, services, transportation).

VIII. REGIONAL WEATHER ANALYSIS (Guerrero, September 2010.)

The methodology used for weather analysis of the region, provides the procedures and criteria established by the Nicaraguan Institute of Territorial Studies (INETER) and the World Meteorological Organization (WMO).

The database used was obtained from the climate data from 4 weather stations. See Table 2. These stations were chosen because they represent a permanent and adequate network for meteorological analysis of the municipality. Besides these stations meet the technical criteria for installing a weather station that the World Meteorological Organization (WMO) has established. With information from these weather stations using standardized methods and climatic indices were calculated to determine the intensity and frequency of maximum rainfall, drought and the trend of annual precipitation, through the Standardized Precipitation Index (PSI) to detect the intensity of drought, is one of the easiest because it requires only precipitation data.

To detect the trend of precipitation and average temperature was used the least squares method, according to the criterion of minimum square error.

Table 4. Features Weather Stations

Name of the station	Code	Record Year	North Latitude gg-mm-ss	West Longitude gg-mm-ss	Elevations msnm
Puerto Cabezas	47 002	1959 - 2009	14° 02′ 48″	83° 22′ 30″	20
Bonanza	53 010	1972 - 2007	14° 00′ 54″	84° 35′ 36″	180
Rosita	53 008	1973 - 2007	13° 55′ 51″	84° 24′ 48″	96
Siuna	53 003	1972 - 2005	13° 44′ 30″	84° 46′ 30″	180

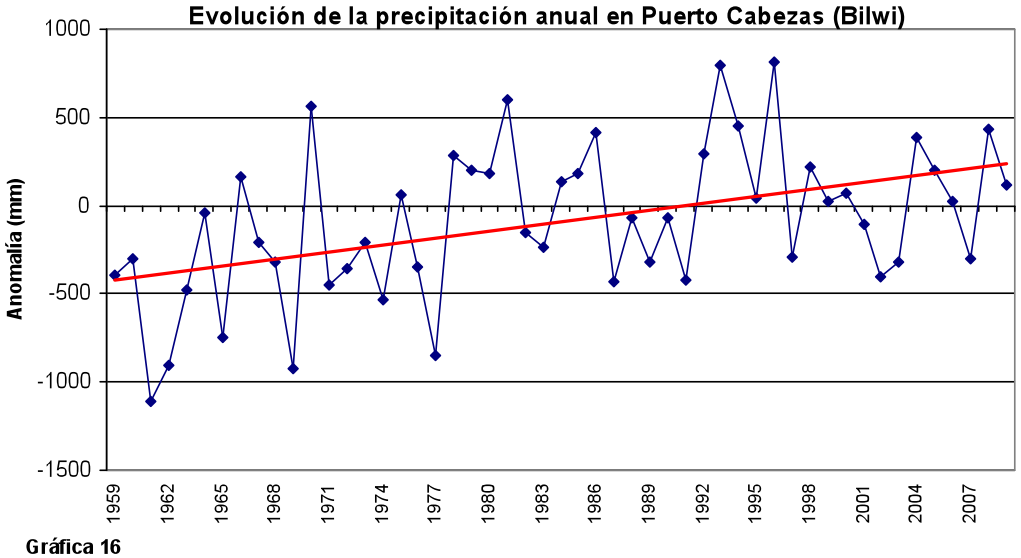
During the Children in this region has an annual rainfall deficit. Because the annual accumulated have occurred during El Niño, are in the normal range (± 10%) compared to its historical value annually (2,624 mm).

Annual precipitation more frequent in years with La Niña is 2.657 mm. During the involvement of this phenomenon have been recorded in the RAAN, slight excess of annual rainfall of about 5% to 12% compared to its historical value annually (2,624 mm).

Trend of Precipitation

For the analysis we used the annual records of the station Puerto Cabezas (Bilwi), by the length of their records and their association with high rainfall regimes of the rest of the region. The base period considered is 1971 to 2000. The results of the analysis are shown in Figure No. 2, which clearly shows an upward trend in annual precipitation, this increase is 25%. This value exceeds the natural variability of precipitation (± 10%), which can be linked to regional warming. Condition that could increase the frequency of extreme events like hurricanes, which could strengthen the future rising trend of precipitation in the RAAN.

Graphic No. 1: Evolution of the annual presipitation in Puerto Cabezas

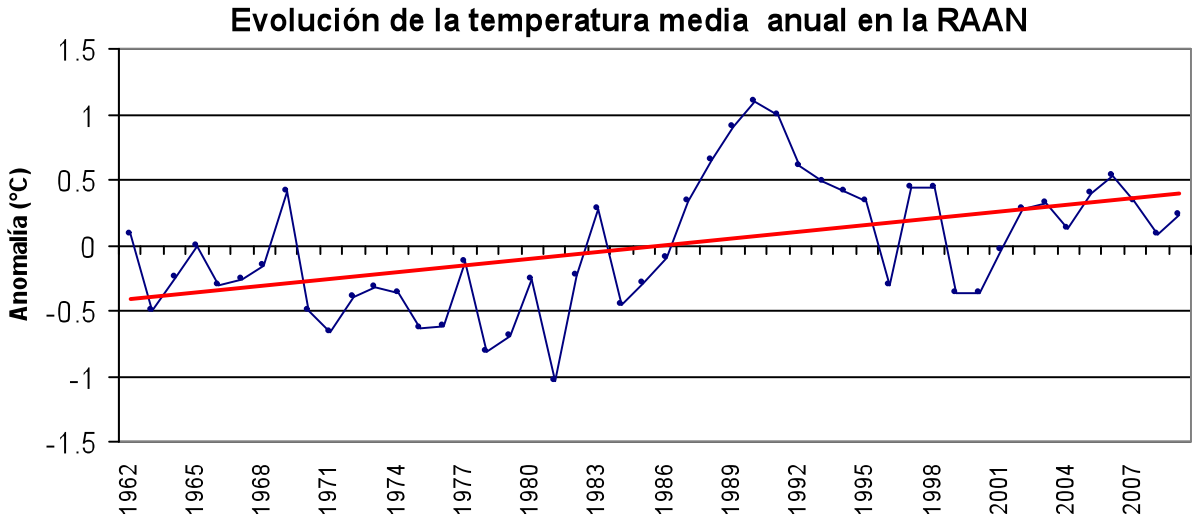


Gráfica 16

Trend in annual average temperature

This analysis used the annual records of the station Puerto Cabezas (Bilwi), taking the base period 1971 to 2000. The result of the trend in this station is valid for the rest of the RAAN, as the temperature behavior Puerto Cabezas thermal regime is representative of this region. The results of the analysis are shown in Figure No. 3, which shows a clear upward trend in mean annual temperature at a rate of 0.02 ° C / year. Which is consistent with the detected temperature increases globally by IPCC.

Graphic No 2: Evolution of the average annual temperature in the RAAN



Gráfica 18

Precipitation Caused by Tropical Cyclones in the RAAN

The rainfalls caused by tropical cyclones were evaluated with the trajectories described by Tropical Cyclones that have affected the RAAN, and its intensity, so that we obtained three types of paths:

In path 1, moving along the north coast of Honduras or enter the country, the amount of precipitation that has accumulated in the days involvement ranges from 27 mm to 294 mm in Puerto Cabezas sector and 144mm in inside the RAAN. Path 2 are the Tropical Cyclone that directly impact on the country, with intensities 2 or 3 on the International scale hurricanes. Accumulated from 52 to 130 mm occur in the area of Puerto Cabezas, however in the mining sector have occurred triangle accumulated precipitation of 146 mm. Path 3, directly affects the Nicaraguan Atlantic coast, with intensities of 1 or 2 of the International Hurricane Scale or only reach Tropical Storm status. Accumulated rainfall of 164 mm to 265 mm, were records in the Puerto Cabezas, while within the region have presented magnitudes of the order of 137 mm.

Category 5 Hurricane Felix on the North Atlantic Autonomous Region (3 -5 September 2007).

Although we can not definitively determine when a tropical cyclone directly or indirectly affect this region there is a possibility that from June to November each year, some of which could affect rainfall and produce at or above absolute maximum daily rainfall before return periods presented, reflecting greater impairment of intense hurricanes of category might be related to global warming.

IX. HARMONIZATION STRATEGIES, PLANS AND PROGRAMS

(Bosawas Management Plan, Proposed Update of the Forestry Development Strategy of the RAAN, Forest Management Plan and the proposed National Strategy for Avoided Deforestation).

One of the cornerstones to harmonize and find synergies between the major planning instruments related to sustainable development with the Regional Strategy on Climate Change, is to optimize resources and strengthen the common themes among the major existing planning instruments in the RAAN it is necessary to harmonize with the Management Plan Bosawas Reserve, in the territories that are within the RAAN, with the strategic lines of action on Climate Change Strategy and the strategic lines of the Proposed Strategy Regional Forestry Development, Programs Forest Management Plan of the Region and the main lines of action of the Proposed National Strategy for Avoided Deforestation. The following matrix highlights the strategic guidelines laid down under the same objective in these planning instruments:

Management Plan Reserve Bosawas	Proposed Forest Development Strategy (EDFOR RAAN)	Regional Strategy to Combat Climate Change	Forest Management Plan (POF-RAAN)	Proposed National Strategy for Avoided Deforestation (NSDS)
1. Organizational strengthening of indigenous communities for the sustainable management of BOSAWAS. The Indians and their culture have been key factor in preserving the core area of the RBB, so to preserve the reserve, you must also strengthen the organization, leadership and cultural identity of these indigenous people to manage their resources and territories and the same being of their communities. In order to improve the management of RBB. Strengthening property rights of indigenous peoples.	**1. Social Development: Strengthening governance of Indigenous Peoples and Ethnic Communities.** The governance of indigenous peoples is closely related to the concept of natural physical space occupied by a community or territory, where a continuous historical coexistence and cultural traditions. Titling and indigenous land reclamation is the basic instrument for achieving good governance in the sustainable use of natural resources.	**1. Order the system of land tenure** To order the system of land tenure is necessary demarcation and titling of indigenous lands so they can rescue their worldview and governance in achieving sustainable use of natural resources. With the effective implementation of various laws related to the autonomous process and achieve harmony with the national laws.	**1. Promoting responsible use and fair.** Promotion and development of conservation, sustainable use and exploitation of forest resources, based on improving the capacity of forest resource use, reducing the intensity of felling trees optimizing the performance of forest use.	**1. Avoided deforestation, forest degradation and a change of traditional wood extraction extractions with reduced impact.** REDD thematic priority actions aimed at the relative importance of the main causes of deforestation / degradation. REDD incentive scheme territorially differentiated based on calculations of opportunity costs.

To develop these strategic lines of action of these methodological tools RAAN planning, action is needed is key and titling of indigenous lands and land use planning, it is necessary to join efforts to make it effective Applying this action may be align and optimize resources.

Management Plan Reserve Bosawas	Proposed Forest Development Strategy (EDFOR)	Regional Strategy on Climate Change	Forest Management Plan (POF)	Proposed National Strategy for Avoided Deforestation (NSDS)
2. Rehabilitation, Management and Conservation of Natural Resources and Biodiversity Biosphere Reserve BOSAWAS (RBB). The prevailing management systems that are recommended and under the focus of rehabilitation, management and conservation are: ■ Maintenance of closed broadleaf forest. ■ Management of open hardwood forest conservation. ■ Management of forest regeneration and Management of natural regeneration, mainly secondary forest.	**2. Forestry Development: Forestry Community.** The aim is to strengthen community forest management as part of the strategy for poverty reduction and improved quality of life of indigenous and Afro-descendants of the RAAN, through sustainable use of natural resources, promoting integral, equitable and inclusive. Similarly seeking to rescue traditional forms of forest management and adaptation to climate change with emphasis on the issue of common property forest.	**2. Integrated management of natural forest.** The aim is to develop its own model of forest development and management capacities of communities and other stakeholders to achieve the sector's development. It will also be necessary to strengthen the legal framework, adapting to the real needs of the forestry sector in the RAAN, protected areas and wildlife to establish consistent rules to support good management with key stakeholders in the region to carry out development sector.	**2. Homeland security and community forest governance.** EU territorial governance is a strategic axis of PAF, whereas more than 80% of the RAAN and forest resources are being dominated by the regime of communal property. So the component focused on "ensuring community management of forest resources with a systemic approach to consolidate the basis of food sovereignty and use of biodiversity and the development of community forestry "	**2. Establishment of reserves in areas already intervened and provided for the restoration and in areas without previous intervention.** Geographical priority areas: deforestation processes are newer and less developed, where more forest remains, the more immediate effects of reducing emissions from LULUCF are available in the RAAN.

Integrated forest management, key guideline RAAN Regional Strategy on Climate Change harmonizes the lines of action on rehabilitation, management and conservation of natural resources and biodiversity of the RBB management plan, the Community Forestry forestry Development Strategy of the RAAN, territorial security and governance of community forestry forest Management Plan and the establishment of reserves in areas already intervened and provided for the restoration and without prior intervention of the National strategy Avoided Deforestation.

Management Plan Reserve Bosawas	Proposed Forest Development Strategy (EDFOR)	Regional Strategy on Climate Change	Forest Management Plan	Proposed National Strategy for Avoided Deforestation
3. Sustainable Production and Diversification of production. The Sustainable Production Program focuses on fostering the establishment, management and adoption of agroforestry production systems and diversification of production, to try to zoom in on areas that are used to their potential use for the land. Among the proposed systems are those known as agrofood, cocoa and coffee ecoforestal, silvopastoral systems and tree plantations, as an economic alternative, all under certain arrangements and the use of appropriate species to the soil and climate, economic and sociocultural existing Biosphere Reserve BOSAWAS.	**3. Restoration and Soil Conservation.** Develop and implement restoration and soil conservation at the municipal or watershed where vegetative practices are included, along with the programs of reforestation with native species and forest plantations, productive reconversion of agricultural activities in forest lands preferably, to utilization patterns agroforestry and forestry.	**3. Traditional perennial crop establishment.** Through the establishment of fruit trees: breadfruit, citrus, mangoes and coconuts in family plots and gardens based on the establishment of Musa and tubers (cassava plantations and banana combined) also are being used to graft, especially cocoa and citrus. Perennials are a food source through the establishment of community nurseries spreading mainly with women.	**3. Knowledge Management.** To help improve the installed capacities of forestry in the RAAN by creation, innovation and technology transfer and information systems relevant to optimize the use of forest resources and development of policies that benefit the conservation and sustainable development.	**3. Enrichment planting and restoration of degraded forests and intervened. Promotion of natural regeneration in disturbed areas.** For the recovery of forests in degraded areas by planting and reforestation activities. Also the improvement and forest management in areas affected by natural regeneration, to the rescue of native species in the region.

The establishment of traditional perennials is a strategic key to sustainable production and recovery and restoration of soils, also has a socioeconomic and environmental function. This line is presented as harmonizing the three methodological tools the soil restoration and sustainable production and food security.

Management Plan Reserve Bosawas	Proposed Forest Development Strategy (EDFOR)	Regional Strategy on Climate Change	Forest Management Plan	Proposed National Strategy for Avoided Deforestation
4. Strengthening management and organizational. System of environmental governance in BOSAWAS indigenous territories. The capacities of the communities (in decision making, organizational development, advocacy, leadership and cultural identity) are the mainstay for sustainable management of BOSAWAS.	**4. Strengthening forest governance structures (CCF-A, SERENA, Directions Natural Resources and Environment of the Municipal Offices, CARENA.** The institutionalization of the process of administration and management of forest resources in the RAAN is raised in all areas of discussion, looking to articulate national development plans and the regional development plan. So the process of forest governance in the RAAN has to articulate the functions of at least 4 institutions with administrative functions on natural resources: Autonomous Regional Institutions, Central Government Institutions, Organizations and Municipal Authorities (INAFOR, 2010).	**4. Forestry and environmental governance at all levels implemented.** Is important to promote coordination of the actors that have to do with the forestry sector and meeting the economic requirements, social and environmental impacts of the different sectors involved in forestry Coordination of forest management of the institutions of state, regional, municipal and forestry-related land (INAFOR, MARENA, MAGFOR, SERENA, CARENA, UGAM, TERRITORIAL GOVERNMENTS), also with the private companies for a good use of forest resources.	**4. Governance Model.** The institutional management processes and management of forest resources RAAN is raised in the Forest Management Plan-RAAN with the articulation of national development plans and regional levels to strengthen the process. The process of forest governance in the RAAN has to articulate at least 4 sets of institutions with administrative functions on natural resources forest: Autonomous Regional Government, Central Government Institutions, Government and Municipal organizations and Communal authorities and institutions and territorial.	**4. National Forestry Program.** Where one of the cornerstones is the Forest Governance at all levels, in order to coordinate projects and components to qualify for REDD plus opportunities as the RAAN is prioritized geographically have: recent deforestation and less advanced, where there are remnants of forest, where you can get more immediate effects of reducing emissions from LULUCF.

Forestry and environmental governance in the RAAN, is a fundamental mechanism for the protection and sustainable use of forests, which must be coordinated and harmonized with the institutional authorities at National, Regional and Municipal forest management and arrange them with indigenous communities present in different areas of the region, mainly taking into account the cultural identity and organizational development of each.

X. PROBLEM OF THE REGION AS TO MAJOR SECTORS

The problems of the region is mainly caused by human actions that increase the vulnerability of sensitive sectors such as water resources and forestry also productive sectors such as agriculture and fishing. The geographical location is susceptible to the impacts of weather events like hurricanes, climate variability, tropical storms and depressions more intense and recurrent Climate Change, which have impacted the RAAN with severe consequences for the high vulnerability of the territory, mainly in the population of the region and loss of life in coastal areas. Annex 1 show in detail the problems encountered in the region identified by sector.

XI. VULNERABILITY ASSESSMENT

Vulnerability Assessment of Current Climate

Nicaragua, for its geographical position overlooking the Caribbean Sea has been exposed to a large number of tropical cyclones in the last 106 years. (Studies of Vulnerability to Climate Change RAAN, 2010), and hurricanes that have hit the country very short recurrences, with rare exceptions, the predominant period of recurrence in a century has been 2 to 4 years.

Also you can check the increased incidence of hurricanes in the past 30 years, and almost all of them have affected the RAAN, the hurricanes that have hit the country very short recurrences, with rare exceptions, the predominant period of recurrence a century has been 2 to 4 years.

Coastal areas around the RAAN are vulnerable to climate change due to the impacts caused by the rising sea level, storm waves and hurricanes and food shortages to a changed climate.

Climate variability in the region is manifested by El Niño and La Niña, associated with both drought and floods, likewise extreme events are associated with tropical storms and hurricanes, so that the RAAN has a high vulnerability to these events, and which clearly shows an upward trend in annual precipitation, this increase is 25%. , Exceeding the natural variability of precipitation (± 10%), which can be linked to regional warming, which conditions to intensify the frequency of hurricanes. Thus, the results of the study of climate variability in the RAAN clearly show an upward trend in mean annual temperature at a rate of 0.02 ° C / year. (Guerrero 2010).

In a scenario of greater temperature increase in precipitation, will affect the power supply to which the population now has access, increasing malnutrition and the prevalence of environmental illnesses. The hazardous characteristics of hurricanes are given by:

- The destruction can be caused by the direct impact of wind or windblown material.
- The rains that accompany hurricanes are extremely variable and difficult to predict. The heavy rainfall causes two types of destruction: the first is due to water infiltration into buildings causing structural damage and the second, and more generally, is flooding on the land that endangers all the valleys with their infrastructure and transportation facilities such as roads, bridges and communications systems, as well as biodiversity and habitats.
- Storm surges, which are temporary rises in sea level caused by water on earth driven mainly by the force of hurricane winds to the coast and only secondarily, by reducing the level barometric pressure sea between the eye of the storm and the outer region. These storm surges pose the greatest threat to communities and coastal ecosystems.

Vulnerability Assessment of Water Resources

In relation to water resources are not significant impacts are anticipated, except for those communities located near the coast or keys, in which case the water resources may suffer injury due to saline intrusion into freshwater reservoirs.

The greatest impacts on water resources will be on coastal communities as a result of saline intrusion. It will be important to management measures that allow the care and preservation of fresh water to weather conditions that will transform in a short time many ecosystems in the region.

Analyzes carried out since 2000, come to the conclusion that despite the reduction in water availability, which may involve the reduction of rainfall in a setting of up to 40% lower and with a population losses increased and saline intrusion even the availability of water would be sufficient for there is no shortage in this area considering an increased population.

However, there is risk of water pollution from runoff of chemicals that could be used in the upper and agricultural activities taking place on the banks of major rivers. According to the RAAN community is reduced water flow of rivers, water shortages exist at the level of territories and communities, the disappearance of aquatic fauna, the difficulty of transporting water by sedimentation of the riverbeds. This decrease associated with the lack of clear-cutting and forest cover in the upper rivers.

Likewise the population of the RAAN, indicate that it is vulnerable to access drinking water by the poor distribution of drinking water in the municipalities of the region and in rural communities no potable water supply, the population is supplied from the eyes water or rivers to be exposed to disease, especially those most vulnerable are children and the elderly.

Vulnerability Assessment Agricultural and Fisheries Sector

The decreased rainfall and increased temperature can generate a transformative effect of soils with lower rainfall regime that could improve yields for certain crops such as maize, rice and beans in some regions with higher altitude (designated as agricultural area) so do not expect potential negative impacts in these areas, except those caused by extreme events (floods and droughts), where there is total or partial loss of crops.

Communities that depend on subsistence agriculture face serious impacts of climate variability, for the loss of their crops.

The loss of soil fertility by inappropriate agricultural practices, the genetic impossibility of seeds used in forest land are diminishing the productivity of the soil, thus increasing production costs and yields are low, and consequently, lower food security, climate variability in addition to the region is exposed, the greater the likelihood of pests, crop diseases of excessive rainfall or drought.

As for fishing, a vulnerability factor is over-catch of species of high commercial value for industrial and artisanal fleets that do not have gear and fishing gear size lobster caught mainly illegal and inappropriate fishing methods such as traps and scuba diving, so you are endangering the species.

More recurrence of hurricanes that impact the coastal zone, the temperature increase and sea level rise, coastal communities dependent on fisheries may be significantly impacted, both by their exposure, as in economic activity that gives livelihood.

The evidence observed in all continents and most oceans shows that climate change, particularly temperature increases, affecting many natural systems. The sea level rise and human development are together contributing to losses of wetlands and coastal mangroves and increasing damage from coastal flooding in many areas.

Climate change alters the habitat of the species, thus moving to other places or collapse, there is reduced supply artisanal fishing mainly by increased rainfall, no turbidity, fishing is hard water fish sweet (crappie, guapote bearded and others).

Water turbidity also affects the activity of diving and fishing activities and the lack of tools and fishing tools appropriate to the rainy season, there is sedimentation affecting mangrove habitat of the species of this ecosystem.

Forest Vulnerability Assessment

The broadleaf forests of the RAAN are experiencing severe impacts, as the rainfall regime may decrease and increase the thermal regime, only those species more resistant adapted for the conditions imposed by climate change will be outside the comfort zone. Another potential threat to these forests is deforestation and the encroachment of agriculture, which contributes to rapid changes in land use, which by their nature are few productive.

Another impact is associated with mechanical injury that produce strong winds over the forest, which in many cases facilitates fires or changes in land use. These forests are the largest reserves of water production in the region may thus affect coastal freshwater ecosystems.

In the coastal lowland broadleaf forests and mangroves may receive a sudden change in environmental conditions due to a significant decrease in the water, increase the risk of flooding during periods of storms or hurricanes.

Since the establishment of the forestry development strategy in 2004 in the region in relation to forest management and governance, the sector presents progress in the areas of: assessment of forest resources, land use planning, protected area management, forest protection, education and training. However there are weaknesses in the areas of community management, strengthening the industry, investment promotion, and environmental services. It is necessary to further strengthen the areas of greatest progress and focus specific actions in the areas of greatest weakness and it has to do with the inclusion of communities in the most efficient production process that guarantees income for families (strengthen community enterprises, chain value, commercialization, industrialization, and payments for environmental services). On the other hand it is necessary to update it to include current and impact issues: climate change and REDD plus, management actions focusing international funds offered.

Vulnerability assessment Ethnic Cultural Partner

The socio-economic impacts directly and indirectly on coastal communities and close to the lagoon system, agricultural production, supply and quality of fresh water, fisheries and human health in coastal areas of the RAAN and with a population grows to these areas are highly vulnerable to climate change, as this sector is affected by increased intensity of rainfall with flooding, heat gain and the environmental impact on people with diseases, tropical storms increase, causing wind and rain damage, presence of hurricanes impacting severely on the socio-economic infrastructure and the productive sectors of the region, rising sea levels, loss of land, beach and coastal infrastructure.

These climate change impacts become more severe by increasing the vulnerability of the irrational use of natural resources, land use change, environmental degradation and social, lack of skills, information, resources and practices to against extreme weather events or events that have been derived from the population of the region even more vulnerable.

Also the pressure faced by communities at the continued loss of their territories and natural resources, reflected mainly through deforestation and degradation of soils and forests, and consequently, loss of cultural and spiritual values because of the involvement that is being done in natural areas, have vulnerable indigenous communities, as they have lost many valuable ancient customs and practices to protect their territories and natural resources and to their health as natural medicine.

Also the rest of the countries migrate to these areas, invading the territories of collective ownership of indigenous and African descent. This vision of economic development is not compatible with the worldview of indigenous peoples and the processing of their territories, which is destabilizing the coexistence of these peoples to their lands.

XII. PRIORITY OF THE PROBLEM AND SOLUTION ALTERNATIVES

Of the problems found in the region through secondary data and through participatory workshops, it became a prioritization of the main problems caused by climate change evaluated by sector and by the driving pressure (human actions) that have been increasing the vulnerability of the territory.

In participatory workshops, it could capture the knowledge of key actors involved, who suggested alternative solutions through group work, which could result in adaptation measures, which would be input from the Climate Change Strategy for the Region. For more detail in Annex 2 can display the problematic areas and their possible solutions.

XIII. REGIONAL STRATEGIC TO CLIMATE CHANGE

- STRATEGIC FRAMEWORK

It has developed a Regional Strategy on Climate Change, based on studies by MARENA and systematization of information on productivity, resource availability, vulnerability and tendency of the variation in levels of precipitation and temperature of the area through INETER and mechanisms for consultation and direct involvement of key representatives of the settled population in the RAAN.

To implement this strategy, it is essential and urgent to its institutionalization in a cross, in the strategic plan for regional development and strategic plans of municipal development, adapting to their peculiarities. It is also important to strengthen the municipal committees of the Region, for the Prevention, Mitigation and Relief to integrate climate change action, assess compliance with current environmental legislation and to encourage compliance.

The measures that are prioritized in this strategy serves as an input into policy-making process of municipalities, guidance and tools to properly direct their efforts and resources by identifying, planning and executing actions, depending on the success of what proposed by strategic guidelines to support decision making and priority setting to reduce vulnerability and socioeconomic and environmental risk of each of the municipalities in the region to climate change.

- MISSION

To reduce vulnerability to climate change, develop effective national, regional, municipal, territorial and community for the conservation and protection of natural resources, where indigenous peoples and ethnic communities in a participatory manner define their governance models land based on their worldview, for sustainable development in the region.

- VISION

The North Atlantic Autonomous Region has reduced its vulnerability to climate change by adopting measures to mitigate and adapt in concert and intensify social capital, physical, cultural and environmental importance of indigenous peoples and ethnic communities, consistent with their worldview, so as to develop sustainable cultural identity.

- PURPOSE

The North Atlantic Autonomous Region, the Nicaraguan Caribbean, to tackle climate change and its consequences, designs and implements programs, measures and adaptation actions that reduce vulnerabilities sector, reduce risks, and generate knowledge and technical skills, technological, institutional, organizational and human and social dynamics changes in the productive, cultural and environmental importance of indigenous and ethnic communities in the region.

- GUIDING PRINCIPLES OF CLIMATE CHANGE STRATEGY

The principles on which frame this Regional Strategy to Climate Change are: Self-determination of Indigenous Peoples and Ethnic Communities in the administration and management of its resources against Climate Change, without political and religious creed, honesty, transparency,

multiculturalism, cultural relevance, inclusiveness, gender equity, respect for the positive and customary rules, autonomy, free prior and informed consent, social harmony and cultural identity.

- GUIDELINES FOR REGIONAL STRATEGY RAAN

This strategy suggests appropriate measures in harmony with ecosystems to reduce the impacts of climate change, ranging from educational measures and technological sectors prioritized in this strategy are: Water Resources, Forestry, Agricultural Sector, Fisheries and Ethnic Sector, sociocultural.

Instances of self-government and national government should coordinate with regional and municipal authorities to establish new forms of cooperation in the design of programs and projects involved in this strategy and incorporate the theme of climate change, all relevant authorities in the fields national, regional, municipal and territorial civil society organizations, private business sector, universities and regional research centers.

- ETHNIC CULTURAL KNOWLEDGE MANAGEMENT FOR THE ADAPTATION-TRADICONAL CLIMATE CHANGE MITIGATION

The increased vulnerability in the other sectors, make the climate change impacts and recurrence of extreme events in this area are severe Ethnic-cultural, for that reason it is necessary to strengthen institutional capacities for disaster response , to articulate and bring together all sectors of the territory for emergency care.

It is also recommended re-evaluate the infrastructure in areas of high vulnerability, amend the design of new infrastructure in coastal areas the effect of climate change on the life of the work, encouraging the introduction of the effect of climate change projects and Marine Works in other recommendations and standards for infrastructure in highly vulnerable areas.

Improving knowledge, preparation and welfare institutions. Education about the risks of climate change and how to reduce or respond to them can help reduce vulnerability.

Training and awareness on the issue of climate change at all levels, promoting the rescue of good environmental practices promoted by indigenous peoples in the management of natural resources and in its rational use, without the disruption of ecosystem balance. It will be necessary to systematize these community experiences of indigenous peoples for dissemination in the various native languages of the region, also raise the family in cross-cutting themes identified in the strategy.

At the community level and territories of indigenous communities regain compliance with EU environmental standards of use of natural resources and community spirituality practices for

managing natural resources, based on zoning of the forest, designating areas harvesting, fishing, mining and utility of medicinal plants and gold mining, among others. Logging only for consumption and home building, land use plant and harvest for home consumption.

Rescuing the traditional knowledge of indigenous peoples in terms of the harmonious relationship with nature, with particular involvement of indigenous women as guardians and transmitters of this knowledge from generation to generation.

In recognition of the contribution of indigenous peoples to the conservation of biodiversity, enforce Articles 8J and 10C of the Biodiversity Convention.

It is necessary to define a region in economic development model for the RAAN, which implements a system of integrated planning and coordination with the interests of different levels of government in the region and immersed the culture, customs and traditions adapting to the development of the region. Also adapt sustainable production models harmonized with the sociocultural and economic characteristics of the region.

Identify, manage and implement sustainable projects in harmony with the environment, input into the plans of municipal and regional development.

To achieve all operate is vital mentioned the participation of state institutions and local stakeholders, particularly in the areas of training and community awareness have in the region: MARENA, INAFOR, GVC, Red Cross, CADPI, universities, Mayors, among others. For further explanation see the following matrix:

Ethnic cultural knowledge management for adaptation tradiconal-mitigation in climate change RAAN

Strategic Lines	Lines of Action	Institutions and Key Actors
Governance and Gender	Strengthening regional institutions, municipal and regional climate change risk management in bicultural land, relations between indigenous peoples and appreciation of the spiritual, economic, social ecosystem approach, seeking equity community, rescuing the traditional early warning systems, development and dissemination of traditional norms and complement the national legal framework with these standards. Promote the involvement of indigenous women in the process of implementing adaptation measures, mitigation of climate change, as transmitters and custodians of traditional knowledge of indigenous peoples.	The GCI (wihta, trustee, council of elders), GTI (representation of the municipal authorities - territorial policy), Municipalities, and CRAAN Graan., NGOs present, universities, SINAPRED, INPESCA, MAG, INTA, MARENA, SERENA, international cooperation agencies. Indigenous women's organizations in the region.

Strategic Lines	Lines of Action	Institutions and Key Actors
Research and communication	Rescue practices, traditional ancestral and traditional classification handling of native seeds, establishment of code of conduct and ethics for stocks, seed storage systems, programs need to know and respect the form of community organization, rescue systems traditional production, dissemination and awareness, recovery and strengthen traditional systems of disaster psychosocial care.	The GCI (wihta, trustee, council of elders), GTI (representation of the municipal authorities - territorial policy), Municipalities, and CRAAN Graan., NGOs present, universities, SINAPRED, INPESCA, MAG, INTA, MARENA, SERENA, international cooperation agencies. Indigenous women's organizations with a presence in the region.
Research and communication	Rescue practices, traditional ancestral and traditional classification handling of native seeds, establishment of code of conduct and ethics for stocks, seed storage systems, programs need to know and respect the form of community organization, rescue systems traditional production, dissemination and awareness, recovery and strengthen traditional systems of disaster psychosocial care.	The GCI (wihta, trustee, council of elders), GTI (representation of the municipal authorities - territorial policy), Municipalities, and CRAAN Graan., NGOs present, universities, SINAPRED, INPESCA, MAG, INTA, MARENA, SERENA, international cooperation agencies. Indigenous women's organizations with a presence in the region.
Integrated management of knowledge.	Inventory and studies on medicinal plants, food security from the traditional cuisine, strengthen disaster response systems., Identify and adjust schedules traditional cultural rescue of traditional food systems of reciprocity, traditional management and recovery of seeds (food fruits and seeds).	The GCI (wihta, trustee, council of elders), GTI (representation of the municipal authorities - territorial policy), Municipalities, and CRAAN Graan., NGOs present, universities, SINAPRED, INPESCA, MAG, INTA, MARENA, SERENA, Indigenous Women's Organizations in the region
Technology and traditional knowledge.	Finding and identifying alternative energy sources for food preparation and other, recovery of traditional use of forest, rescue systems traditional fishing, hunting, gathering, and agriculture, the promotion of conservation. To promote consumption practices and practices of traditional medicine.	The GCI (wihta, trustee, council of elders), GTI, Municipalities, and CRAAN Graan., NGOs present, universities, SINAPRED, INPESCA, MAG, INTA, MARENA, SERENA, international cooperation agencies and governments tips regional (Graan-CRAAN). Indigenous women's organizations with a presence in the region
Financial mechanisms.	To allow access to funds to GTI for their life plans and projects, construction standards and procedures for access and distribution of adequate funds to reality (management models). Integration of GTI models for compensation for the good management of natural resources. Allow indigenous women access to finance compensation fund to improve their quality of life.	The GCI (wihta, trustee, council of elders), GTI (representation of the municipal authorities - territorial policy), Municipalities, and CRAAN Graan., NGOs present, universities, SINAPRED, INPESCA, MAG, INTA, MARENA, SERENA, international cooperation agencies. Indigenous women's organizations with a presence in the region.

MITIGATION

- Overview

Is to reduce emissions of greenhouse gases (GHGs) and carbon dioxide sequestration by vegetation and soils, to help stabilize the atmospheric concentration of greenhouse gases. To mitigate the adverse effects of global warming efforts should be directed toward reducing emissions of greenhouse gases through the implementation of mitigation projects.

The Central American countries concerned to contribute to global efforts to stabilize emissions of greenhouse gases and the opportunity for income generation for sustainable development, encourage participation in international carbon markets through the pursuit of favorable conditions

for renewable energy and energy efficiency, and programs to overcome the barriers currently faced by mitigation projects and commercialization of emissions reduction certificates (CERs).

The issue of "carbon market" has aroused the interest of environmental business in Nicaragua, being economically attractive and sustainable investment potential to couple mainly the private sector. In order to facilitate the entry of Nicaragua to the new market, MARENA through the project: Capacity Building in Priority Areas Climate Change funded by the UNDP developed the "Methodological Guide for the Design, Verification and Monitoring of Mitigation Projects Greenhouse Gas "in order to advance disseminate business opportunities and facilitate the design of such projects represent additional cash flow and independent of traditional line of business. The guide focuses on different aspects of project cycle greenhouse gas reduction, especially for energy sector projects and forestry.

One of the areas where you can make mitigation projects is the national energy sector, as 92% of the energy in the country is from petroleum and can also promote energy saving, as it is essential to demonstrate the political commitment to energy efficiency.

The Nicaraguan Electricity System consists mainly of the National Interconnected System (SIN) and the isolated systems. The INS is powered by 14 power plants, thermal steam, gas turbines, geothermal and hydroelectric. Isolated Systems has 30 diesel units located on the Atlantic and serve some scattered populations of the Atlantic coast and the island of Ometepe. Energy production in the different centers of the National Electrical System transformation is from: Hydropower, 5.7%, Geothermal, 10.3% Fuel, 82.5%, diesel oil: 1.5%.

Nicaragua as a developing country, has no commitments to reduce emissions of greenhouse gas (GHG), but has the prospect of short, medium and long term to transform the matrix of renewable electricity generation and thus reduce GHG emissions and develop forestry projects for carbon sequestration and clean production mechanisms. Other mitigation options are for the Agricultural Sector and Use Change and Forestry.

- Forestry and Environmental Issues Nicaragua

The ecosystem of the humid tropics accounts for nearly 60% of the country and is suffering severe degradation processes and inadequate use of soil. Dry areas of Nicaragua represent approximately 14% of the country, are characterized by highly degraded soils. According to the inventory of greenhouse gas emissions was estimated at 101.182 Gg CO2 and removals totaled 68.493 Gg CO2. This balance is mainly the sector of land use change, mainly deforestation and forest degradation: annual deforestation rates between 70 to 100,000 beam and the annual GHG emissions between 33 - 45 million tonnes of CO2.

- Nicaragua opportunities to qualify for REDD Plus and reduce GHG

REDD is a global financial mechanism for Reducing Emissions from Deforestation and Degradation. REDD + takes into account not only the reduction of deforestation and degradation, but gives equal priority to conservation, biodiversity, rights of indigenous peoples and indigenous contribution to social development and sustainable use of natural resources and increasing reserves forest carbon. Opportunities to opt for this financial mechanism occur in areas where: The processes of deforestation are more recent and less advanced countries, where more forest remains and Older immediate effects of LULUCF emissions reduction can be achieved.

Currently the RAAN, is developing the proposed national Under the framework of the National Strategy for Avoided Deforestation (NSDS), where there is a great opportunity and chance to qualify for this mechanism, in the following lines of action of REDD Plus: Avoid deforestation (REDD), Preventing forest degradation (REDD), Changing traditional extraction of timber extractions with reduced impact (REDD +), establishment of reserves in areas already intervened and provided for the restoration (REDD +), establishment of reserves in areas without prior intervention (REDD +), Extending rotations in areas under forest management (REDD +), enrichment planting and restoration of degraded forests and intervened (REDD +), promotion of natural regeneration in disturbed areas (REDD +).

With a likely implementation of these action lines can increase carbon sequestration, renewable energy supply, and the establishment of model farms and sustainable use of forest lands for future sustainable eradicate poverty in the territories of incidents of these options. It is also important to work in coordination with the various planning instruments in the region on the management of forestry and other national programs (Zero Hunger, National Reforestation Crusade, among others.), And to strengthen inter-institutional relations to implement mitigation options.

ADAPTATION

- Strategic Lines of Action for Forest Sector and adaptation measures.

For the forest industry has been identified 3 broad strategic lines, which are duly justified in their adaptation measures, which are linked and will be implemented through Forest Development Strategy (EDFOR) in the RAAN and as with the National Forest Plan That is the instrument for the Implementation of These Measurement for the forestry sector. These strategic Are: Integrated sustainable forest land management and promote forest governance implemented at all levels.

Here is each:

✓ Sustainable integrated management of forest

In general, the forest of the RAAN is vulnerable to climate change and human activities, which are pushing the resource. This is best explained in the chapter on forest sector vulnerability.

To reduce environmental damage and make an integrated forest management is necessary to develop studies to the understanding, assessment and quantification of forest resources (forest inventory) and the environmental services offered by these ecosystems. Also implement the measures set out in the Strategy of Forestry Development in the Region and the Regional Forest Management Plan and develop local forest management plans, with each of its peculiarities.

Ecosystems and forests have a diversity and potential of environmental goods and services, although not measured and it is necessary to insert them into the economy of each of the municipalities in the region and thus promote alternative use activities such as ecotourism between other.

Also through agreements with specialized educational institutions, may provide technical assistance, training, implementation and support to develop its own model of forest development and management capacities of communities and other stakeholders to achieve sector development , consistent with international agreements, requirements and opportunities inherent in globalization of markets.

It will also be necessary to strengthen the legal framework, adapting to the real needs of the forestry sector in the RAAN, protected areas and wildlife to establish consistent rules to support good forest management and take a leading role communities and key stakeholders present at the region to carry out the development of the sector.

✓ Promote land use planning

Titling and indigenous lands, is the basic instrument for achieving good governance in the sustainable use of natural resources. With the effective implementation of law 28 (Autonomy Law) and its regulations, the law 40-261 (Municipalities Act and its amendments), the Act 445 (Act regime Ownership Communities on the Atlantic coast of the river Bocay Coco, Indio and Maiz) and other laws related to an independent process to achieve harmonization and advocacy to all these laws, including the Forestry Law, Law 462, Law of Organizations and Powers of the State, Act 290, Environmental Law, Law 217, by failing an ordering of the land, many timber companies exploiting forest resources without control, causing a serious problem of deforestation and degradation

of community forests, communities are also losing the rights to cultural heritage, especially land and natural resources.

✓ Forest governance implemented at all levels

To enforce the Forest Governance in the joint region is required of the actors that have to do with the forestry sector and meeting the economic requirements, social and environmental impacts of the different sectors involved in forestry.
In the context of forest governance is necessary to find the links between existing strategies and plans local, municipal, regional and national, that is to articulate the administrative functions of the Central Government, the Autonomous Region, with institutions and municipal organizations good management and administration of forest resources in the RAAN. Once articulated administrative functions and roles of each of the administrative bodies for the forestry sector will be necessary to institutionalize them to be effective and shall govern the administration of the forest sector in order to protect natural resources, including forests in the RAAN. Also look for the joint agreed with the other productive sectors and institutions and agencies in the region.

It is also important to promote interagency coordination and organization of forest management of the institutions of state, regional, municipal and forestry-related land (INAFOR, MARENA, MAGFOR, Graan, SERENA, CRAAN, CARENA, municipal, territorial governments, and universities), along with private companies, for good management of forest resources. In the Matrix No. 1, you can clearly see the strategic lines, their adaptation and their respective indicators for further assessment and state institutions should be involved in the sector.

MATRIX 1: Forestry Sector: Strategic lines of action and adaptation measures RAAN

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
Sustainable integrated management of forest.	Strategy and Integrated Management Plan being implemented Sustainable Forest.	▪ Increase in forest areas through sustainable management and recovery of lost and ecosystems degraded areas (promoting agroforestry, environmental services, carbon projects).	▪ % Increase in forested areas. ▪ No project is being implemented. ▪ No reclaimed areas with soil conservation, agroforestry systems and productive soils. - ▪ Number of indigenous women involved in the process of adaptation measures.	CENTRAL GOVERNMENT, CRAAN Graan, INAFOR, municipalities, local governments, SERENA, NGOs, GTI, governments communal, territorial governments, MARENA, INTUR INAFOR MAGFOR. Indigenous women's organizations with a presence in the region

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
		■ To strengthen knowledge and skills of environmental management of the forest from fire with a focus on climate change. ■ Promote packages formal, non formal climate change and the importance of forests to CC. ■ Promote healthy environmental practices to reduce the burning and forest fires. ■ Strengthened by training indigenous women practice their knowledge of the environment friendly.	Programs and plans implemented with the population of the communities (women, youth, children) in forest management to climate change. The preservation of forests and forest fires.	CENTRAL GOVERNMENT, CRAAN Graan, INAFOR, municipalities, local governments, SERENA, Universities, NGOs, GOs, municipal governments, professionals in the territories, territorial governments, MARENA, INTUR INAFOR MAGFOR, GTI. Indigenous women's organizations with a presence in the region
		■ Promote the use of wood products with production models harmonized with the standing forest.	■ Forest industry under management and new technologies with low environmental impact and economically viable	CENTRAL GOVERNMENT, CRAAN Graan, INAFOR, municipalities, local governments, SERENA, NGOs, municipal governments, MARENA, INTUR INAFOR MAGFOR, GTI. Indigenous women's organizations with a presence in the region.
		Develop a baseline that reflects the state of forestry and the impacts of climate change, and establish an electronic public access, control and permanent monitoring.	■ Specific studies conducted on-forest ecosystems for alternative uses. ■ Municipal Inventory prepared with information on different species of trees are the forest layer in the region as well as quantified and reflect the current state of the resource. ■ Electronic public access established with all information in the forestry sector.	Central Government CRAAN Graan, INAFOR, municipalities, local governments, SERENA, universities, NGOs, MARENA, INTUR INAFOR MAGFOR GTI.y National and International Cooperation. Indigenous women's organizations with a presence in the region.
		Strengthening of regional structures, municipal, territorial, municipal plans focusing on climate change.	■ Structure of the central government, regional, municipal, territorial and community strengthened in the knowledge of their roles and functions on the forestry sector with a focus on Climate Change.	Central Government, regional and local levels, GTI, SERENA, MARENA, INAFOR, MAG, and other institutions that have a presence in each of the municipalities and regional levels. Indigenous women organizations with a presence in the region of Innsbruck.

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
		■ Decentralization of forestry decisions in the region / regionalization ■ Strengthen interagency coordination and partnerships for management synergy between them.	■ % Compliance of the specific lines of strategic guidelines: Forest Protection and Control of Forest Development Strategy in the Region. ■ - Coordination and effective synergies in forest management.	Central Government CRAAN Graan, INAFOR, municipalities, local governments, regional, SERENA, Universities, NGOs, GOs, municipal governments, professionals from the territories, territorial governments, MARENA, INTUR INAFOR MAGFOR, GTI. Indigenous women's organizations with a presence in the region.
		Promote the valuation of goods and services from ecosystems through sustainable programs, and recovery of natural resources, mainly forest.	■ Forests managed and retrieved in 30%. All communities have general management plans for their areas.	Local government, regional, SERENA, municipal governments, professionals in the territories, territorial governments, MARENA and INAFOR MAGFOR. Indigenous women's organizations with a presence in the region.
Promote land use planning	Territories of indigenous peoples of the Region titled lands reclaimed and zoned.	Strengthen community structures in land use.	All community information is handled with transparency and public level. Every three months, accountability systems and audits between the parties and industry collaborative.	Regional government, municipal, territorial. Competent institutions of the state and agency cooperation, CONADETI, Graan, CRAAN, GTI, GOB COMMUNITY, IP, PGR, Army of Nicaragua.
		■ To promote forestry incentives for restoration, conservation and sustainable forest management. ■ Protect forest genetic conservation areas	■ No apples restored, preserved and under sustainable forest management. ■ Communities in general, manage and use their resources according to their worldview.	Local governments, regional governments communal professionals territories, territorial governments, program managers, mayors, politicians, CONADETI, Graan, CRAAN, GTI, IP, PGR, Army of Nicaragua Indigenous women's organizations with a presence in the region.
		Promote sanitation and legalization of land.	All of the RAAN indigenous territories demarcated, with titles and sanitized.	CONADETI, Graan, CRAAN, GTI, communal government, IP, PGR, Army of Nicaragua.
		Support to strengthen territorial negotiations between governments and third parties.	■ Organized Territories and strengthened in the process of land administration and protection of natural resources in agricultural frontier area. ■ Implemented strategies for coordination, negotiation and alliances with neighboring communities, for purposes of protecting the territory and its resources.	Regional government, municipal governments, territorial governments, competent institutions of the state and aid agencies. Indigenous women's organizations with a presence in the region.

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
		Promote productive area zoning, forestry, conservation, anthropogenic, natural areas, and recovery in agricultural frontier areas.	■ Production areas with forest conservation and recovery anthropogenic agricultural frontier determined. ■ Spatial planning of the RAAN becoming effective.	INAFOR Local, Regional, SERENA, community governments, professionals in the territories, territorial governments, MARENA and INAFOR MAGFOR. Indigenous women's Organizations With A Presence in the region.
		Strengthen management capacity of regional governments and community in managing natural resources.	■ Each community is able to manage their communities according to their needs and zoned uses. ■ Technical help local communities manage their natural resources.	Local governments, municipal governments Regional Government, professionals from the territories, territorial governments, NGOs, GOs, MARENA, INTUR INAFOR MAGFOR. Indigenous women's organizations with a presence in the region.
Forest governance implemented at all levels		Governances strengthen existing systems at local, territorial and municipal. To strengthen national forest governance, regional, municipal, territorial and community in decision making.	■ -Strengthened and coordinated actors that deal with forestry for the Forest Governance meets the requirements of good resource management. ■ Operationalizing the platform-forestry in the territories.	CCF, GRAAN, CRAAN, GTI.
		Creation of mechanisms for coordination, consultation and coordination to implement forest governance at all levels of the RAAN.	The mechanisms for coordination, consultation and coordination apply to all actors and at different levels, for good forest governance.	Central Government, Graan, CRAAN, municipal governments, municipal governments, state institutions working for the proper management of the forestry sector (MARENA; INAFOR). Indigenous women's organizations with a presence in the region.

The organisms in the RAAN will implement projects or activities under this Strategy for Climate Change, as it is a regional planning tool within the framework of the Regional Strategic Development Plan, for which they must be coordinated with the Regional Government and Regional Council and the respective municipalities.

Adaptation measures should be agreed for implementation in the short (5 years), medium (10 years) and long term (20 years) according to the priorities of the territories where they will be developed.

- Strategic Lines of Action for Water and adaptation measures.

Water for the sector has been identified 3 broad strategic lines, which are duly justified in their adaptation measures. These strategic guidelines are: Proper handling surface water resources, protection and proper management of groundwater resources and water supply and equitable distribution of water resources. Here are each:

✓ Sound Management of Surface Water Resources

The major impacts in the region on water resources will be on coastal communities due to loss of the resource as a result of saline intrusion will also be important to management measures that allow the care and preservation of fresh water to a climate conditions transformed in a short time many ecosystems in the region.

To protect the surface waters of the region, it is necessary to know its been mainly in terms of volume and quality of water as the population settled in the region is supplied from the liquid element, for which it is necessary to study the biophysical and availability of water sources in the region in the short term, with the involvement of competent institutions and the Regional Government, as this study will be the baseline and benchmark for the development of a Plan of Management and Rational Use of Water region. So it is necessary to increase forest cover and protect the existing natural forests, mainly the banks, to increase the flow of rivers, diminished considerably.

In the region there are problems of contamination of surface water, due to poor solid waste disposal, by clear-cutting, livestock, agriculture (in the upper basin), solid waste, chemical product of guiriseria, fishing with poison (DDT, sipermetrina). One of the priority tasks is to involve all people in the management of water resources for conservation, to prevent pollution and make appropriate use in order to improve the quality and quantity of water sources in the region. It is necessary to emphasize the sooner the recovery of water and thus the forest.

✓ Protection and Proper Management of Underground Water Resources

In the region despite the high rainfall, it is difficult to use of groundwater due to the low permeability of soils. In many wells, yields are low, the water also is acidic and low hardness, which could be solved by reaching a lime-based treatment (Puerto Cabezas), also many of the wells of the municipalities the RAAN not meet basic health and hygiene standards due to the level of contamination of groundwater sources, leading to an increased rate of gastrointestinal diseases.

In the region, groundwater is also negatively impacted primarily by human actions, therefore it is necessary to protect or remove the extraction of fresh water near the coast to prevent saltwater intrusion into underground aquifers, protection of wells flood and pollution as well as by the poor location of latrines. Lack of monitoring and follow the competent authorities of drinking water. You need to pay attention as soon as the protection of groundwater, because an alternative would be well treated to meet the demand of drinking water in the region.

✓ Supply and Equitable Distribution of Water Resource

Overall in the region the water service is poor and of low quality, another important item to note is the small numbers of families are given the service, which has conditioned the population to consume the vital fluid from wells as well as pipes, rivers and dams on a smaller scale for urban areas.

Each of the municipalities of the RAAN a situation would be the service in question, much as has been the efforts have not been sufficient to address the need, adding that this refers only to the urban part of each municipality, where Puerto Cabezas provides only 49%, 3% Waspam, Prinzapolka, is free service, 31% Bonanza, Rosita Siuna 2.4% and 20.7%, and so on. To improve water service to the region must implement the following measures of adaptation: a strategy defining the adequate intake, protection and conservation policies of the water source, implementation of a distribution network of more efficient water municipalities in the region, implement programs for drinking water in rural areas with health standards, building capacity in communities on water management and sanitation.

It is important that this strategy supports the implementation of regional strategy for water and sanitation and municipal units of water and sanitation.

MATRIX 2: Water Sector: Strategic lines of action and adaptation measures RAAN

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
Sound Management of Surface Water Resources	Strategy and Plan of surface water management being implemented.	Study of availability of water sources in the region by municipalities, territories and communities by identifying the sources of river water. Mapping of surface water courses in the region.	Volume of surface water quantified, assessed the quality of water, measured as water demand uses and identified the sources of river water.	INETER ENACAL, municipal mayors MARENA, MINSA, Communities, Companies,-donors, ANA, the GTI.
		Develop scenarios of the availability and quality of surface water resources by 2050.	▪ Scenarios of the availability and quality of water resources in the short, medium and long term to 2050	INETER ENACAL, mayors and municipal MARENA Ministry of Health, Communities, Companies,-donors, ANA, the GTI.
		▪ Promote the protection of water sources by the care and management of natural forest. ▪ Reforestation in the upper watershed.	▪ Increased forest layer by 30% and 40% in water recharge area and the GTI and communities sensitized on the Protection of Natural Resources according to their worldview.	Local, Regional, SERENA, municipal governments, territorial governments, MARENA, INAFOR, ANA and External Cooperation.

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
		Integrated water resource management governance (effective management) Establishment of agroforestry systems, mixed fruit crops, fodder and energy to control soil erosion and prevent sedimentation of rivers.	■ No. Committees of Water Supply and Sanitation (CAPS) in the territory. And the governance of the resource in place at all levels, management of the resource. ■ Families implementing agroforestry systems, 45% of the affected area recovered with agroforestry systems.	GTI-SERENA Graan, New FISE, INAFOR, Communities, MARENA, Municipalities, Graan-SERENA, MAGFOR, MARENA.
		Establish a monitoring and control of pollution of surface water resources, mainly for players who generate pollution (dairy, mining, hydrocarbons, etc.).	■ Plan monitoring and control of water resources developed and being implemented. and legal framework under the control of pollution of water resources.	GTI GCI (NR protects and manages your community), INAFOR, municipal mayors, Graan, SERENA.
Protection and Proper Management of Underground Water Resources	Strategy and Plan of protection of groundwater resources under.	Study of the availability in quantity and quality of groundwater in the region. ■ Develop scenarios of the availability and quality of groundwater resources by 2050.	■ Volume of water underground quantified and assessed the quality of the waters. ■ Quantified water demand scenarios as applications and the availability and quality of water resources in the short, medium and long term to 2050	INETER ENACAL, municipal mayors., MARENA, MINSA, Communities, GTI, CRAAN, Graan, New FISE.
		Promote environmental education and awareness of private enterprise and the general population.	■ Territorial leaders and community-organized for the protection and proper management of water resources, 10% of the total population of the RAAN trained, 30% of the total population of the RAAN aware and radio programs implemented.	Municipal authorities, universities, Graan, SERENA, INAFOR, MARENA, GTI, GCI (NR protects and manages your community), Private Companies.
		Establish a regional program of protection and conservation of water sources that provide for payments for environmental services and watershed management plans.	■ Increase forest layer by 30% and 40% in water recharge area.	CRAAN, Graan, local governments, regional, SERENA, municipal governments, territorial governments, MARENA, INAFOR.
		Construction of latrines serving the NTON 09-002-99	No. Latrines built and relocated according to technical and sanitary standards, 100% of cases of diarrheal diseases registered in the communities visited, has decreased by 20% of cases.	MINSA, MARENA. Mayors, PGR-Environmental, GTI, National Police, New FISE, communities.
Supply and Equitable Distribution of Water Resource.	Municipalities of the Region with permanent supply of drinking water.	To support the future implementation of the Strategy for Water and sanitation in the region.	Water and sanitation strategy in the region implemented.	ENACAL, municipalities, communities, Police, Army, CRAAN, Graan and ENACAL.

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
		Develop a strategy for appropriate use, protection and water saving policies in the region, including the creation of a DC, for industries or firms making use of ground water use and consumption paid.	Strategy to save drinking water, protection and water saving policies being implemented, making territorial governments and community management and protection of water sources.	MARENA Ministry of Health, Municipal Offices, PGR-ENVIRONMENTAL National Police. GTI, New FISE., Communities, Nic Army, CRAAN, Graan and ENACAL.
		Collection of water at household level for domestic consumption, at Community level in order to use it to irrigate crops and pastures also promote the producers-the infiltration of rainwater into the aquifer through soil improvement. ■ Implement a program of the RAAN to drinking water in rural areas with sanitation standards.	■ No. of water collection systems implemented in the municipality, and not apples with soil conservation works and vegetation cover. GTI and communities sensitized to the sanitary standards for drinking water, based on their worldview.	MARENA INAFOR, Municipalities, MAG, IDR, GTI, communities, New FISE. Government and Regional Council, through its technical teams, New FISE, MINSA, MARENA, Municipal Offices, New FISE, GTI.
		Implement best practice water and sanitation program RAAN support the environment.	■ Strengthened Communities in the management of water and sanitation good practices.	MINSA, MARENA, ENACAL, Municipal Offices, GTI, communities.

The organisms in the RAAN will implement projects or activities under this Strategy for Climate Change, as it is a regional planning tool within the framework of the Regional Strategic Development Plan, for which they must be coordinated with the Regional Government and Regional Council and the respective municipalities.

Adaptation measures should be agreed for implementation in the short (5 years), medium (10 years) and long term (20 years) according to the priorities of the territories where they will be developed.

- Strategic Lines of Action for the Fisheries Sector.

For the fishing sector has given a general strategic line, which is duly supported with their adaptation measures. This strategic line is the proper management of the fishery resource. Following the detailed:

✓ Sound Management of Fisheries Resources

Analyzing the status of fishery resources at the region and climate change negatively impacts on these resources, especially in coastal and marine resources, it also includes other very diverse habitats, large rivers, small rivers and small streams tributary, waterfalls, rapids, lakes, ponds, swamps and other wetlands subject to flooding. These systems usually have all interconnected complex cycles of flooding and maintain biological diversity vary widely in size and habits.

Human actions such as deforestation of mangroves for firewood in, is causing serious problems by settling and consequently there is a decrease of the species that inhabit it. By the increased flow and turbidity can not fish in fresh water. Also in the coastal zone can not perform the tasks of diving water turbidity, as well as the fish migrate to other places, which makes fishermen look for different fishing spots, reducing fishing operations.

There are also changes in the physic-chemical parameters of the fish is in its life cycle, which makes looking for areas where the water temperature according to their habitat. Besides the catching of fish with inappropriate practices are causing a depletion of fishery resources, expressed on lower catches in those places historically excellent for fishing, the more time required to capture the same amount of years ago and the variation in the depth to catch mainly lobster.

With all the problems presented is necessary to find ways to decrease the vulnerability of this sector, mainly for Climate Change, for which this strategic line of action of the proper management of fishery resources will be strengthened by measures of adaptation: as detailed in the following matrix:

MATRIX 3: Fishing Industry: Strategic lines of action and adaptation measures RAAN

Strategic Line of Action	indicators	Adaptation measures	Indicators	Participation of State Institutions and Local Stakeholders
Sound Management of Fisheries Resources	Strategy and management plan being implemented fishery resource.	Include bio indicators of climate change on fishery and potential commercial species (scales, molluscs, crustaceans and other) systems.	Fisheries adapting to climate variability changes.	Graan, CRRAN, municipal governments, INPESCA, universities, companies and fishermen's cooperatives.
		Promote the conservation, reforestation and restoration of coastal areas, coastal lagoons, inland waters and mangrove areas., Prior knowledge of the status of aquatic ecosystems existing water sources and inland marine.	Knowledge of the status of marine and inland aquatic ecosystems. Actions taken for the conservation and restoration of coastal areas. coastal lagoons, inland waters and mangrove areas.	Graan, CRRAN, municipal governments, INPESCA, universities, companies and fishermen's cooperatives.

Strategic Line of Action	indicators	Adaptation measures	Indicators	Participation of State Institutions and Local Stakeholders
		Strengthening artisanal fisheries of coastal communities. Based on knowledge of fish stocks, media, arts, fishing times and alternative potentially commercial species and ancestral knowledge. Strengthening the knowledge-based organizations dependent on fisheries from the impacts of climate change and measures to protect coastal marine ecosystems, lagoons and rivers.	Artisanal fisheries strengthened with better income and diversified fisheries with potentially commercial species, document diagnosis of fishing, fishing locations, fishing gear used and fishing periods. Companies, cooperatives of fishermen and independent fishermen strengthened and using appropriate fishing gear to avoid pressure on the resource.	Graan, CRRAN, municipal governments, INPESCA, universities, companies and fishermen's cooperatives. INPESCA, Universities, Graan, CRAAN, fishing companies, fishing, cooperatives. Indigenous women's organizations dedicated to the marketing of fish.
		Implement fishing strategy and develop all the value chain in the Caribbean. (fishing, processing and marketing) with a gender perspective.	Fishing strategy played, giving better conditions to the fishermen, with standards and controls in place to protect the resource.	Graan, CRAAN, municipal governments, INPESCA, universities, companies and fishermen's cooperatives.
		▪ Implement fishing regulations and controls relating to the number and sizes. ▪ Implement controls on industrial fishing licenses and / or crafts. ▪ Implement the regulation of oil concessions and energy	Standards and controls in place to protect the resource.	Graan, CRAAN, INPESCA municipal governments, cooperatives of fishermen. Indigenous women's organizations dedicated to the marketing of fish.
		Promote the diversification of productive activities to reduce pressure on fishery resources and develop aquaculture as an alternative measure of life.	Various activities implemented by fishermen and aquaculture development for cultivation of the sea.	Graan, CRAAN, municipal governments, INPESCA, universities, companies and fishermen's cooperatives. Indigenous women's organizations dedicated to the marketing of fish.
		Awareness of Enterprises, cooperatives and independent fishermen fishing for stewardship of the resources.	Fisheries Awareness campaign conducted for companies, cooperatives of fishermen and fishermen, not for posters, trade fairs, exchange of experiences, among others implemented.	Graan; CRAAN, Municipal Governments, INPESCA, Universities, Enterprises, cooperatives of fishermen and the General Population. Indigenous women's Organizations dedicated to the marketing of fish.

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Adaptation measures should be agreed for implementation in the short (5 years), medium (10 years) and long term (20 years) according to the priorities of the territories where they will be developed.

- Strategic Lines of Action for the agricultural sector and adaptation measures

For the Agricultural sector has been identified 4 broad strategic lines, which are duly justified in their adaptation measures. These strategic guidelines are:

- ✓ Improvement and diversification of agricultural production.
- ✓ Establishment of perennial crops traditional and nontraditional backyard economy.
- ✓ Implementation of a management system of surplus agricultural products and storage.
- ✓ Management of cattle and sheep..

Here are each:

- ✓ Improvement and diversification of agricultural production.

  In the RAAN is practiced agriculture and cattle ranching in forest land, for that reason the soils are poor to good farming, ranching and also compact the soil deteriorates, and advancing the agricultural frontier and deforestation, in s search of new lands for agriculture and livestock.

  Action is needed to improve soil productivity, with appropriate technology and intensive and diversified agriculture, promote the use of compost (the worm, etc..) To improve crop yields. In the indigenous people of the RAAN is natural pesticide use in the growing area with salt, garlic and chile to counter pests and also rescue ancestral complement culture methods with traditional methods (technology)

  Modernization of the productive system, systematic technical assistance to producers, provision of seeds resistant to pests and diseases caused by extreme events (flooding, drought), using rotation and crop diversification are practices used by the Miskito and Mayangna , which decrease the deterioration of the soil, because you avoid the slash and burn.

  Adaptation measures that includes this strategic are: Improvement of soil fertility and productivity, modernization of the productive system, systematic technical assistance to producers and awareness for the application of knowledge, promoting organic farming and pest and disease control , use of native seeds resistant to pests and diseases caused by extreme events (flooding, drought), promote food security and nutrition.

  The nutritional food security and sovereignty of the people of the RAAN, can be achieved by ensuring adequate services throughout the agribusiness value chains, giving priority to basic consumer goods of the population according to their traditional practices. Food sovereignty should be based on the cultural bases of both indigenous and Afro-descendant and peasant.

✓ Establishment of perennial crops traditional and nontraditional backyard economy

In the RAAN and indigenous peoples are diversifying their food source through the establishment of fruit trees: breadfruit, citrus, mangoes and coconuts in the family lots and gardens based on the establishment of Musa and tubers (cassava plantations and banana combined), plus is resorting to the graft, especially cocoa and citrus crops, and produce their own seeds of grains, roots and tubers.

It is necessary to implement a campaign on the rescue and the importance of planting perennial crops (cashew, breadfruit, mango, lemon, coconut, avocado, tea Jamaica, ginger, chile chicken, pear water, among others.) And set community nurseries primarily with women.

✓ Implementing a management system of surplus agricultural products and storage.

One of the problems of the agricultural sector in the RAAN do not have a system of collection and storage, making it producer sells its products at low prices and that the intermediary is carried most gain, to improve this problems must create a system of collection and storage and also establish a structure of association r between producer organizations to reduce intermediaries and seek better crop prices and supply directly the municipal market mainly (from countryside to city). Capacity building of farmers, seeking the added value of the product before being placed on the market, encourage producer associations to use low-interest credit to support producers for agricultural production. Among the adaptation measures to be implemented are: Promotion of storage systems, improvement of road infrastructure to transport production to the collection centers, building access roads to production areas within the communities, ie strengthening agricultural sector strategy containing the productive value chain to improve economic conditions in the region.

✓ Management of cattle and sheep

In the communities of the RAAN, is necessary to separate parts of the livestock farm, making a sort of pasture and planting areas for improved pastures, to implement an intensive livestock also promote community work for the livestock management.

Encourage the establishment of agro-ecological standards in the territories, the community of new territory, promote reforestation of deforested areas, the introduction of improved pastures to reduce areas degraded by a change ranching to intensive and awareness in the community for the use of lines dividing (pasture), are measures to assist the management of livestock in the communities of the region.

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MATRIX 4: Agricultural Sector: Strategic lines of action and adaptation measures RAAN.

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
Improvement and diversification of agricultural production.	▪ Agricultural production diversified. ▪ % Decrease in poverty levels.	Determine the climate change models for the RAAN and define agro-climatic projections for future monitoring.	Climate change models established with their respective projections.	Central Government, Graan, CRAAN, INETER Mayors.
		Develop the study of soil and determine the productive potential of the RAAN to improve fertility and soil productivity, promoting management plans and farm management.	▪ Increase by 30% yields of different crops and hectares with crops not diversified.	FAO and UNDP (support for different projects). SEPROD (production and marketing). MAGFOR (provision of seeds, grains crops monitors) INTA (produce and seed certification) MARENA (monitoring of environmental impacts: insecticides) IDR (based on different projects), Municipalities, SERENA.
		Implementing protection practices and soil conservation (crop rotation, organic farming, pest and disease control, crop contour, cover management, native seeds resistant).	▪ Increase by 50% of crop yields as basic grains. ▪ No seed banks in the communities according to cultivars collected by the producer, the family and community.	IDR (based on different projects), FAO relies on different projects), MAG (food production program), AMICA (supplied seeds, training on how to store seed), Municipalities, SERENA and communal government through its authorities should organize Community producers to carry out the activities agreed and coordinated with the different levels of government at the territorial, municipal, regional and national levels.
		Modernization of the productive system, rescue, systematization and validation of local knowledge on the management of production systems community. Diversification agrifood production systems.	▪ Document systematization of ancient methods of cultivation and its complementarity with technically advanced methods.	Generally corresponds to the MAG-FOR support the development of agriculture. This has the INTA, which is attached to this ministry, and is responsible for developing research processes, seed certification and technology transfer.

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
		Systematic technical assistance to producers and awareness for the application of knowledge. to improve soil productivity.	■ 2 or 3 demonstration plots for each of the territories with the application of knowledge to improve soil productivity.	The city government through its authorities to organize the Community producers to carry out the activities agreed and coordinated with the different levels of government at the territorial, municipal, regional and national levels.
		Promote food security and nutrition by strengthening community production systems and farmers in the RAAN.	■ No of farmers working in partnerships to improve their income.	SEPROD (production and marketing). MAGFOR (provision of seeds, grains crops monitors).
Establishment of perennial crops traditional and nontraditional backyard economy.	■ % Of apples with perennials traditional and nontraditional backyard economy	Promotion of traditional crops and perennial crops (breadfruit, mango, lemon, coconut, avocado, orange) of nontraditional crops (cocoa, vanilla, some fruit) and the backyard economy.	■ No traditional apple perennial crops, not apples with nontraditional crops patios not productive.	INTA (produce and seed certification). MARENA (monitoring of environmental impacts: insecticides). IDR (based on different projects), city hall, SERENA, the municipal government
		Establish nurseries, orchards, hydroponics and plant material community banks managed and run by women.	At least one nursery in each sector (community co-tiger shark).	MAG, INTA, SEPROD-Graan. The city government through its authorities to organize the Community producers to carry out the activities agreed and coordinated with the different levels of government at the territorial, municipal, regional and national levels.
Implementing a management system of surplus agricultural products and storage.	Regional agricultural strategy of the system being implemented.	Building capacities of small-scale management of surplus agricultural products and processing.	Each community manages the surplus of agricultural products and value-added market and has storage systems for their crops.	The city government through its authorities to organize the Community producers to carry out the activities agreed and coordinated with the different levels of government at the territorial, municipal, regional and national.
		Construct roads and infrastructure, access roads to communities according to atmospheric conditions of the zones in the RAAN.	■ He is permanently trade country - city-communities and their production by removing the access roads built.	Mayor Bilwi (organize, design, project management). Graan-CRAAN (Transportation Commission), MTI (Bridge Maintenance), DANIDA PAST (building bridges).

Strategic Line of Action	Indicators	Adaptation Measures	Indicators	Participation of State Institutions and Local Stakeholders
Management of cattle and sheep.	% Increase in intensive farming and% decrease in ranching.	Establishment of livestock (tabulated, intensive and community), confinement areas for cattle and sheep. Diversification of small livestock (poultry, pigs, sheep).	Communities have their zoning and use regulations No of hectares which have been ordering in relation to all areas, has declined 50% from the introduction of cattle., At least 20 producers in the areas most affected by REDD+ incentives.	Indigenous territorial governments (coordinate), SERENA-SEPROD, CONADETTI (territorial demarcation of communities and territories) MAGFOR.
		Greater use and value of forest products. Implementation of agroforestry systems.	No apple agroforestry systems implemented.	Indigenous territorial governments (coordinate), INAFOR, SERENA-SEPROD, CONADETTI (territorial demarcation of communities and territories). MAGFOR (monitoring of agricultural activities).

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XIV. MONITORING AND FOLLOW-UP TO THE IMPLEMENTATION OF MEASURES OF ADAPTATION STRATEGY TO CLIMATE CHANGE IN THE RAAN

- Target

Monitoring and follow-up is to systematically analyze the level of implementation of mitigation measures and adaptation through the strategy and action plan and implementing projects, plans or review of policies, all aimed at sustainable development in line this regional strategy.

- Criteria for the Monitoring and Tracking

✓ Contribution to the process of implementation of Mitigation and Adaptation Measures.

✓ Important aspects for the implementation of the Strategy.

✓ Indicators to measure the impacts of adaptation measures

✓ Organizations responsible for monitoring and tracking

- ✓ Frequency of monitoring and tracking.
- ✓ Monitoring and follow-up of the strategy will be undertaken by a steering committee.

- Monitoring and follow

  - ✓ Monitoring system design and monitoring:

    Set of procedures by which the information must reach the different levels of the organization or committee monitoring or tracking.

    For which the monitoring and follow-up should be focused:

    - The implementation of adaptation measures according to plan.
    - To what extent has developed local capacities.
    - If there are changes in the context of planning and implementing adaptation measures, causes and consequences.
    - Communication should be consistent and objective through meetings of grassroots organizations with the Committee in charge of monitoring and follow-up information on the progress and results.

  - ✓ Definition of indicators to measure

    The environmental indicators used in monitoring and tracking system must be able to predict those environmental trends and be focused on three types of indicators: Pressure that we find the socio-economic activities and their impact on the Environment, Environment focused on state Natural Resources and Response Indicators, which will measure the alternatives and adaptation measures implemented to improve or reverse environmental degradation, or for the prevention and mitigation of natural events that can happen in region.

  - ✓ Establish agreements and commitments on responsible and time monitoring and tracking

    The pace of monitoring and evaluation must be agreed in the planning cycle for the implementation of the measures. Should be immersed in the planning of each of the municipalities from the region. The key moments are:

    - In developing the Municipal Investment Plan.
    - During the preparation of the Annual Operating Plan.
    - Responsibility: The Environmental Management Unit and the Environmental Commission

Matrix model to develop the monitoring system and monitoring Adaptation Measures

Adaptation Measure	Adaptation activities as		Duration of Monitoring Period	Results	Difficulties	Correction Model Employee	Evaluation as Indicators
	Planned	Executed					

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ANNEX No 1

PROBLEM OF THE REGION AS TO MAJOR SECTORS

WATER SECTOR	
Decreased water flow (water scarcity level of territories and communities)	■ Deforestation of the banks and upper basins .. ■ Settlements in the banks (natural resource-use pressure).
Periods of droughts (prolonged) by altering the hydrological regime.	■ Reduced water supply. ■ Water sources were dried (Prinzapolka). ■ Lowering of the water table (dry wells), decreased river flow (Bambana Prinzapolka Kukalaya, Okonwas) Rosita and Prinzapolka.
Increased intensity of rainfall by altering the hydrological regime.	■ Contaminated wells and collapse. ■ Contaminated water sources and can not make use of them (women can not wash pollution),
Pollution of water sources	■ For despales, livestock, agriculture and artisanal mining (chemicals). ■ Sedimented seriously watersheds. ■ Use of agrochemicals without any control. ■ For the establishment of dairy (cheese making), coffee (meads). ■ Auto wash, artisanal mining.
Contamination of wells	■ For the poor location of latrines. ■ Consumption of contaminated water due to lack of monitoring and tracking of the competent
Sea Level Rise	■ Contamination of wells by salt water.
Increase in temperature (heat waves)	■ Increase in temperature of surface waters affecting aquatic flora and fauna.
Frequency of flooding from rivers	■ Major and minor contamination of wells and drinking water sources. ■ Contamination of wells and waste water settles
High degree of Deforestation	■ Reduction in water flows
Variation in time of rain	■ Water and sanitation: a decrease in quantity and quality of drinking water. ■ Loss of forest plantations established.
Hurricane	■ Water pollution.
FORESTRY	
Decreased forest cover (deforestation)	■ By advancing agricultural frontier, natural phenomena, population migration, illegal logging, loss of species (flora and fauna)
Little use of forest products.	■ Reduce the economic choices of families.
Deforestation of irrational without management plans	■ Loss of forest species, little economic return to the forest sector dependent
Loss of biodiversity	■ For the exploitation of species of commercial trees indiscriminately, which have altered the forest systems.
Forest fires (little knowledge of response).	■ Loss of forest. extinction of species affected and altered life cycle
Extensive livestock	■ implementation Deforestation for pasture, hence loss of forest cover, plus livestock compact soil by the hooves of livestock (land of vocation mostly forest)
Poor forest management practices	■ Loss of timber species and mainly energy. ■ It takes advantage of the possibility of seed dispersal in the river's edge.
Increasing the intensity of rainfall	■ In the fields of forest resource is Contaminated water and there is decomposition of organic matter and emission of methane gas, a product of this is Caused Mortality in Biodiversity.
Ignorance of the law.	■ Little technical support of the active institutions.
Few means to transport wood by the river flow.	■ Few sources of funding for the sector.

AGRICULTURAL SECTOR	
Loss of fertility soil (decrease in productivity, thus increasing production costs and no reduction in safety food)	■ By poor agricultural practices and livestock, the use of inappropriate technology. ■ Primarily by water erosion, which cause the soil to deteriorate or be lost. ■ By forest fires. ■ For soil desertification. ■ Were missing the traditional perennial crops (cashew, breadfruit, mango, lemon, coconut, avocado, Jamaica tea, ginger, chile chicken, water pear)
Increased salinity the ground in communities coastal (loss of soil fertility, loss of flora and fauna, microorganisms and loss of quality freshwater)	■ For soil erosion, cause saltwater intrusion to ground easier. ■ On the rise of tides and sea level rise by melting of glaciers.
Change of use of Soil mainly for agriculture and livestock, soils are degraded and lost productivity.	■ For agricultural practices on forest land and inadequate agricultural practices and extensive livestock that will make losing soils. ■ Increase of greenhouse gases (methane) for livestock. ■ Increase in pests and diseases (affecting agricultural crops) by climate variability
Increased frequency hurricanes and increasing the intensity of rainfall.	■ Are lost harvest of basic grains, roots and tubers, citrus, vegetables and Musa, grasslands and agricultural infrastructure. ■ Lower the performance of agricultural production. And are pests and diseases. ■ Access to markets is interrupted by damage to road infrastructure (road, bridges, roads) in extremes.
Increase in temperature (heat waves)	■ Poor performance in milk production. ■ Weight loss in cattle and sheep.
Frequency of flooding from rivers	■ Lost crops and agricultural infrastructure.
The communities do not implement the collection system to store the seed	■ Which makes food shortages and increased food insecurity.
Introduction of new varieties of seed,	■ To the detriment of traditional or native seeds. With these new seeds are new threats to agriculture, such as weeds, new insects.
There is no proper management of animal exploitation in the municipalities.	■ why farming is extensive and contributes to increase the agricultural and forest destruction.
FISHING SECTOR	
Overexploitation	■ Extinction of species endangered in terms of food security, Reduced Household Income.
Hurricane	■ Alteran el hábitat de las especies, por ende se desplazan a otros lugares o colapsan, disminución de la oferta pesquera artesanal principalmente.
Destruction of mangroves	■ Loss of species.
Wave disturbance Erosion of Coastal Zone Irresponsible fishing	■ migrate marine species and raise prices
Increase in rainfall intensity	■ On the increased flow and turbidity can not catch fish such as bream guapote bearded all freshwater fish. ■ Allocation of water turbidity affects the activity of diving and fishing activities. Lack of tools and fishing tools appropriate to the rainy season. ■ Sedimentation on Mangroves.
Temperature increase	■ The fish migrate to another area cold
increase storms	■ create turbulence in the water, reducing the oxygen and fish die.
Frequency of flooding from rivers	■ Some freshwater species become inflamed and can not be consumed. ■ Low productivity of fisheries in rivers. ■ Reduce the amount of fish available
Increased sea level.	■ Aumento de salinidad en las lagunas y ríos (se mueren los peces)
Inadequate practice destroys divers the marine ecosystem.	■ Lack of awareness for responsible management for the capture of species. ■ Increase in population, increase in fishing effort. ■ Lack of alternative employment is accepted makes fishing without safety.

ETHNIC SECTOR-SOCIO-CULTURAL	
Increased rainfall intensity	■ Impact on infrastructure (school, health post, house, church). ■ Disease outbreaks caused by contamination of water sources (wells and rivers). ■ Poor quality of housing and bad location, (in streams, on river banks), make it vulnerable to collapse. ■ Increased malnutrition product of food insecurity. ■ Increase of diseases and epidemics. ■ Food shortages, lower family income, food insecure, and health is malnutrition. ■ Increase outbreaks of respiratory and gastrointestinal is, and malaria.
Increase in temperature (heat waves)	■ Negative impact on health: increased pressure, increased cardiovascular disease and survival is affected. ■ Reduction of fresh air, lower labor income in the countryside. ■ Increase in people with hypertension. (deaths). ■ Increase in viral and allergic diseases. ■ Reduction in the amount of water in water sources and wells, pollution and scarcity of this vital liquid, affects hygiene and health. ■ skin diseases arise due to the incidence of mites or other insects.
Increased storms = tropical rain and wind Hurricane	■ Flood settlements, affecting communication and access. ■ Physical damage, loss of life and disease outbreaks. ■ Reducing the supply of food, destruction of infrastructure, housing, etc..
Frequency variation of rainfall	■ There is reduction of food, affecting the diet and level of nutrition. Affected family income.
Flood frequency Rivers	■ Destruction of bridges and roads, infrastructure damage, increased cost of water transport. ■ There is famine, the loss of crops, decreasing the food and nutrition security. ■ Increase the disease by the presence of viruses and bacteria. ■ They contaminate wells and latrines are flooded, with the consequent effect on hygiene and health of the population. ■ remain incommunicado, difficulty in mobilizing students and merchants, there is a famine in the population, emergencies are not performed.
Sea Level Rise	■ Loss of land and the sea, waterfront cleft the town of Bilwi.
Lack of knowledge and appropriation of community organization to implement the laws.	■ Political Partisanship (multiple leaders), constant rotation of leaders
Are not implemented Strategic Plans Development	■ Institutional weakness in the territories at the institutional level, regional and municipal
Difficulty of access to markets (forestry, fisheries, agriculture)	■ There is no planning on the entire value chain from the production or collection of products
Lack of access to funding programs	■ These programs are not accessible mainly by artisanal producers guarantees required.
Weak institutional presence in remote communities and vulnerable.	■ The institutional presence in communities is virtually zero, a high proportion of organisms.
Lack of financial and human resources in institutions	■ Low manpower for forest monitoring and technical assistance in communities.
Advance of agricultural frontier in indigenous territories and in areas with forests.	■ The RAAN and the entire Caribbean coast is exposed constantly to the loss of forest areas by the encroachment of agriculture by farmers
Lack of a clear and coherent vision of sustainable socioeconomic development based on their particular worldview Indian.	■ As part of the institutions and other organizations when developing projects and programs also lack of strategies, projects and budgets to the regions of the Caribbean Coast.
Loss of balance between culture, nature and politics. It is the cause of disease, death and imbalance in indigenous cultural spaces.	■ An important aspect arising from the destruction of natural resources is the loss of breeding areas of knowledge for the survival of communities, that a forest or deforestation of forest area, or a dry river, involves the loss of a deity or spirit, therefore, the new generations lose the reference to that knowledge, to that tradition.
Loss of relations of solidarity and reciprocity within the Community,	■ Currently, in many cases, labor is paid, the hunts are no longer organize collectively, and therefore redistribution is not as extensive as in the past. Nature has changed, we have changed, and we are not thinking collectively, but individually. Our work has changed. Now we are tougher on our brothers, with our neighbors.

Loss of ability to solve conflicts and institutions Community	■ In the RAAN there are more divorces and separations, because conflicts between partners are not able to overcome, as no temporal separation is practiced, or given the support and solidarity among women, as a form of group therapy. Since men do not talk about their issues in the walks during the day hunting, institutions represented by the Council of Elders, community assembly, the wihta and the trustee is in danger of extinction.
Loss of control over ancestral lands	■ The presence of companies for the exploitation of forest resources is a critical factor in deforestation and degradation of community forests, causing the loss of rights to the community heritage, especially over land, territory and the natural resources. ■ Contingency farmer the rest of the country come to be located on the agricultural frontier, invading the territories of collective ownership of indigenous and African descent.
Deforestation, for change of land use is a common factor identified as the main cause of climate change.	■ With the advancement of the culture of the agricultural frontier, it occupies large tracts of land for pasture, cattle for sale, for trade in meat or milk. This situation is affecting food security, it causes changes in the ecosystem and the use of soil, which then lead to loss of tuber crops, rice, plantains and bananas, among other agricultural products.
Loss of traditional knowledge on the topic "climate-time by climate change	■ On Climate Change to the animals are confused over time. For the case of Miskito communities have focused on the calendar that is related to animals and eventually, it is evident that the weather changes is no longer applicable.

ANNEX No 2

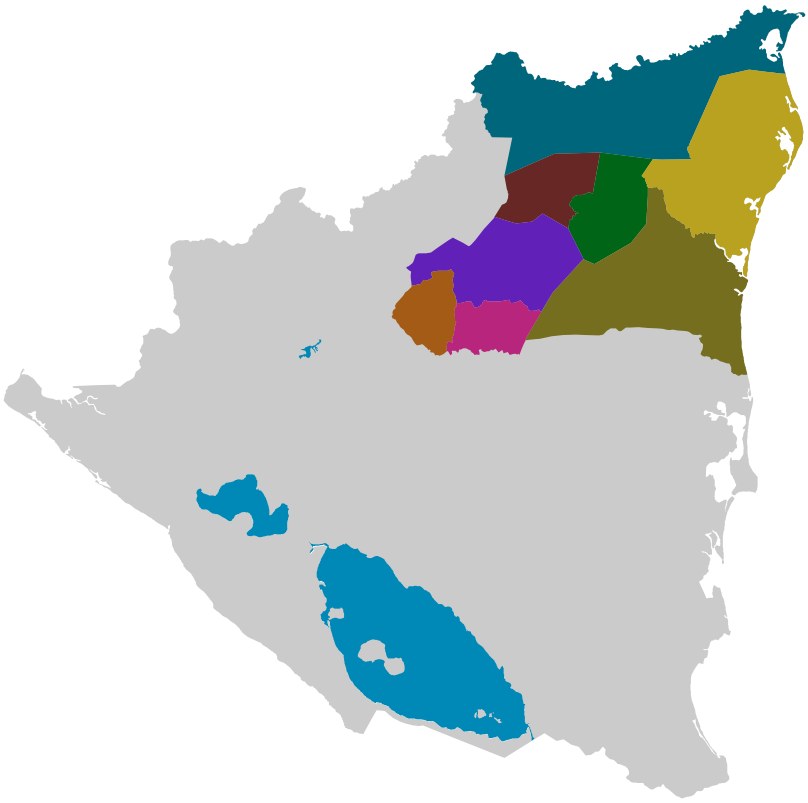
PRIORITY OF THE PROBLEM AND SOLUTION ALTERNATIVES

WATER SECTOR	
PROBLEM	ALTERNATIVE SOLUTIONS
Decreased water flow: Water scarcity level of territories and communities, the disappearance of marine life, water transport difficulty.	■ Promote the protection of watersheds and water sources. Protection and conservation of forest areas. Care and management of natural forest. Reforestation of the headwaters of rivers. Promote the culture of wáter
Alteration of the hydrological regime: Increased and altered rainfall and drought.	■ Integrated water resource management governance (effective management)
Sedimentation of rivers by soil erosion and landslide.	■ Establishment of agroforestry and intercropping fruit trees, fodder, energy.
Pollution of wáter sources	■ Promote the use of water treatment methods. Training and awareness program to the general population and environmental education. Effectively implement the existing legal framework to prevent environmental pollution.
Contamination of wells by the poor location of latrines	■ Environmental education and awareness to the population. Building latrines in compliance with the NTON 09-002-99 drinking water treatment in rural and health standards.
Reduced water flows by high degree of deforestation.	■ Promote integrated water resource management governance (effective management)
Poor distribution of drinking water in the municipalities of the region No drinking water in rural communities, the population is supplied from springs or other means without the quality of drinking water.	■ Tell ENACAL implementing a more efficient distribution network for the region. Give them the conditions for human consumption under existing phytosanitary standards. Sensitize the population to consume safe water for consumption and train them in treatment of drinking water craft.
FORESTRY	
PROBLEM	ALTERNATIVE SOLUTIONS
Changing land use (agricultural frontier advances)	■ Implementation of forest management plan ■ Law Enforcement, 445, 28 and its rules 40 and 261 ■ Implementation of environmental protection units ■ Coordination with regional agencies municipal territorial army and Community Organization INSPECTOR territorial decentralization of functions and responsibilities to the regional and municipal authorities. Strengthening community and regional bodies
Deforestation	■ Reforestation. Forest control. Reforestation in watersheds. Development of programs to develop the wood. Establish productive plots at different times of year. ■ Efficiency of value chains and market
Illegal harvesting of trees. Illegal timber business community	■ Monitoring and control and adjustment of legislation. Enforce the rules. Training programs for communities. Create marketing management mechanisms
Low institutional capacity	■ Strengthening and increasing institutional coverage for the control and monitoring of logging.
Forest fires (little knowledge of the response)	■ Prevention, control and attitude change ■ Funds for operationalization of the brigades and rangers / equipment with tools and equipment). Prevention campaigns
Loss of forest cover due to extreme weather events	■ Recovery of degraded and deforested areas (reforestation and afforestation in clear). Restoring forest cover. Land use planning in each community or municipality according to their worldview and their respective areas. Management Programs and Recovery of Natural Resources

Failure of management plans for forest	■ Implementing the legal framework. Information to communities. Work with management institutions to create an agency responsible for coordinating surveillance and monitoring. ■ Encouraging and promoting forest ■ Knowledge and skills Forest Management
Conflicts of rules, There is no clear policy decision-making processes	■ Coordinated Supervisory Board at Different Levels of government, community work Towards Participatory regional governments, forest Create a clear policy of the RAAN, Including the worldview of indigenous peoples. ■ Forest Governance. ■ Community management capacity / local
AGRICULTURAL SECTOR	
PROBLEM	ALTERNATIVE SOLUTIONS
Loss of fertility soil (decrease in productivity, thus increasing production costs and no reduction in safety food)	■ Diversification of crops tolerant to flooding and drought. - Modernization of the productive system. Systematic technical assistance to producers. Awareness of application of the training. Provision of seeds resistant to pests and diseases caused by extreme events (flooding, drought). Exploitation of other resources through community Forestry.
Change of use of Soil mainly for agriculture and livestock, soils are degraded and lost productivity	■ Land use planning according to the vocation of the soil.
The new varieties of seed, to the detriment of traditional or native seeds. With these new seeds are new threats to agriculture, such as weeds, new insects.	■ Establishment of a rescue program at Community level, of native seeds for agricultural production
Were missing the traditional perennial crops (cashew, breadfruit, mango, lemon, coconut, avocado, Jamaica tea, ginger, chile chicken, water pear)	■ ■ Rescue of perennial crops ■ Establishment of nurseries in the different sectors (women) ■ Awareness campaign about the rescue of the importance of planting fruit trees
The communities do not implement the collection system to store the seeds.	■ Monitoring the use of storage systems ■ Awareness of application of the training ■ Promotion of storage systems
Access to markets is interrupted by damage to road infrastructure (road, bridges, and roads) in extremes.	■ Improving the system of construction of road infrastructure. ■ Designing concrete bridges,
There is no proper management of animal exploitation in the municipalities	■ Establishment of containment areas for cattle and sheep. I separate the livestock farm. Sort the fields, planting grasses. Promote community work for the livestock management. Encourage the establishment of agro-ecological standards in the municipalities.
Clear-cutting for pasture use	■ Economic-ecological zoning of the territory. Community of new territory. Reforestation of deforested areas. Introduction of improved pastures to minimize degraded areas. Sustainable management of cattle. Encourage people with forests. Pasture rotation. - To promote community awareness in the use of dividing lines (pasture)
ETHNIC SECTOR-SOCIO-CULTURAL	
PROBLEM	ALTERNATIVE SOLUTIONS
Impact on coastal infrastructure from sea level rise, as well as roads, bridges and homes by increasing the intensity of rainfall	■ Create institutional capacities for disaster relief, to articulate and bring together all sectors of the territory for emergency care. ■ Rehabilitation of sediment transport in coastal erosion zones. ■ Re-evaluate the infrastructure in areas of high vulnerability. ■ Amend the design of new coastal infrastructure the effect of climate change on the life of the work, ■ Promote the introduction of the effect of climate change on Marine Works projects and other recommendations and standards for infrastructure in highly vulnerable areas. ■ Improving knowledge, preparation and welfare institutions. Education about the risks of climate change and how to reduce or respond to them can help reduce vulnerability.

Reducing the supply of food for extreme events (floods and hurricanes)	■ Improving knowledge, preparation and welfare institutions. Education about the risks of climate change and how to reduce or respond to them can help reduce vulnerability. ■ Have food reserves in the region to meet emergency needs. ■ Promote agro-forestry production systems that can maintain the nutritional needs of producers in the affected areas.
Disease outbreaks from extreme events (floods and hurricanes) and heat waves	■ Development of hospital emergency plans, warning plan and trained personnel. ■ Organization and functioning of an epidemiological surveillance system articulated before, during and after the disaster and providing factual information. ■ Improving knowledge, preparation and welfare institutions. Education about the risks of climate change and how to reduce or respond to them can help reduce vulnerability. ■ Training of people in basic health issues.
Lack of access to funding programs	■ Management of credit and lines of credit to priority sectors
Lack diversification of forest products and other products.	■ Technical assistance to diversify production and products ■ Fisheries production, forestry and agriculture is diversified
Weak institutional presence in remote communities and vulnerable	■ Institutions include in their budgets funds for greater regional presence
Lack of a clear and coherent vision of sustainable socioeconomic development based on their particular worldview indigenous	■ Implement a system of integrated planning and articulated the interests of government levels. Defining socio-economic development model for the RAAN. Implement articulated models of socioeconomic development
Lack of strategies, programs, projects and budgets to the Caribbean coast regions	■ Identify manage and implement sustainable projects in harmony with the environment
Loss of balance between culture, nature and politics. It is the cause of disease, death and imbalance in indigenous cultural spaces.	■ Formulation of a proposed Statement of Coexistence that incorporates non-indigenous communities to facilitate the rehabilitation of their ancestral territory. ■ Establishment and strengthening territorial governments strengthen advocacy skills and negotiation, and seek to protect and defend together the natural heritage of communities. ■ The coordination strategy, negotiation and alliances with neighboring communities, for purposes of protecting the territory and its resources, and aims to curb migration, protect natural resources, and provide, at the same time, the economy owners of the territory.
Loss of relations of solidarity and reciprocity within the Community,	■ Retrieve the practices of reciprocity and community solidarity as the foundations of the economy in the community are sustainable practices (diversity in production), solidarity and mutual assistance and joint efforts. It means that everyone must work, help and share.
Loss of ability to solve conflicts and institutions Community	■ Strengthening of community structures and community institutions to community control. ■ - Implement participatory community meetings to inform ■ Community Assembly on developments, and have the same criteria for continued community management
Loss of control over ancestral lands	■ The legal recognition of their ancestral land rights. ■ Strengthening the capacity of advocacy and negotiation to protect and defend together the natural heritage of the communities of the territorial governments. ■ Implementing a strategy for coordination, negotiation and alliances with neighboring communities, for purposes of protecting the territory and its resources. ■ Appoint guards to protect the place, and to prevent the entry of mestizo settlers on indigenous lands
Deforestation, for change of land use is a common factor identified as the main cause of climate change.	■ ■ Establishment of breeding species or natural resource conservation, animals of various species, including deer and turkeys, for reproduction and for household consumption. ■ Establishment of conservation areas to protect natural resources such as ensuring water supply to communities.
Loss of traditional knowledge on the topic "climate-time by climate change	■ Regain compliance with Community environmental standards of natural resource use and practices of community spirituality. ■ Revisit the Community rules for the management of natural resources, based on zoning of the forest, designating areas of collecting, fishing, mining and utility of medicinal plants and gold mining, among others. Logging only for consumption and home building, land use plant and harvest for home consumption.

NORTH ATLANTIC REGIONAL COUNCIL INDEPENDENT • AUTONOMOUS REGIONAL GOVERNMENT NORTH ATLANTIC
FORESTRY AND ENVIRONMENTAL ADVISORY COMMITTEE



10 years'

"Of commitment and responsibility in the use and management of natural resources and environment in the RAAN"

SERENA-GRAAN

"Building advocacy processes on forest and climate change with the active participation of the GTI and actors local region"

NICARAGUA:
LA ALEGRÍA DE VIVIR EN PAZ!

CRISTIANA, SOCIALISTA, SOLIDARIA...
POR MÁS VICTORIAS!