Capacity building to improve adaptability to sea level rise in two vulnerable points of the Colombian coastal areas (Tumaco-Pacific coast and Cartagena-Caribbean coast) with special emphasis on human populations under poverty conditions.

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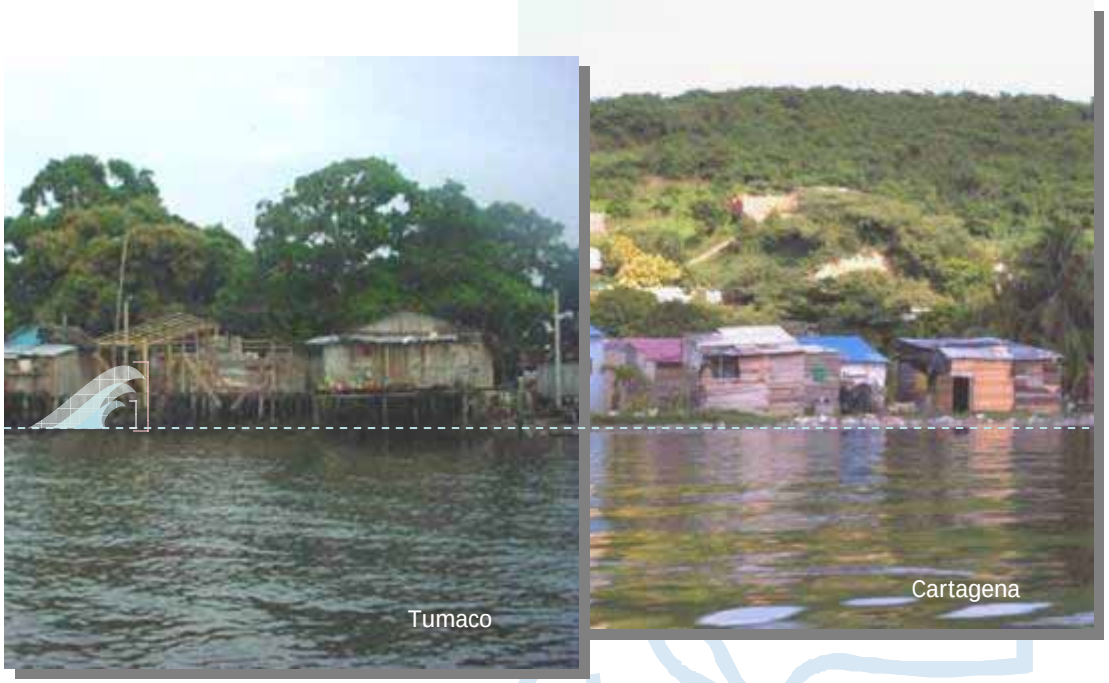

Instituto de Investigaciones Marinas y Costeras
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Vinculado al Ministerio de Ambiente, Vivienda y Desarrollo Territorial

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Capacity building to improve adaptability to sea level rise in two vulnerable points of the Colombian coastal areas (Tumaco-Pacific coast and Cartagena – Caribbean coast) with special emphasis on human populations under poverty conditions.

Scenario development - ADM

Santa Marta DTHC - 2005

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NCAP
The Netherlands Climate Assistance Programme

Libertad y Orden
Ministerio de Ambiente, Vivienda y Desarrollo Territorial

The Netherlands Climate Assistance Programme II – COLOMBIA

Capacity building to improve adaptability to sea level rise in two vulnerable points of the Colombian coastal areas (Tumaco-Pacific coast and Cartagena de Indias - Caribbean coast) with special emphasis on human populations under poverty conditions.

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Project summary

The NCAP-Colombia is a strategic partnership between INVEMAR and ETC International to produce a comprehensive approach for developing the capacities needed at the regional level to meet the challenges of global climate change, in particular the effects of accelerated sea level rise (ASLR).

It is a continuation of an early initiative from the first phase of the Netherlands Climate Change Studies Assistant Programme NCCSAP:Colombia[1] aimed to assess the vulnerability of coastal zones to potential sea-level rise using the methodology proposed by the Intergovernmental Panel on Climate Change (IPCC, 1992). A 0.88 m rise was considered in the study. Land loss due to inundation was defined to reach approximately 5.000 km^2 for the case of coastal continental lowlands, 5 km^2 for the Colombian insular Caribbean[2] and 6.000 km^2 for the Pacific coast.

As a result a National Action Plan within the actual country institutional and planning framework was produced. In this plan concrete actions for the short and medium term were identified: a) Knowledge and information, b) Planning, c) Institutional capacity building, d) Education and public awareness, d) International negotiation, e) Economical and financial aspects. Moreover, seven critical zones were identified along the coasts: The Archipelago of San Andrés, Providencia y Santa Catalina in the Colombian insular area of the Caribbean; the cities of Cartagena de Indias, Barranquilla, and Santa Marta in the Caribbean continental coast; and the cities of Tumaco and Buenaventura in the Colombian Pacific. Due to the fact that Cartagena and Tumaco have the largest population and highest capital value at risk, the scope of Colombia in the second phase, focused the study to these critical areas.

This new initiative follows the guidelines of the National ICZM[3] Policy using an integrated coastal zone management approach to generate effective tools for local, regional and national authorities to support the difficult task of decision making towards the reduction of the potential effects of ASLR. The study looks into the effects over key economic sectors along the two vulnerable areas making especial emphasis on the evaluation of the adaptation capabilities of population under poverty conditions.

To accomplish this target the identification and assessment of possible multisectorial adaptation strategies through a decision analytical framework is intended. A detailed vulnerability assessment as a starting point focusing on social groups under poverty conditions will support the initiative. The outputs of the study are expected to set demonstrative pilot actions in the preparation of the country for the establishment of a Climate Change Adaptation National Policy.

Capacity building through research, institutional training strategies and public awareness are thought as effective mechanisms to improve the adaptability of the Cartagena de Indias and Tumaco coastal areas. International cooperation as well as sharing of experience with other countries are also key components of success in this scheme.

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[1] Definición de la vulnerabilidad de los sistemas biogeofísicos y socioeconómicos debido a un cambio en el nivel del mar en la zona costera Colombiana (Caribe continental, Caribe Insular y Pacifico) y medidas para su adaptación.

[2] Colombia. Primera Comunicación Nacional ante la Convención Marco de las Naciones Unidas sobre el Cambio Climático

[3] National ICZM Policy: Environmental National Policy for the sustainable development of the oceanic spaces and coastal and insular zones of Colombia (PNAOCI in Spanish).

Introduction

One cannot study the impacts of climate change without also studying, or at least making assumptions about adaptation [1].

Adaptation was defined in 1992 by the United Nations Framework Convention on Climate Change (UNFCCC) as "all adjustments in socio-economic systems designed to reduce vulnerability to climate change". Since then this concept has changed and given the necessary relevance in comparison to mitigation actions [2]; adaptation has been considered as an urgent and even imperative issue.

Whereas *mitigation* refers to limiting global climate change through reducing the emissions of greenhouse gases (GHGs) and enhancing their sinks, *adaptation* aims at moderating its adverse effects through a wide range of system–specific actions on the local or regional scales [3].

This very broad process is limited by the understanding of the mechanisms along which adaptation to climate change occurs. The identification and implementation of appropriate adaptation options, that is, options that are economically efficient, technically feasible, environmentally sound, culturally compatible and socially equitable, is therefore filled with uncertainties. Moreover, the costs and benefits of adaptation options, especially non-technical, are more difficult to measure and express in a common unit [4].

In developing countries, especially the poorer, least developed, and most vulnerable to the effects of varying climate, the capacity to adapt is generally much lower that in developed countries. This is due to a relative lack of financial resources; less access to technology; weaker scientific research and development capacity; fewer effective institutions, social and governmental organization; and less development of skilled human resources. In addition, not only is the actual amount of national wealth a factor, but its distribution is also important. Countries with larger proportions of the population living in poverty have less adaptive capacity. The uncertainty about the response of natural ecosystems and potential loss of biodiversity is another impediment to the development of sound adaptation policies, especially in tropical countries [2].

In general terms, the IPCC has distinguished between three categories of adaptation in coastal zones: protect, (managed) retreat, and accommodate. Each of these categories helps to reduce vulnerability to climate change. A *protection* strategy reduce the risk of the event by decreasing its probability of occurrence; a *retreat* option reduce the risk of the event by limiting its potential effects; and the *accommodate* strategy increase society's ability to cope with the effects of the event. These strategies used in the first accelerated sea level rise vulnerability assessment of the Colombian coasts (INVEMAR, 2003) are good guidelines but too general be applied to case studies such as the localities of Cartagena de Indias and San Andres de Tumaco.

This first assessment also concluded that the legislative/institutional/organizational issues presented serious constrains to implement the response strategies towards adaptation. The economical implementation feasibility is critically low, since the country is not prepared to assume the financial costs of ASLR consequences; Technical feasibility was also considered low due to the lack of technical capacity among the institutions and high scientific uncertainties and short knowledge on the subject. Cultural and social vulnerability are considered high, because of the low quality life conditions in terms of healthcare and public services at the Colombian Coastal zones, even far below the national mean. What is more important, the violence conflict affecting a great portion of the national territory influences negatively most of the economical activities.

Having this in mind, adapting to ASLR can be seen as a primarily matter of local managers, individual households and companies, in the context of a regional economy and society. Domestic policy makers in climate-sensitive sectors have more limited needs for global information than for national information Planners in climate-sensitive sectors are interested in the local benefits and costs of adaptation related to specific options and projects.

However, slow changes in the natural environment are not generally seen as a problem neither the risk associated to it. It is given for granted that societies are constantly adapting to slow change, and communities are always making decisions in the face of known risks. There is a generalized unawareness among local managers on the risks of climate change and the impact of ASLR. This situation could be understood based on the fact of high uncertainty caused by unpredictable changes in specific projections of extreme events such as Tsunami as in the case of the Pacific coast.

Uncertainty could be used as a tool in the search for “no regrets” actions taken by individuals and governments. In the context of adaptation, a no regrets action is one that is taken for reasons other than avoiding climate change damages, but which nevertheless “softens” the impacts of climate change as they occur [5]. Many actions, can be taken today for reasons that are more directly related to a broad variety of other developmental goals (including reduced vulnerability to existing climate variability) that also are potentially effective in reducing the vulnerability of the regions to ASLR.

This approach is the basis for the “facilitative” adaptation intended to be explored by the project. In the literature many forms of adaptation can be distinguished including anticipatory and reactive adaptation and planned and autonomous adaptation, where planning is carried out to happen at the level of analysis, normally at government and multilateral organizations [2-4, 6]. Facilitative adaptation is perhaps a form of planned, anticipatory adaptation but, instead of telling local and regional managers which areas are under direct impact or where to invest in hard structures protection or how many people does it have to be relocated, facilitative adaptation are those actions that allow households, companies, lower authorities, local and regional planners adapt better [1]. This implies out lightning the benefits of adaptation or related these benefits, consistently, to the damages caused by ASLR, with and without adaptation.

Colombia could be considered fortunate to be right on time to take action towards the sustainable coastal management of its coast. However, the cultural diversity in the Caribbean and Pacific Region embraces different indigenous groups and Afro Colombian groups to whom different resources exploitation methods are attributed. It is also a fact, that there is not similitude between the productive systems of the two coasts; there is a greater development in cattle raising, mining and industry in the Caribbean compared with the Pacific region. Because of the above, adaptive capacity must be particularly explored for each representative area an issue that helps to illustrate that it is difficult to find the differences in investing in adaptation measures and the investment that strengthens adaptation capacity.

As such, facilitative adaptation and adaptive capacity are not concepts that can be measured in a straightforward way. The literature on adaptive capacity is rather scarce. There is no concrete guidance as to how adaptive capacity can be assessed, although a range of indicators have been identified that are assumed to be useful predictors of adaptive capacity. Some of these such as GDP/capita, literacy, incidence of poverty, life expectancy among others relate to the determinants of adaptive capacity, listed in the definition above.

Beside these the existence of planning regulations at national and local levels as well as existing warning and protection regulations from natural hazards can provide a first glimpse on the priority actions needed to reduce vulnerability on the selected case study areas. The methodological framework intended to asses this vulnerability is introduce with an understanding of the general systems involved in case study areas. This description then the VA for the case study areas and the definition of desired development scenario is the aim of this report.

Approach/Methodologies/Tools

The capacity building strategy aimed on the project is supported on the generation of decision analytical tools suitable for local policy and decision makers responsible for devising and implementing adaptive policies to the impacts of sea level rise.

Accordingly with the line of action established for the ICZM approach followed by Colombia, an integrated view of the systems of Cartagena de Indias and Tumaco is intended. The physical, economic and societal impacts of sea-level rise due to climate change will be examined. Although fisheries, agriculture and tourism has been identified as the most directly affected economic sectors by ASLR, a more rigorous evaluation is needed as a basis for discussion with key stakeholders such as population under poverty conditions.

For this purpose, the term 'key stakeholders' is used to mean individuals, groups, or institutions that have an interest or stake, or could be potentially affected by the outcome of the project. The primary stakeholders are the most affected and vulnerable populations to climate risks for a specified human system. They are the direct beneficiaries of the project. The secondary stakeholders are those who are able to influence the success, or failure, of the project. Serving both to meet the capacity building and adaptation goals of the project, stakeholders will be engaged in the project through information dissemination, consultations, surveys, workshops to exchange and validate information, and cooperative actions.

The methodological scheme intended in the project (Figure 1) combines the adaptation frameworks proposed by Klein and Nicholls (1999), UNDP - GEF Adaptation Policy Framework (2003), *DINAS-COAST* Project methodology and the one proposed by Sharifi *et al.* (2004), Framework for Planning and Decision-making Process. The framework recognizes that local scale interventions should be consistent with and inform national-scale policies. The framework also assumes that systems change over time, and that vulnerabilities and adaptation to current experiences will not necessarily be the same in the future.

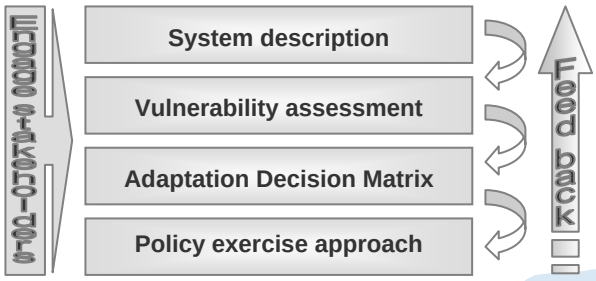

Figure 1. Methodological scheme NCAP- Colombia

Within these schemes, the definition of an initial *state of the art* of the system is used as the starting point. Then a vulnerability assessment is made to include into the analysis the assessment of both anticipated impacts and available adaptation options. A scenario development process will be included in the Adaptation Decision Matrix approach (IPCC, 2001) to synthesize and assess alternative policy options that respond to different adaptation measures. A spatial decision support system approach would help to assess the implications of local adaptation alternatives. Lastly, a Policy Exercise Approach (IPCC, 2001) will follow to downscale known national policy options to reduce climate vulnerability in the local level. During the first eighteen months of execution of the project, the first two phases will be completed, setting the basis for the following one.

1 System description

This phase examines the environment to identify problem or opportunity situations. Includes defining and describing the system; embrace perceived problems or opportunities in terms of boundaries, natural environment, societal and economic sectors, stakeholders, space and time. It is based mainly on existing assessments, expert judgment and stakeholders verification. A specific examination of current development activities, especially those activities that increase vulnerability to climate variability and change, are also included.

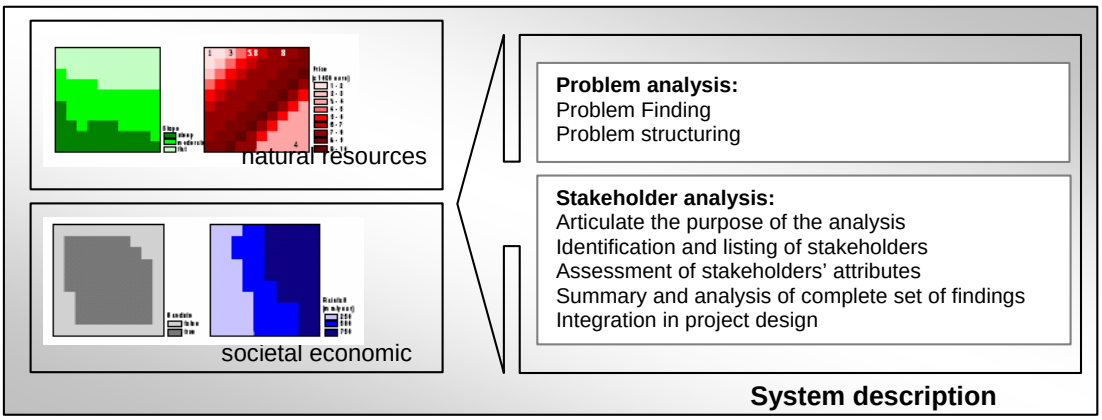

Figure 2. Schematic components of the SD phase.

2 Vulnerability assessment

The vulnerability in each of the areas of interest will be analyzed under three concepts:

1) the susceptibility of the coastal area to the physical and ecological changes imposed by sea-level rise;
2) the potential impacts of these natural system changes on the socioeconomic system; and
3) the capacity to cope with the impacts, including the possibilities to prevent or reduce impacts via adaptation measures ('adaptive capacity').

Box 1. Definitions, IPCC TAR 2001

Vulnerability is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate variation to which a system is exposed, and its sensitivity and adaptive capacity.

Adaptation to climate change refers to adjustment in natural or human systems in response to actual and expected stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation

All three concepts will be analyzed under the spatial representation of impacts in order to contribute to a more realistic problem analysis following the lessons learned from the *DINAS-COAST* projects methodology.

Following, a selection of impact indicators suitable for each particular area is made, the *First generation of base- line environmental indicators* of the Colombian Environmental Information System (SIAC in Spanish) will be used. Such indicators will be accompanied by a definition, a method of calculation, interpretation, means of verification and associated assumptions. The sum of these indicators will define the natural resources and societal economic drivers.

As a result, a set of vulnerability maps for each area is generated. The *ESRI Geodatabase* structure in *Arc GIS9.0* seems as an appropriated tool for modeling these dynamical systems concepts, for expressing the static information about the system data model as well as other concepts for representing the system's dynamics.

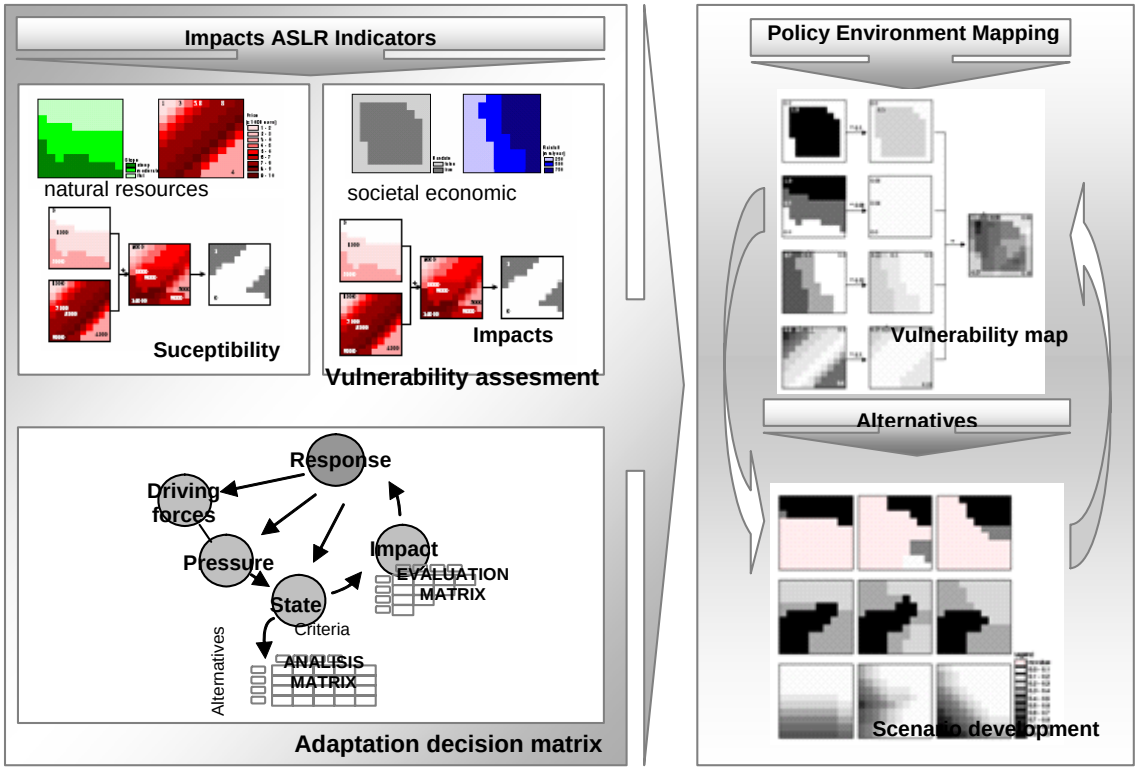

Figure 3. General scheme of the vulnerability assessment.

3 Adaptation Decision Matrix (ADM)

This phase takes into consideration the understanding of the system behavior by establishing the functional and structural relationships among major elements. The Driving Forces – Pressure – State – Impact - Response framework DPSIR (EEA, 2000) is used to assist this activity.

This process will involve expert judgment and quantitative analysis. It will be implemented under an interactive manner, keeping a feedback with stakeholders and addressing a step-by-step path to estimate potential impacts, under alternative policy adaptation options. These interaction and their responses are the basis for the development of adaptation options and thus the alternative scenarios. The key aim of using scenarios within the project is to promote people's habits of thinking, or constructing their mental models of how things work so that they can deal better with the uncertainties of the future. Scenarios could help key stakeholders decide how to adapt to change and achieve their vision about the future.

Among the advantages identified regarding ADM are the moderate requirements of resources (suitable for data availability in Colombia), moderate level of precision and the ability to address uncertainties.

4 Policy Exercise Approach

For the second part of the project, the Policy Exercise Approach will be based on different steps to propose and analyze different alternatives. The previous causal chain analysis (DPSIR) establishes some root causes of environmental priority problems (i.e. vulnerability of sea level rise on coastal areas). The policy options are suggested to attend those environmental concerns roots causes. The options can be grouped in agreement with the subject they cover, for example, technological, knowledge, economical, governance or demographic causes, among others. After establishing a clear definition for each kind of group the priority alternatives analysis should be made, considering Effectiveness, Efficiency, Equity, Political feasibility and Implementation capacity for each alternative. The principal alternatives are selected by a scoring exercise and analyzed considering the same factors already mentioned, but with more detail.

SD - System description

Global sea level rose 10 to 25 cm during the 20th Century and this rate of rise is expected to accelerate during the 21st Century due to human-induced global warming [7].

There are indications that Colombian coastal zones are highly vulnerable to sea-level rise with clear indication that coastal erosion and flooding of low-lying coasts will increase; However strong differences can be observed between the Caribbean and the Pacific coast of Colombia. Such differences are reflected in the description of each of the case study areas. Based on the previous NCAP experience the limits of the study area aimed to appoint a manageable spatial unit under social-economical and administrative parameters. For this reason the municipal limits of both localities was selected as the initial study area boundary.

A preliminary list of potential sea level rise impacts indicators serve also as a criteria for this boundary selection to ensure that any of the potential effects of ASLR were known beyond these limits. A description containing the most relevant aspects of each of the areas is presented herein.

5 Cartagena de Indias

The *Distrito Turistico y Cultural de Cartagena de Indias* (Figure 4), also known as *La Heroica* (The Heroic), is a large seaport on the north coast of Colombia. Founded in 1533 by don Pedro de Heredia, and named after Cartagena, Spain, it was a major center of early Spanish settlement in the Americas, and continues to be an economic hub as well as a popular tourist destination.

Cartagena is located at 10°25' North, 75°32' West and faces the Caribbean Sea to the west. To the south is the Bahia de Cartagena (Bay of Cartagena), which has two entrances: Bocachica in the south, and Bocagrande in the north.

During the 16th and 17th centuries, Cartagena was part of the Spanish Main, one of the chief ports of the Spanish treasure fleet and so a prime target for English and French pirate and privateers (such as Sir Francis Drake, who sacked the city in 1586). Many of Cartagena's fortifications still stand: the Castle of San Felipe de Barajas, built between 1536 and 1657; the walls around the Old City (las Murallas); the undersea wall across Bocagrande built between 1771 and 1778; and the forts of San Jose and San Fernando, built between 1751 and 1759 at Bocachica.

Cartagena is the capital of the department of Bolivar along with 44 municipalities located on 6 natural regions. Limits to the north with Caribbean Sea as well as the municipalities of Galerazamba, Santa Catalina, Santa Rosa, Turbaco, Turbana and the Sucre Department. It has a territorial extension of 609 km2. From the total 8.86%, belonging to the urban area and the rest 551.1 km2 represent 91.14% of suburban and urban area (Alcaldía de Cartagena, 2000).

Table 1. Distrito de Cartagena de Indias extention (Source: Alcaldía de Cartagena)

Total area	60.900,2 Ha
Coastline length	193,0 Km
Urban area	7.590,8 Ha
Rural area	53.309,2 Ha
Ciénaga de la Virgen area	2.200,0 Ha
Inner channels and lakes	152,0 Ha

In 1984, the Committee of the World-wide Patrimony of UNESCO included in the list of the world-wide patrimony the "Port, Strength and Monumental Set of Cartagena de Indias".

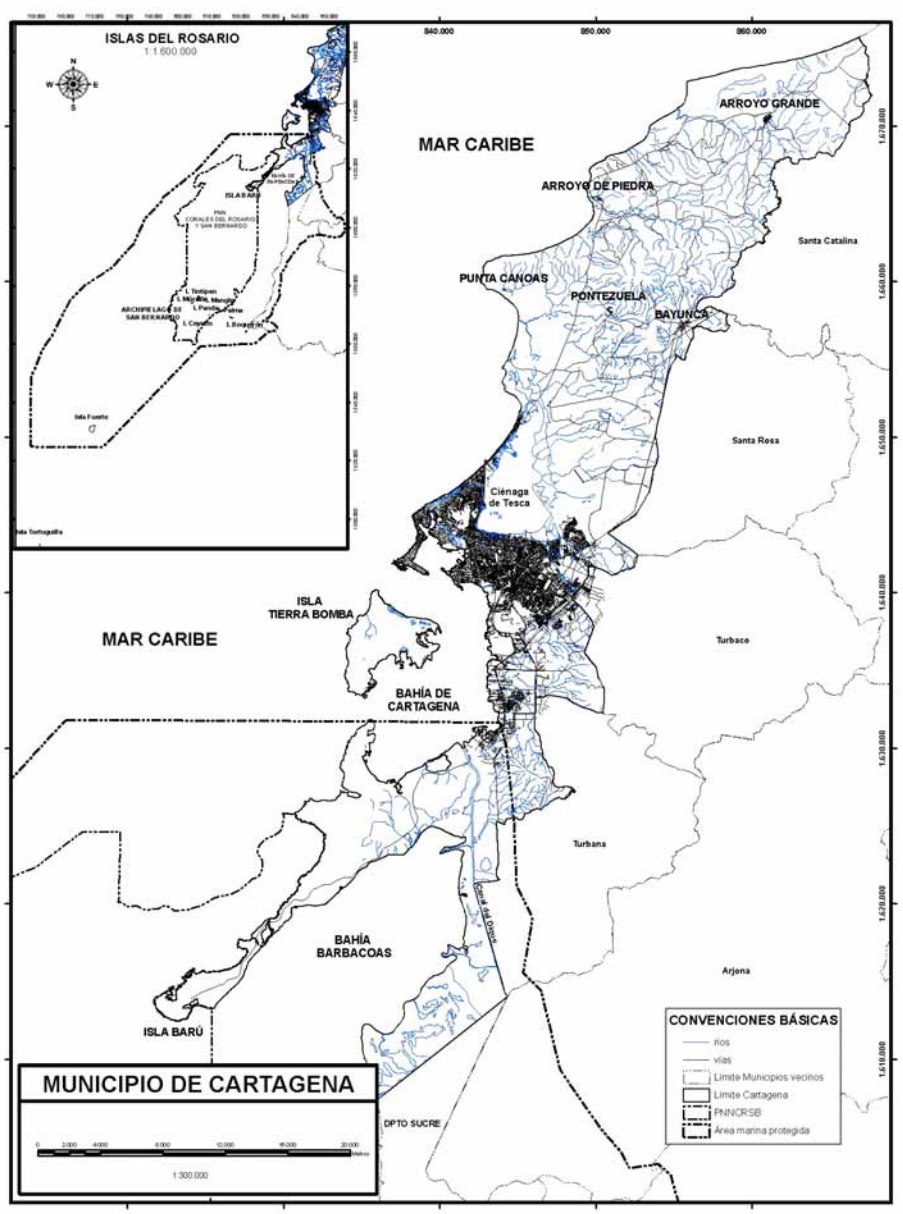

Figure 4. General limits of Distrito Turistico y Cultural de Cartagena.

About 30 km southeast of Cartagena there is a complex of islands, peninsulas and inner water bodies, that conform the insular and the continental area (Figure 4). Within the insular area the nationally protected park Corales del Rosario y San Bernardo embrace the biggest marine protected area of Colombia. The principal water bodies within the urban area are the Bahía de Cartagena, Ciénaga de la Virgen and Ciénaga de Juan Polo that are connected by a complex system of lakes and channels (Alcaldía de Cartagena, 2000). All natural ecosystems had been seriously threaten by local mismanagement making them vulnerable to future disturbances such as the ones caused by ASLR.

Due to Cartagena's tropical location, the climate changes very little, with an average high of 31°C (88°F) and an average low of 24°C (75.4°F) throughout the year. Cartagena also averages around 90% humidity, with a rainy season typically in October. Cartagena receives about 100 cm (40 inches) of rain a year [8].

5.1 Ocean dynamics

Circulation in the southwestern Caribbean is highly variable. It is driven in large part by seasonal changes in the trade winds and the Intertropical Convergence Zone, or "ITCZ", and possibly also by interactions with the offshore Caribbean Current. In winter, the ITCZ shifts slightly south and the weather over the Caribbean region is often dry, but very windy. These winds cause strong upwelling of nutrient-rich water -- and productive fisheries. In summer, the ITCZ moves north and the winds die away; however, ITCZ clouds produce intense rainfall -- up to two meters during the rainy season. Heavy rainfall in the region can modify the salinity and density of the nearby bay and affect current flow [8].

Additional to this general currents a local one is generated by the Canal del Dique (Dike Channel) that can reach the Islas del Rosario according to the season (June - July). Between December and April (dry season) the strong winds can cause high waves flooding inshore areas. (CIOH, 1998).

5.1.1 Sea-level

The coastal area of the District is influenced by a mixed type predominantly semi-diurnal tide regime. The tide presents two high waters and two low tides during the day. The range between these two is very short (60 cm as a maximum) being categorized of micro-tidal. The moon and the monthly variations are the mainly factors influencing the local tides [8].

Once the tide is filtered, the annual variation of the mean sea level, (Figure 5) is noticeably seasonal and inversely proportional to the effort of the Colombian Caribbean coast Northeast trade winds [9]. Sea-level is usually smaller at the end of April when winds cease and increases during the time of transition until the arrival of the "Veranillo" in July or August when it has a slight and noticeable reduction reaching his maximum level in October. At the end of the boreal summer, due to the seasonal thermal expansion, there is a shift of wind direction and intensity of the Crosscurrent of Panama-Colombia (Andrade, 2000).

The lower sea-level returns at the end of November with the arrival of the “wind time”. This annual variation reaches around 40cm. Added to the 40cm of amplitude in a high tide in October, produces during day hours an increase of almost a meter at the Bay mean sea-level. The phenomena traduces in to the well-known yearly floods of the low zones of the coast in Cartagena, the overflowing of pipes, the opening of the bar of the Cienaga de la Virgen (from the sea towards inside) among other aspects that have been observed and little studied. When considering the associated problems of sea level rise it is generally spoken about the possible interannual increase greater to ten years. These are the most important variations to be considered at the present study.

5.2 Coastal variations

The morphological and sediment characteristics of the area are generated from the interaction of the three converging faults: Caribbean, Nazca and South American [10]. The Andean sediments discharged from the Magdalena River and Canal del Dique are responsible for the terrestrial origin coastal continental margin of Cartagena; arcillious diapirism is also responsible for the formation of the base of the coral reefs areas from Islas del Rosario and San Bernardo archipelago [11].

During the last 12 years the coastal line between Galerazamba and Bahia de Barbacoas evidence important changes associated to coastal processes. These modifications are the result of short (winds, tides, waves, litological process) and long (tectonic) geological and geomorphologic agents. Seasonal climatic changes and their associated oceanographic phenomena act as modifiers on those areas susceptible to the sediment accumulation and lost. The regional accumulation and erosion processes can be associated to the Galerazamba arcillious diapirism [8].

Erosion and sedimentation rates of 10 m/year are considered extremely high in comparison to the global standard [12]; nevertheless in some sectors of Bocacanoas and Flecha de Galerazamba this rate can be as high as 18 and 53 m/year. This variability on the beaches nursing and misplacing during very long periods of time can also be understood on local seasonal changes. Significant changes on the position and conformation of the coast line of the area can be registered during the last 12 years of observation. The coast is dominated by unconsolidated sediments and low topography. These changes can be reflected on huge extension of sediment deposition mainly in the Flecha de Glareazamba, Tombolo, Isla Cascajo, Punta Piedra and Punta Canoas. In

some areas such as Galerazamba, Bocacanoa, Punta Canoas and Boquilla the coastal withdraw has been less important.

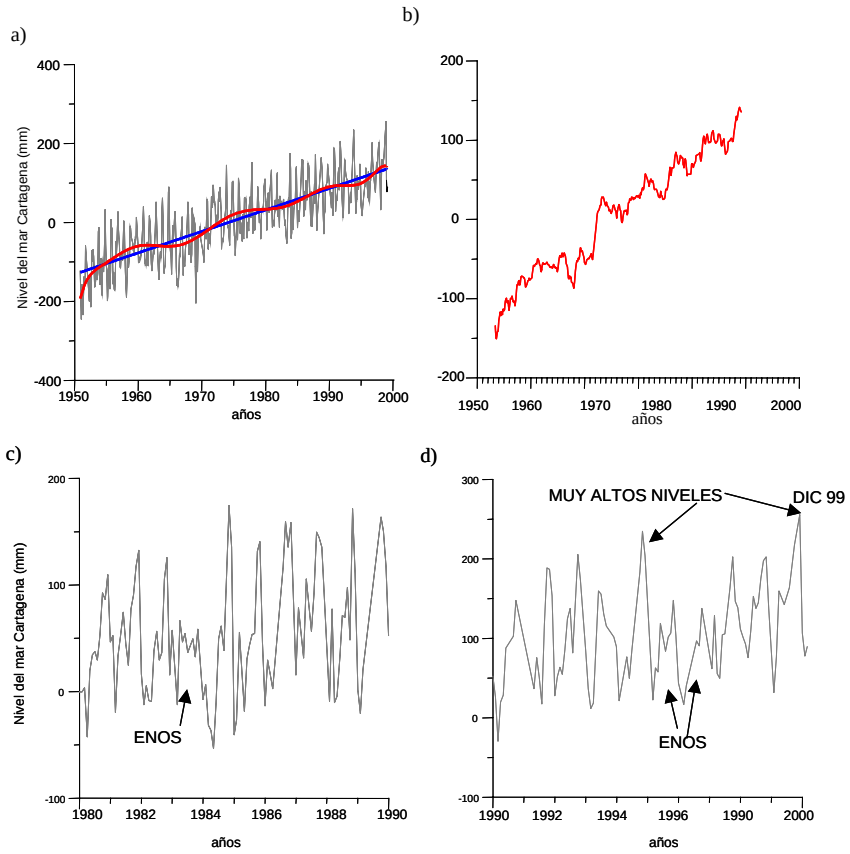

Figure 5 a) Cartagena steady increase of sea level (lineal-blue and polynomial-red tendency) multi-annual monthly mean (1951-2000). b) Stationed changes 6.5 period during the last two decades (filtered from previous) c) 80´s register amplification, d) 90´s register amplification. Evident variability during ENOS years (1982-83 y 1996-97). December 99 are the highest levels reached during the period.

The growing of old beaches in Flecha de Galerazamba sector has formed a sandy bar interrupting the Amangaguapo channel water mixed between the Cienaga de Totumo and the sea. Sea water enters the Cienaga La Redonda thru an artificial channel allowing sea water irrigation into the shrimp factories. High sedimentation into the channel forces continues dredging [8]. Continuous backward movements, mainly in its distal part of the Flecha, have forced the relocation of Pueblo Nuevo causing illegal settlements and associated social problems Several meters of variation in the bathymetry of the area has been caused by the subsidence and uplifting of the shallow platform due to the arcillious diapirism.[13].

The Canal del Dique is an artificial structure also influencing greatly the dynamic of the area. It is an artificial channel constructed in 1650 than communicated the Magdalena river with the Cartagena and Barbacoas Bays thru the Lerica, Matunilla and Pasacaballos sewers. This channel has a low topography with north south direction (Lemaitre, 1982 en Alcaldía de Cartagena, 2000). The low Magdalena region hidro-climatic regimes make a distinction of its behavior averaging 1000 and 1500 mm annual precipitation [14].

5.3 Marine and coastal ecosystems

The Caribbean coastal zone contains many productive and biologically complex ecosystems. Near shore marine habitats include coral reefs, sea grass beds, mangroves, coastal lagoons, beaches and benthic mud communities; among them coral reefs are the most visible and well studied ecosystem. All these ecosystems

are represented in the District as well as its surrounded waters. The economic dependence on the natural resources show different levels on intervention that need to be considered into the evaluation of their susceptibility to respond to ASLR effects.

Figure 6. Overview of the hard structures constructed along the Bocagrande sector between 1999 and 2004.

5.3.1 Sandy beaches

Among the most intervened marine and coastal ecosystems found in the area are the sandy beaches. This ecosystem is equivalent to the 90 % of the coastal profile of the District. The biggest hazard for the preservation of this ecosystem comes from the intense anthropogenic intervention suffered in the recent 8 years as seen in Figure 6. The sandy beaches from La Boquilla sector are the biggest and widest of all (between 60 and 100 m wide). In the dry season these are affected by erosion due to the strong winds coming from the north and unusual high and frequent waves. On the rainy season on the other hand sediment deposition reconstructs these areas [8].

The sandy beaches of the Cartagena Bay, include the ones in contact with the city of Cartagena, Mamonal, Pasacaballos and Ararca. They extent almost 82 km^2 in a long shape configuration with a depth average of 30 m. Their amplitude vary between 2 and 20 m., being the narrowest one located near the Tierra Bomba sector and the widest one near Punta Arenas. They are constituted by fine grain to very heavy calcareous sands formed as a product of degradation from coral as a result of strong surges [15].

The North limit of Bahía de Barbacoas is marked by the western flank of Baru reef island. This bay has a particular topography that exhibit heights from 0,5 m to 60 m. The beaches of the sector have formed by the disintegration of the coral reef terraces, appearing in patches in contact with the Ciénaga del Mohán, Punta Mojaculos, Espiga de Cholón, Punta Barú and Punta Platanal.

The coral reef island of Barú extends in northeast-southwestern direction. Its altitude goes from 0,5 ms to 60 m. Its western flank is in contact with the open sea whereas its Eastern flank limits with Bahía Barbacoas. Like the beaches of Bahía Barbacoas, these have formed by the disintegration of the coral reef terraces. The well developed and wide beaches of the island display a 3,5 km length with a 20 m amplitude average and a 9 degree slope beach front. It is a highly tourist beach limiting with the inner lagoons, the mangrove areas ant the semi vegetated dunes.

5.3.2 Coral reefs

This ecosystem associates to the insular area under the jurisdiction of the district of Cartagena. Rosario islands reefs are one of the most important coral reef ecosystems in Colombia. This area was declared as a National Natural Park in 1978 to preserve the coral community. However, the use of dynamite as a fishing-method, uncontrolled tourism, launches and boats, increase in sea surface temperature and sediment discharge due to dredging of Dique Channel resulted in coral coverage loss [16]. Barón et al., (1984) reported a sediment discharge amount of 12,000 tons per day from Dique Channel since 1982, when dredging began. By 1986 a 90% mortality of ramified corals and coral coverage decreased was observed.

The western sector constitutes the most important formation which displays a calcareous terrace that extends 2 km to the west with depths that oscillate between the 2 and the 7 meters. This terrace presents a cross-linking pattern of furrows covered by calcareous seaweed, sea fans and encrusting corals. The most representative species are *Diploria clivosa* and *Siderastrea siderca*. Seaweed of the *Halimeda* spp, *Dictyota* spp and *Dictyiopteris* spp genera are also very common associations [17].

5.3.3 Sea grasses

In Colombia marine sea grasses are present solely in the Caribbean Sea and its representation is established by five species: *Halodule wrightii, Syringodium filiforme, Thalassia testudinum, Halophila bailonis* y *Halophila decipiens*. The distribution of this ecosystem around the marine waters of the District like some limiting factors for its development are sumarized in Table 2.

In the Cartagena Bay 76 ha of sea grasses are associate to the open beach and 58 Ha are inside the bay. The predominant species is *Thalassia* and sometimes is combined with *Syringodium*, *Halophila* and *Halodule*. They can be found between 1 and 25 meters depth. They can be associated to seaweed, mollusks, crabs, sponges and sea urchins. They are threatened mainly by the untreated sewage disposal and the continental water unloading [18].

Table 2. Distrito de Cartagena sea grasses coverage (Modified from Díaz, Barrios et al. 2003).

Location	Extension (Ha)	Proportion (%)	Development constrains
Isla Arena	2	0.005	Turbidity, unstable substrate
Bahía de Cartagena	77	0.18	Low salinity, turbidity, pollution
Barú – Islas del Rosario	835	1.93	Low salinity, turbidity
Isla San Bernardo	2443	5.7	Depth, coastal erosion
Isla Fuerte	624	1.44	Depth, coastal erosion turbidity

5.3.4 Estuaries, deltas and coastal lagoons

The biggest coastal lagoon in the area is the Cienaga de la Virgen, which has a length of 22.5 km and a a mean depth of about 1.5m. It is separated from the sea by La Boquilla's bar and is surrounded by mangrove areas and anthropogenic intervened areas (Alcaldia de Cartagena, 2000; Niño, 2001). Additionally it is constantly loosing area given the constant inflow of sediments that result from continental erosion. On the eastern flank it receives streams that carry waters coming from nearby human settlements (Santa Catalina, Santa Rosa and Turbaco) and that wash out farming and cattle areas (Niño, 2001).

South and west flanks are intervened by human expansion, as this area is home of several of the city's periphery districts. In this area also inflow waste water systems and city drains from some of the most densely populated areas of the city. Sedimentation processes observed in the area have favored urban expansion towards the inner part of the lagoon. The western flank receives La Boquilla's population constant pressure, where strong settlements that are constantly growing along with erosion, can be observed (Niño, 2001).

Juan Polo's marsh is the southern part of the Cienaga de la Virgen and the one that receives greater marine influence. It is as well the best environmentally preserved area. The central part of La Virgen's complex, shows an island- like formation, resulting in sediment deposition, where a mangrove area has established. The inner side towards La Boquilla, a delta resulting from sea sedimentation is formed. In this area mangroves that diminish wave action have also settled down (Niño, 2001).

In Cartagena's bay low floodable areas restricted to the northeastern part of Tierra Bomba island, are found. These are usually surrounded by mangrove areas. The largest is going through accretion processes and shows high intervention levels as it is being filled with trash to adequate areas for building infrastructure (Alcaldia de Cartagena, 2000).

In this area other marshes located at the eastern flank of the bay can be found, in the industrial sector known as Mamonal. They have a maximum amplitude of 12 m to the south of the bay. At present they have been modified by fillings done for port and industrial installations (Alcaldia de Cartagena, 2000).

In Baru the marshes: Honda, Cholón, Portonaito, Pelao, Barú, Vásquez, Mohan, Cocon and Coquito, are found. Cienaga Honda locates at the western side of Pasacaballos settlement, with an approximate extension of 1400 m and is separated from Cartagena's bay by a reef bar of 1.250 m de long. It is mainly colonized by mangroves, presenting an access canal on the western flank. The greater intervention effects are result of shrimp industries that exist in this area (Alcaldia de Cartagena, 2000).

Western to cienaga Honda is Cienaga de Coquito, with a medium amplitude of 600 m. It is surrounded by mangroves and connected to Cartagena's bay by a channel located west; it also has shrimp industries (Alcaldia de Cartagena, 2000).

In Cartagena's bay is possible to find low zones, susceptible to floods. They appear in the middle and south of Mamonal as two isolated bodies that reach between 1.5 and 2.6 km in eastern- western direction. In Baru island the Mohan marsh is located in the central part of the island and has direct communication with Barbacoas bay. It has a total extension of1.375 m and an amplitude of 700 m; it is completely surrounded by mangroves (Alcaldia de Cartagena, 2000).

In the southern part of the island the cienaga de los Vásquez is located. It is limited by marine terraces and mangrove areas. It is 1250 m long and has a maximum amplitude of 250 m. Portonaito's marsh is located southeast of Punta Gigante and has a total extension of about 2.500 m, with a total amplitude of 1.250 m.. it is surrounded by marine terraces and mangroves. Inner marshes near Playa Blanca are in poor conditions due to bad sewage treatment observed in the area (Alcaldia de Cartagena, 2000).

Cholon's marsh is the biggest in Baru with a total length of 3.000 m and an amplitude of 1.000 m. It is also surrounded by coral terraces and mangrove areas. The area that separates it from the sea is currently intervened by houses buildings. In the south part of the island Baru's marsh is in a northeastern direction towards Pelao's marsh, with which it has direct communication. It has a total length of 1.500 m and a mean amplitude of 1.000 m. it is surrounded by terraces and mangrove areas (Alcaldia de Cartagena, 2000).

South to Barbacoa's bay in Cobado's island are Arroyo de Plata and Arroyo Hondo marshes. Inland are several lagoons connected between them by canals, to the marshes and to el Canal del Dique. The area is surrounded by mangroves. Lequerica and Matunilla streams provide the canal del Dique with Magdalena's river waters, they were artificially created and behave as bars that in a way isolate inner lagoons (Alcaldia de Cartagena, 2000).

5.3.5 Mangroves

In all the borders towards the sea in Cartagena there are mangroves, except in the frame between Mamonal and the inner bay. Despite this it is possible to observe a small relict surrounding the islands facing Industrial zone, borders of inner streams connected to Cienaga de la Virgen and borders of Tierra Bomba and Baru Islands. In sea related areas in Canal del Dique's sector, also mangroves are the main land cover, finding the five reported species for the Caribbean (mainly *Rhizophora mangle*, *Avicennia nítida* y *Laguncularia racenosa*) surrounded by verdolaga (*Portulaca* sp) (Sánchez- Páez *et. al.* 2004). In areas with low sea influence *Avicennia nítida* prevails (CARDIQUE, 1998).

Mangrove systems have been heavily exploited in an unsustainable manner. Given the amount of services and wealth they provide, their destruction is worrisome. Among the main environmental services and wealth they serve are wood extraction, fishes, mollusks (bivalves, snails and chips- chips) and crustaceans (crabs, jibes and shrimps), wildlife fauna (birds, mammals, amphibians and reptiles) and other resources (salt, chemical inputs and commercial fibers) (CARDIQUE, 1998; Sánchez- Páez *et. al*,. 2004).

Table 3. Mangrove areas for Bolivar's Department (Source: Cardique, 1998)

Mangrove Areas	Ordered Units	Extension (Ha)	Zone Kind
Canal del Dique's Delta and Barbacoa's Bay	Delta and Canal del Dique Sectors	4547	Sustainable use
	Barbacoas Bay and Matunilla and Lequerica streams sectors		Recuperation
	Cacique Dulio (Santa Ana- Baru Island)		Preservation
Insular	Baru Island	614	Recuperation
	Rosario, San Bernardo, Punta de Baru, Palma Island and Fuerte Island		Preservation

Cartagena's Bay	Tierra Bomba Island	556	Recuperation
	Cienaga del Coquito towards la Carbonera Sectors		Recuperation
	Mamonal's and Manzanillo's Sectors		Recuperation
	Varadero Sector		Preservation
	Cartagena´s Bay Islands		Preservation
Streams and Lagoons in Cartagena	Streams and inner lagoons	94	Preservation
Cienagas de la Virgen and Juan Polo's complexes	Cienagas de la Virgen and Juan Polo	824	Recuperation
North Zone	Manzanillo del mar- Galerazamba Sectors	366	Recuperation

5.3.6 Vegetation coverage

Table 4 resumes the vegetation coverage areas for the Distrito de Cartagena. Secondary forest patches and succession strubbles are also found. North zone and Ciénaga de Tesca vegetation has been highly intervened due to extractive processes and unsustainable practices (illegal logging). Inland towards the continent a very well developed transitional dry tropical forest with an 8 m canopy can also be found.

Table 4. Type and coverage areas in square kilometers with the DTHC de Cartagena

Vegetation coverage units	North zone	Cienaga de Tesca	Bahía de Cartagena	Bahía de Barbacoas	Canal del Dique	Islas del Rosario	Total
Mangrove	78.10	667.71	458.84	475	101.2	12	1792.85
Scrub	4883.3	406.1	924.9	182.3	114.4	2600.3	9111.3
Forest	2092.9	62.5	755	509.4	509.4	1456	5385.2
Bear soil	39	56.5	170.5	533.05	98.2	114.58	1011.83
Flood plain		67.4		154			221.4
Grasslands	109.17	12.47	5.88	5.37	7.54	8.94	149.37
Crops	40.99	47.35	1.69	1.26		6.68	97.97
Sandy fields	1345.70	130	53.37	144	47.1	102.3	1822.47
Urban area	31	272	5266.1	0	0	27	5596.1

1.1. Social economic issues

1.1.1 Social aspects

Demography

According to the projections of the National Statistical Administrative Department (DANE) in 2005 Cartagena counts with 1´030.149 residents, from which 952.855 live in the urban area and 77.294 live in the rural area.

Table 5. Administrative and political division of Cartagena. Source: www.alcaldiadecartagena.gov.co

LOCALITY	*Unidades Comuneras de Gobierno* -UCG	Rural *Unidades Comuneras de Gobierno*
HISTORICA Y DEL CARIBE NORTE	1-2-3-8-9-10	Tierra bomba – Caño del oro – Bocachica – Santa Ana- Barú – Isla Fuerte – Archipiélago de San Bernardo, Islas del Rosario.
DE LA VIRGEN Y TURÍSTICA	4-5-6-7	Boquilla - Punta Canoa – Pontezuela – Bayunca – Arroyo de Piedra –Arroyo Grande.
INDUSTRIAL DE LA BAHÍA	11-12-13-14-15	Pasacaballos – sector Membrillal – Sector variante Cartagena y Cordialidad

Cartagena is politically divided into three known localities: *Virgen y Turística*, *Industrial de la Bahía* and *Histórica y del Caribe*, which are subsequently separated into *Unidades Comuneras de Gobierno* (UCG), urban (*comunas*) and rural (*corregimientos*).

According to the Cartagena Planning Secretary division the demographic structure can be divided as expressed in Table 6.

Table 6. Cartagena residents projected 2004. Source: Secretaría de Planeación Distrital

URBAN		RURAL	
Comuna 1	80.219	Arroyo de piedra	1.471
Comuna 2	52.250	Arroyo grande	1.132
Comuna 3	42.900	Barú	2.887
Comuna 4	78.848	Bayunca	12.643
Comuna 5	54.334	Bocachica	4.446
Comuna 6	85.032	Boquilla	7.792
Comuna 7	58.572	Caño del oro*	1.952
Comuna 8	54.834	Isla de San Bernardo*	563
Comuna 9	58.215	Isla fuerte*	1.577
Comuna 10	58.981	Islas del Rosario*	735
Comuna 11	29.860	Pasacaballo	12.184
Comuna 12	97.119	Pontezuela	1.581
Comuna 13	44.272	Punta canoa	875
Comuna 14	101.185	Santa Ana	3.379
Comuna 15	55.873	Tierra bomba	1.958
Total Urban	952.494	Total Rural	55.175

*Year 2000

The *corregimiento* of Bayunca and Pasacaballos concentrates most of the rural population. The *comunas* 6, 12 and 14, concentrates 30% of the urban population of the area of Cartagena. This distribution reflects that 36% of the population is congregated in the Localidad Histórica y del Caribe Norte.

The population of Cartagena, could be considered facing a transitional stage, in which the grow population rates are decreasing. A diminishing natality and fecundity rates can be considered as an influencing factor. On the other hand the rural population obeying migratory processes from the field to the city explains the decreasing rural grow, but also to the unavoidable displacements in which the inhabitants of the countryside are involved. These two factors contribute to the urbanization of the city of Cartagena (POT Cartagena, 2001)

Poverty and welfare

SISBEN (System for the Selection of Beneficiaries of Social Programs) is a proxy means test index widely used as a targeting system for social programs in Colombia. The SISBEN index is a function of a set of household variables related to the consumption of durable goods, human capital endowment and current income. SISBEN was created by the Colombian government with the purpose of simplifying, expediting and reducing the cost of targeting individual beneficiaries of social programs at the various government levels [19]. In the Cartagena case this index is applied to the people belonging to the 1 and 2 social strata and served as a source of data for the social characterization of population and identification of household welfare.

By 2003, 54% of the people of Cartagena was included under the SISBEN scheme; these levels include the population groups with greater poverty and inequity. In this same year 33% of the new beneficiaries were mothers head of house. The main population group were those people under 24 years (ADC & CCC, 2004).

Since 2001 the number of people under the SISBEN system has been growing as shown on Figure 7, this increment reflects a growth of the public investment on these strata. The districts with greater number of population “sisbenizada” in level 1 and 2 are: Olaya Herrera with 52.259 people, followed by El Pozon with 39.363, soon appears Nelson Mandela with 25.262 and finally San Francisco and La Esperanza with 16.781 and 12.555 respectively (ADC & CCC, 2004).

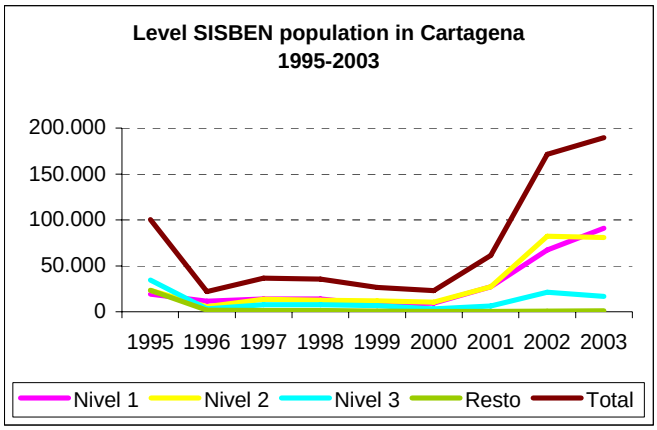

Figure 7. Different levels of SISBEN population in Cartagena 1995-2003. Lowest to highest. Source: Alcaldía Distrital de Cartagena - Secretaría de Planeación

Education

The educative organization of the District of Cartagena is divided into five zones (Historical and Tourist, North, South-Eastern, South-western and Center), and 16 nuclei or communes. With the purpose of displaying the distribution of the matriculation by degree, zone and sector, the Secretariat of Education in 2001, zoned the district in 4 *gerencias comuneras*: North, South-Eastern, South-western and rural (Viloria, 2002).

Since 2000 the gross and net educative rate coverage has been growing. In 2003 the District reached a rate of gross cover in basic education of 94%, that is equivalent to a total of 253.339 registered students and one rate of net cover of 84%. In terms of educative levels the variation in the gross cover is greater in primary than secondary education. In the case of the primary basic education, the gross cover is greater than 100%, this fact due to those students whose age are outside the established ranks, in this case 7-11 years.

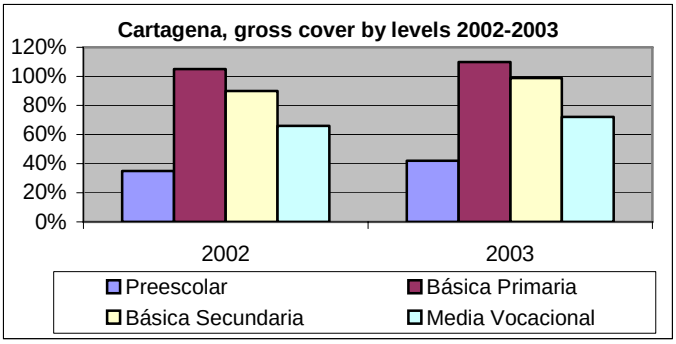

Figura 3. Cartagena education gross cover by levels 2002-2003. Source: Alcaldía Distrital de Cartagena – Secretaria de Educación

Health

The crisis of public the network of hospitals of the city, materializes through the closing of the University of Cartagena Hospital and the Clinic of the Lions Club. The crisis considerably reduced the supply of health services of second and third level hospitals; In 2003 the District counted on 1.360 beds available in all the city (public as much as private), to take care of the health necessities of a population of 978.000 inhabitants according to projections of the DANE. This throws a rate of a bed by each 720 inhabitants (ADC & CCC, 2004).

Displacement

According to the Network of Social Solidarity, Cartagena received in 2003, 7.138 displaced families equivalent to 31.136 people. This value register historically as 2% of the total displaced in Colombia.

Cartagena mainly receives people from the municipalities of Montes de Maria and the South of Bolivar (ADC & CCC, 2004). The effect of this phenomenon on the human settlements in Cartagena (to April of 1998), is characterized by a concentration in the peripheral and urban edge, against water bodies as much as protected zones, rural zones or outside the municipal limit superposed to Turbaco expansion area. The districts that receive the displaced ones are mainly the Nelson Mandela (12% of displaced), el Milagro, el Pozón and San José de los Campanos. The type of possession indicates that 60 % are located under the invasion scheme, the rest in pieces of friends or houses of relatives. Most of the displaced ones would prefer to be relocated in the place where they are at the moment (POT Cartagena, 2001).

The district that concentrates the greater numbers is Nelson Mandela which is characterized by being a vulnerable and poor territory, where the pressure on the social services, public and the labor unmannerliness is very high. This situation generates environmental problems and risks to its inhabitants. Other districts where a high number of displaced is concentrated are: Pozón (9.8%), Olaya Herrera (6.8%), San José de los Campanos (2.7%), Boston (1.5%), El Líbano (1.0%), La Boquilla (0.9%), San Francisco (0.3%) and other districts (65%) (Banco de la República et al, 2003).

1.1.2 Economic aspects

Comercio exterior y Movimiento portuario

The activity and levels of development of the Colombian Public Ports (SRPs) show a tendency towards the specialization in the load movement. In the case of Cartagena is being developed a vocation associated to the movement of containers with great expectations in the business of the transfer, with the implicit risk of the high competition with the ports of the Caribbean, Central America and the Antilles in expansion process (DNP, 2004).

From 1997 the trade balance of Sociedad Portuaria (SRP) of Cartagena although displays a deficit has an ascending tendency, thanks to the growth of the exports and the almost constant behavior of the imports. In 2003 the balance registered a surplus of 35,811 tons. In 2004 although the exports and imports increased a 36% and 31% respectively, the trade balance was positive.

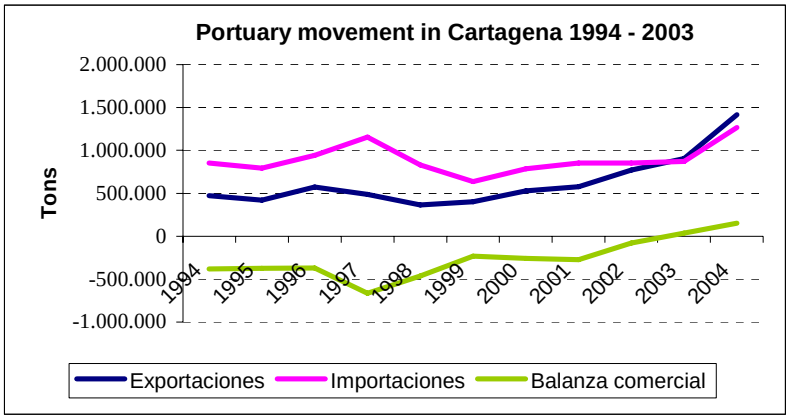

Figure 8. Portuary movement 1994-2003. Source: Superintendencia de Puertos y Transportes

In agreement with the information of the Supervision of Ports and Transports, the exports of the Port of Cartagena represented in 2003 14% of the total of tons exported by the four main ports of Colombia and 10% of the total of tons that entered the country in the same year. In spite of the recovery of the harbor movement of the city, in the last complete decade the Port lost participation at national level (the national total had a growth proportionally greater than the one of the city), since in 1994 their exports represented 15.5% and their imports 14.8%, of the total of load mobilized by the Colombian ports (ADC & CCC, 2004). [20]

Industry

The industries located in Cartagena are characterized by being intensive in capital, which makes difficult the generation of employment in the sector. Nevertheless the existence of subsectors, although represent little

value of production of the sector, as foods one (approximately 3%) are intensive generating job industries in need of manual labor. The subsector of Industrial Chemical Substances, contributes near 55% of the total production. The industrial sector is characterized by being intensive in capital (ADC & CCC, 2004). According to numbers of the Manufacturing Annual Survey of DANE in 2001 the industrial production of Cartagena represented 6,38% of the national industrial GIP and a 98% of the departmental one (2% rest take place mainly in Magangue). Additionally 11,165 people in the local industry were employed, equivalent to 2,11% of the occupied Colombian industrial use, approximately 4% of the city total.

Table 7.. Annual per month percentage industry variation in Cartagena- 2003. Source: Encuesta de Opini6n Industrial Conjunta ANDI

Month	Production		Sales		Installed capacity
	Cartagena	National	Cartagena	National	Cartagena
January	-4,80%	5%	24%	2%	70%
February	9,90%	2,50%	13%	2,50%	75%
March	10%	5,50%	12%	5,10%	60%
April	9,90%	4,00%	9,50%	5,20%	80%
May	16,00%	4,50%	11,50%	5,10%	*77%*
June	6,00%	4%	2%	2,20%	78%
July	5,00%	3,50%	5%	2,50%	77%
August	6,50%	3%	8,50%	3,10%	81%
September	6,00%	3%	8%	3,50%	85%
October	5,90%	3%	7,50%	4,20%	87%
November	5,00%	5%	5%	4,70%	90%
December	9,50%	4%	8%	5,30%	85%

Sales presented a growth tendency in Cartagena as in the country, nevertheless the variation in the case of Cartagena registry a descendent tendency, being the smaller variation in the first semester. As of July Cartagena and Colombia they presented/displayed an increase in the sales, at the end of the year the variation was of 8% and 5.3% respectively. The installed capacity stayed over 60% throughout the year.

Employment

According to DANE, since 2000 the quarterly unemployment rate in Cartagena registers a descendent tendency, much lower than the thirteen main cities and metropolitan areas of the country. The annual behavior of the rate is characterized by an increase during the first three trimesters to diminish in the last quarter. The descendent tendency is reflected on the best economic performance of the city after the period of crisis, also contributes to this behavior the increase of the "mototaxismo" (motorcycle taxi rides) as a working force generator (ADC & CCC, 2004).

In 2003 the last quarterly unemployment rate was 14.22%, which meant a reduction of 0,8 points percentage with respect to the same period in 2002 (ADC & CCC, 2004). Nevertheless during the first three trimesters the rate of unemployment was greater than the registered in October - December period by 2003. The rate of under employment diminished during the course of 2003, this ratifies the reduction of the inadequate use by competitions and the inadequate use by income.

Table 8. Employment index in Cartagena. 2003. Source: DANE - ENH y ECH

Concept	Jan - Mar	Apr - Jun	Jul - Sept	Oct - Dec
Population % working age	74,35	74,42	74,51	74,58
Participation global rate	53,50	51,64	53,97	55,60
Occupation rate	46,01	43,29	45,20	47,70
Unemployment rate	13,99	16,18	16,25	14,22
T.D. Open	13,54	15,22	15,96	13,87
T.D. Hidden	0,45	0,96	0,29	0,34
Sub-employment rate	16,97	14,97	15,27	14,41
Tour insufficiency	1,95	2,86	3,28	2,18
Inadequate employment by competences	1,68	1,54	1,34	1,49
Inadequate employment by income	16,40	14,27	14,87	13,75

In 2003, 34 % of the employed people were from the commerce sector. Nevertheless from 2001 this participation has diminished, as well as in the communal, social and personal services where the proportion of vacated people has increased.

Table 9. Activity sectors occupied and vacant people in Cartagena. 2001-2003. Source: DANE - ECH

Sector	Occupied			Vacant		
	2.001	**2.002**	**2.003**	**2.001**	**2.002**	**2.003**
Commerce	95.549	99.923	110.730	15.015	14.018	13.338
Communal, social and personal services	81.465	86.867	86.158	10.917	12.076	12.827
Industry	31.459	38.707	38.833	2.955	3.831	3.569
Transport	30.265	29.234	31.047	3.265	3.521	3.768
Construction	24.033	19.844	29.577	3.986	2.525	1.211
Real state activities	17.180	12.178	15.372	2.498	1.274	1.982
Other	10.125	9.772	7.037	627	689	509
Financial services	3.140	4.832	5.607	495	299	1.191
Total	*293.216*	*301.357*	*324.361*	*39.758*	*38.233*	*38.395*

In 2003, the people between 25 and 55 years of age constituted the main population group in being occupied (77%), followed by young people 18 and 24 years (15%); 70% of the people older than 56 are inactive. The working age population however is not looking for a job, which indicates that a great part of population over 56 years rely on a pension, with some additional income source or another means.

Table 10. Age labor indexes in Cartagena 2003. Source: DANE - ECH

Description	Age in years				Total
	12 to 17	**18 to 24**	**25 to 55**	**56 and more**	
Occupied	4.692	47.984	248.761	22.925	324.362
Sub-employed	940	11.718	39.091	2.723	54.472
Unemployed	97	11.998	25.634	664	38.393
Inactive	94.928	61.438	81.837	63.695	301.898
Total	100.657	133.138	395.323	90.007	719.125

Tourism

Since 1989 the hotel occupation rate in Cartagena is characterized by two periods, before and after 1997. Before, the rate of occupation fluctuate between 65% and 80%, and after 1997 these rates were reduced almost by half. In 2003 the occupation rate was 45%. The months of greater occupation were January, August, November and December. The number of rooms from 1989 to 2001 registered an increase of 40%, nevertheless in the last years this supply diminish to levels near those of 1989. This indicates that the smaller occupation does not obey to an increase of the tourist supply (habitacional) but to its lowers demand of the tourism services of Cartagena (ADC & CCC, 2004)

On the other hand the number of visitors of cruises and foreign tourists arriving at the city has fallen steadily in the last four years, having registered negative growth rates for both variables, located in levels near the ones close to the eighties and beginning of the nineties. As expected, a direct relation between the number of arrived visitors and the number of cruise ships exists; which is ratified by the diminution presented in the arrivals to the port of Cartagena in the same period (ADC & CCC, 2004).

Before 1990 the number of visitors of cruises, presented a decreasing rate. During the decade of the 90s the number of visitors of cruises displayed an ascending tendency, registering in 1995 the highest variation (75%). The foreign tourism also presented a similar behavior, in this case the growth continued until 1995. In both cases the situation of internal conflict of the country can be considered the determining factor of the low demand.

Table 11. Cruises visitors and foreign tourism Cartagena 1985-2003

Years	Cruises		Foreign tourism *
	Ships	People	
1985	N.A.	114.640	N.A.
1986	N.A.	106.470	N.A.
1987	N.A.	101.098	N.A.
1988	N.A.	81.008	N.A.
1989	68	49.978	32.098
1990	5	8.958	7.783
1991	28	21.100	26.146
1992	54	40.648	29.289
1993	89	72.849	40.080
1994	76	60.612	57.451
1995	124	103.346	75.151
1996	96	97.911	57.759
1997	106	136.061	58.445
1998	136	156.236	60.000
1999	154	178.586	61.758
2000	117	147.511	35.540
2001	127	170.493	29.480
2002	70	85.880	28.710
2003	32	31.065	30.443

* Number of people arriving from aboard according to DAS.
N.A. No available

Fuente: Sociedad Portuaria Regional Cartagena y D.A.S.

Public investment

The District public investment of 2003 focused on the *comunas* No. 8 (17%), No. 13 (15%) and the *corregimientos* (14%). Each of the urban and rural units received less than 10% of the total zonal investment. The most populated *comunas* received the highest investment. (ADC & CCC, 2004).

Tabla 2. Public investment by sector within comunas *2003.*

Comuna	Sectors												
	Total investment	Participation	Health	Education	Infraestruc.	Sports and recreation	Basic equipment	Social development	Housing	Security	Disaster prevention	Capacity building	Other
Comuna 1	3.726	7,70%	-	179	1.650	773	44	15	-	17	1	100	948
Comuna 2	3.708	7,60%	-	1.724	1.790	79	-	-	-	-	115	-	-
Comuna 3	2.529	5,20%	65	2.027	304	94	12	28	-	-	-	-	-
Comuna 4	1.819	3,80%	-	629	1.128	55	8	-	-	-	-	-	-
Comuna 5	1.232	2,50%	-	504	540	177	-	-	-	-	-	10	-
Comuna 6	895	1,80%	-	442	247	190	-	16	-	-	0	-	-
Comuna 7	1.523	3,10%	-	723	433	362	5	-	-	-	-	-	-
Comuna 8	7.900	16,30%	-	545	1.376	5.955	24	-	-	-	-	-	-
Comuna 9	2.046	4,20%	-	692	828	66	18	-	381	-	61	-	-
Comuna 10	1.892	3,90%	-	447	269	89	997	-	-	89	-	-	-
Comuna 11	425	0,90%	-	60	217	73	74	-	-	-	-	-	-
Comuna 12	3.785	7,80%	30	311	984	2.441	18	-	-	-	-	-	-
Comuna 13	7.269	15,00%	-	1.633	5.521	70	36	-	-	8	-	-	-
Comuna 14	1.352	2,80%	-	340	855	71	86	-	-	-	-	-	-
Comuna 15	1.733	3,60%	-	68	874	39	741	10	-	-	-	-	-
Corregimientos	6.661	13,70%	23	921	2.695	201	2.645	119	23	20	13	-	2
Total	*48.495*	*100%*	*118*	*11.246*	*19.712*	*10.735*	*4.707*	*187*	*404*	*135*	*190*	*110*	*949*
Sectored	100%		0,20%	23,20%	40,60%	22,10%	9,70%	0,40%	0,80%	0,30%	0,40%	0,20%	2,00%

The *comunas* invested mainly in education (23%), infrastructure (46%) and sports and recreation (22%). There are few communes who destine resources to the prevention of disasters; only *Comuna* 2 and 9 destine 3% of the total investment to this direction. The total investment of the S*ecretarias de Despacho* in 2003 was $231,323, reserved in education (48%), health (25%), basic cleaning (12%) and others (4%).

1.1.3 Land use and productive systems

Land use

In general terms 42% of the ground of the study area has no apparent use and is covered with open vegetation, followed by the urban zone mixed use (14,3%), agriculture (14%) and commerce (12,3%). (POT Cartagena, 2001)[15].

Table 12. Size of the land use units.

Land use	Zona Norte	Cienaga de la Virgen	Bahía de Cartagena	Canal del Dique	Islas del Rosario	Barbacoas	Total
Agriculture	4.062,23	301,08	309,30	123,00	737,60	118,80	5.652,01
Shrimp cultivation	0,00	0,00	65,47	0,00	0,00	0,00	65,47
Cattle	448,96	63,39	125,73	103,93	1.024,19	502,11	2.268,33
Shrimp industry	0,00	0,00	0,00	0,00	183,70	622,41	806,11
Artisan fisheries	0,00	0,00	8,36	0,00	88,74	0,00	97,11
No use	2.292,09	24,02	398,66	49,74	248,83	599,87	3.613,20
Tourism	0,00	4.950,88	0,00	0,00	0,00	0,00	4.950,88
Open vegetation	6.622,64	749,88	1.784,22	255,10	4.922,28	2.730,39	17.064,51
Urban, mixed use	125,00	272,00	5.266,10	50,00	18,00	27,00	5.758,10
Total	*13.550,92*	*6.361,26*	*7.957,84*	*581,77*	*7.223,34*	*4.600,58*	*40.275,71*

Fuente: Estudio Plan de Ordenamiento Territorial. Planimetría mapa de usos del suelo

Ciénaga de La Virgen

The urban area of Cartagena is enclosed in this sector. The main use is residential where different types of houses located in the low part of the Cerro de la Popa, the Boquillita sector and the Suroriental zone of the Cienaga. Medium to high residential areas strata are located at Marbella and Crespo while marginal districts locate at the sandy cord separating the Cienaga from the sea. In the base of the suroriental zone of the Cerro it has been constructed beyond of the natural and safe limits of firm land, which has implied reduction of the mangrove area and the development of houses without provision of public services.

The commercial use is developed throughout the main roads where the formal commerce is mixed as much as informal. The institutional use is represented by the organizations of educative and governmental character Some no built areas locate around the Cienaga (sector the northwest) and in limits with the rural area. The different uses (commercial, residential, tourist and others) appear simultaneously in the districts of the city as a result of spontaneous processes and without control, which has generated a great deterioration of the urban zone. The deterioration of the Cienaga has harmed all the productive activities, specially agriculture, fisheries, and aquaculture. Towards the central part of this zone is the Cerro de La Popa, which is affected by the located subnormal establishments in the low part, which have grown without planning, as result of the pressure from the population of low economic resources that looks to take advantage and benefits from this location near working possibilities.

Bahía de Cartagena

Here, 90% of the population of the District is located. The condition of natural harbor and its strategic location, define the harbor use like the most relevant. The bay surrounds are completely urbanized, excepting small areas located to the south of Pasacaballos and Membrillal populated center. The harbor and industrial activities have been located throughout the east margin of the Bay, the industrial activities are located east of the Bay. Additionally, since the 50´s the Bay has been used for the pouring of residual waters of the harbor and industrial activity; as well as 40% of served waters of the city, without any treatment. In the Bay activities

such as commercial, artisan fishing and subsistence, recreation and tourism are marked. In the nonurbanized spaces near the municipal limits, farming activities like small subsistence agriculture occur.

6 San Andres de Tumaco

Colombian Pacific basin has nearly 80000 km2 and is located in the Western region of the country, with geographic coordinates of 7°28' N- 0°14'N; 75°51'W- 79°02'W (Sánchez *et. al*, 1997).

6.1 Climate

Tumaco's climate is mainly determined by the movement of the intertropical interconvergence zone, ocean masses and El Niño events. It has a coastal humid weather, with an average temperature of 26° C, with a 33° C maximum and an 18° C minimum. Rainfall is constant throughout the year and humidity is quite high, with values that lie between 80 – 88%, reaching 100% during night (Alcaldia de Tumaco, 2000; Montagut, 2000).

The movement of the intertropical interconvergence zone between 0°-8°-10° N latitude in Colombia's pacific, generating two rainy seasons. For Tumaco, heavy rainfall is present in April, May, June and January. The lowest are usual in February, October and November. Therefore the first semester is the rainiest one (Alcaldia de Tumaco, 2000).

The rise of air masses charged with humidity from the pacific, regulates weather as they lower temperature, resulting in humidity condensation and therefore rainfall. In Tumaco there's a mean of 2500 mm of annual rainfall (Alcaldia de Tumaco, 2000).

El Niño phenomena is heavily felt in Tumaco, which influences marine conditions and appears every 2 to 7 years. Currents change, resulting in a coastal water warmth, which in turn reduces nutrients concentration and therefore fishing. This also generates sea level rise, heavy rainfall and droughts (CCCP, 1998).

6.2 Ocean Dynamics

6.2.1 Currents

Tumaco is influenced by ocean currents that come from the Southwest- West, belonging to the Northern arm of the Ecuatorial Contra current (CCE), which becomes Colombia's current and runs North superficial water masses are displaced towards NE, being later deviated towards NW as a result of tide currents (CCCP, 1998).

Wave direction may generate littoral transport of suspended solids and therefore result in erosion – accretion processes. This is common in Tumaco's coast line, but as erosion processes occur in some areas, accretion processes take place in others and this is changing constantly the way the landscape is.

6.2.2 Tides

Tide regime in Tumaco is semidiurnal with two high tides and two low tides every 24 hours. The multi annual average of high tides is of 2.807 meters and of 0.294 m for low tides. mid range is of 2.513 m and sea level average was of 1.530 meters (IDEAM, 1997 in Tejada, 2003). The highest value for a tide was of 3.68 m (Tejada, 2003).

6.2.3 Surface Water Temperature

Pacific Colombian waters are usually low tempered, rich in nutrient concentration and therefore very productive in fishing resources (CCCP, 1998). Throughout the year two maximum and minimal take place. The highest temperatures are between June and July and between December and January. Minimum values take place between February and March and between September and October (Guayana, 2001; INVEMAR, 2003).

6.2.4 Superficial Salinity

Water salinity changes are due mainly to evaporation and precipitation processes. The lowest values are related to rainiest areas and near coasts where rivers converge (Tejada, 2003).

For the entire pacific region, salinity usually rises in January, reaching values between 30 to 32. river inflow begins in May – June, reaching its highest in November, when salinity decreases up to 25 - 28 (Guayana, 2001; INVEMAR, 2003; Tejada, 2003).

6.3 Geology

Colombian south pacific is part of the Atrato - San Juan – Tumaco system as defined by Etayo *et al* (1986) (CCCP, 1998). Tumaco is on the west flank of the western cordillera which is surrounded by important faults, towards the east the rio Cauca fault is found and towards the west Choco's big crack, or rio Atrato fault system (Alcaldía de Tumaco, 2000).

Topografically, costal zone has a low belt, 3 to 5 km wide that is affected by tides. This belt is followd by a region that has a width that varies from 35 to 45 km. Finally the higher areas that rise over 500 m above sea level (CCCP, 1998).

For the present study, intertidal zone is highly important as it supports the natural systems in which emphasis was made. It is divided in different kinds:

i. Not Vegetation Covered Inter tidal Platforms: Areas where sediments are clustered, located on Tumaco's inlet, around Tumaco's island, el Morro and between Tumaco and Bocagrande. These areas are completely covered with water during high tides.

   Toward the ocean, these areas are shallow bottoms for the inlet and towards land they form beaches or suitable areas for mangrove establishment.

ii. Vegetation covered floodable platforms: Matter accumulation with high vegetative development that are periodically flooded by tidal action and water accumulation during high tides. They receive sediments from fluvial systems. On the southeast area they come from the river Mira; on the other areas they receive sediments from rivers Rosario, Mejicano, Tablones, Colorado and Patia.

   These are areas covered mainly with mangroves and ferns, and other vegetation kinds that can stand halophytic conditions.

6.4 Water Resources

This is a very rich area in water resources that come from rain, rivers and marine waters (INVEMAR, 2003). There are 5 important basins in Tumaco's inlet (Tomado de Tejada, 2003):

- Rio Mira
- Esteros Natal, Aguaclara, Resurrección and Trapiche.
- Basin formed by rivers Rosario, Mejicano, Caunapi, Gualajo and Imbilpi.
- Basin formed by rivers Changui, Tablones, Colorado and Curay.
- Rio Patía.

Patia and Mira rivers ae the most important deltas for Tumaco. They carry high matter concenbtration that results from erosive proceses throughout their margins (CCCP, 1998). Rio Rosario has an influence of over 60% of Tumaco's inlet and is formed of four sub basins: Caunapi, Alto Rosario, Bajo Rosario and Mejicano. Rio Rosario and Mejicano drain directly to the sea and run through 25.2% of total Tumaco's territory (Alcaldia de Tumaco, 2000).

Given the highly richness in water resources, it is usual that local populations use related resources constantly. In Tumaco's POT a list of species present in the area is available (Table). Some of this species are recognized as highly threatened as a result of over exploitation, habitat destruction and contamination amongst other reasons.

Table. Some species related to hydric systems in Tumaco (Source: Alcaldía de Tumaco, 2000)

Species	Habitat	Species	Habitat
Xphopenaus rineti	Marine	*Cynoponeticus conicep*	Marine
Trachipenocus byerdi	Marine	*Arius, Galeichtis*	Marine
Penacaus occidentals	Marine	*Anisotremus*	Marine
Callirectes toxotes	Marine	*Haemulon sp*	Marine
Uca sp	Marine	*Larimus sp*	Marine
Anadora tuberculosa; A. similis	Marine	*Mentielrrus sp*	Marine
Dono panamentis	Marine	*Centropomus sp*	Marine
Surrogota sp	Marine	*Cintropomus pectinotus*	Marine
Litorino cebra	Marine	*Bothides*	Marine
Ostrea columbiasis	Marine	*Caranx sp*	Marine
Lepidochelys olivacea	Marine	*Coryphaena hippurus*	Marine
Eretmochely imbricato	Marine*	*Scamberomuros sierra*	Marine
Lutra longicaudis	Marine*	*Hemibrycom tolimae*	Fluvial
Caiman cocodrilus chiapasius	Marine*	*Hemiolotropis lotifasciotus*	Fluvial
Centengraulis mystiecfus	Marine	*Pimelodella sp*	Fluvial
Opisthonema sp	Marine	*Trychomycterus sp*	Fluvial
Caranx caballus	Marine	*Symbronchidel*	Fluvial
Sphyraena ensis	Marine	*Macrobaquium sp*	Fluvial
Lutjanus, Hoplopargus	Marine	*Macrobaquium tonelum*	Fluvial
Cynoscion sp	Marine	*Brycon sp*	Fluvial

**Highly threatened*

6.5 Ecosystems

Tumaco has an overall forest cover of 201340 ha, that represent 60% of its total territory. In every area forestall exploitation for commercialization, use and recollection of other associated products, take place (Table 8) (Alcaldia de Tumaco, 2000).

Wildlife has certain threatened groups in this area, which include: *Agolti paca, Mazama americana, Tajassu sp., Tajassu tojaci, Dasyproctotus prectata, Felis concolor, Bradypus variegattus, Dosypus sp, Nasua nasua, Cíclopes didactitus, Felis tigrina and Potos flovus* (Alcaldía de Tumaco, 2000).

Tumaco makes part of bio geographyc Choco and has strong rainfall throughout the year. According to Holdridge clasification it has 3 main life zones, two of which are reelevan for the preent study:

6.5.1 Tropical rainforest

UIT low temperature variations, and high precipitation and humidity, these are the most complex ecosystems given their estructural, stratification and species diversity (IAvH, 1997 en INVEMAR, 2003) (Alcaldía de Tumaco, 2000).

This has climatic limits close to 26° C and rainfall that varies from 2500 to 3500 mm yearly. They cover a total area of 140900 ha, representing 42% of Tumaco's territory (Alcaldía de Tumaco, 2000).

In Tumaco, this life zone is found close to the coast line, being wider in the south than in the north. In littoral areas predominant vegetation are mangroves. Towards continent guandalls, agricultural systems and cattle can be found (Alcaldía de Tumaco, 2000).

6.5.2 Very Humid Tropical Rainforest

Mangroves can be found in these areas as well, where temperature is over 24° C, and rainfall that varies form 3500 and 4500 mm/year. Located below 200 m. over sea level, in these areas forests can be found, along with agriculture and cattle. It covers a total area of 168000 ha (50.1% of the total area) (Alcaldia de Tumaco, 2000).

Table 8. Forestal species available in Tumaco and current state (Source: Alcaldía de Tumaco, 2000)

Species	Conservation Situation	Species	Conservation Situation
Rhizophora brevistyla	Abundant	*Psychotria santaritensis*	Scarce
R. mangle	Abundant	*Cespedesia macrophyla*	
Laguncularia rocemota	Abundant	*Colophyllum longifolium*	Highly threatened
Conocarpus erecta	Abundant	*Symphonia globulifero*	Scarce
Avicenio sp.	Abundant	*Virola reidii*	Scarce
Pellieiera rhizophorae	Abundant	*Virola dixoni*	Scarce
Mora megiosperma	Scarce	*Euterpe precatoria*	Scarce
Pachira aquatico	Scarce	*Terminalia amazonica*	Abundant
Eutorpe sp	Scarce	*Coropa guianensis*	Scarce
Camnosperma panamensis	Scarce	*Cederla odorata*	Scarce
Alchaoncopsis floribunda	Scarce	*Cordia olliodora*	Scarce
Maurifiella pacifica	Scarce	*Apeiba aspera*	Scarce
Otoba gracilipe	Scarce	*Sacoglotis sp*	Abundant
Socretea exorrihiza	Scarce	*Genipa americana*	Scarce
Ocotea oblongifolia	Highly threatened	*Achroma sp*	Scarce
Aniba puchury	Scarce	*Jessenia policarpa*	Abundant
Guadua angustifolia	Abundant	*Paraschcelea anchistropetole*	Scarce
Crecentia cujeta	Scarce		

Tumaco's coast line has important ocean – continent interactions. It has strong natural processes dynamics and it's littoral width varies depending on mangrove coverage and marine influence (Montagut, 2000).In this area the main marine ecosystems found are mangroves, beaches, estuaries, deltas and coastal lagoons.

6.5.3 Beaches

Found in areas that have no vegetation coverage and can be seen in the islands of El Morro, Tumaco, Vaqueria and Bocagrande. They have semi permeable substrate with very low inclinations (below 5°) (Tejada, 2003).

Beaches in these areas haven't faced major human intervention proceses, being moderatelly web preserved. They can be divided as follows (source Tejada, 2003):

- Ample Beaches: they are over 20 m wide and can have some vegetation. They may exhibit dunes and littoral cords, less than 70 cm height. They are seen in El Morro island.
- Moderate Beaches: Amplitude that fluctuates between 5 and 20 meters. Found in Bocagrande, La Viciosa and Vaqueria islands.
- Narrow beaches: with an amplitude below 5 meters, they can be seen in Bocagrande, Trujillo and el Morro (north).

6.5.4 Cliffs

Continuous cliffs can be found in Tumaco's North east, east from the inlet from rio Cura's estuary up to Cascajal point. Island cliffs can be seen in el Morro and el Gallo islands (Tejada, 2003).

6.5.5 Estuaries, Deltas and Coastal Lagoons

Mainly found in areas where the rivers meet the sea, being the ones of Patia river and Tumaco's inlet the main ones (Vides and Sierra 2003).

6.5.6 Mangroves

Nariño's mangroves occupy a continuous range, only interrupted in some areas of Tumaco's northern area (Sánchez *et. al*, 1997). Six main associations can be seen (Hoyos & Rozo, 1973 in Sánchez *et. al*, 1997):

Nariño has 149735 ha of mangroves, being the area that has the biggest coverage in Colombia. Most of the species can be found in this area (*Rhizophora mangle, Rhizophora harrisonii, Laguncularia racemosa, Conocarpus erecta, Avicennia germinans, Pelliciera rhizophorae, Mora oleifera*) (Ulloa- Delgado & Gil Torres, 2002 in Sánchez- Páez et. al. 2004).

For Tumaco, this systems governs from estero Guandarajo up to Colorado river and in some areas between cliffs and recent littoral cords on the southern part of Tumaco island. (Tejada, 2003).

For Tumaco, mangroves occupy a total of 97400 ha (29% of its total area). They include the beaches: Bocagrande, Cabo Manglares, Mira river estuary and Ancon's bay amongst others (Alcaldia de Tumaco, 2000).

Salty marshals are the most extensive border of this unit and can be found along the coast line in the inlet or behind beaches. In the southern and SE sectors of the inlet they are in the shore directly (CCCP, 1998)..

Rhizophora Association: Distinguished by red mangrove (*Rhizophora spp*.) dominance associated with other species.

Natal Association; Pure natal rodals (*Mora oleifera*) with short extensions.

Avicennia association: Small sector colonized by *Avicennia germinans*

Pellicera association: Transition areas with *Pelliciera rhizophorae*.

Laguncularia association: White mangroves are the main species found in these areas *Laguncularia racemosa*.

Beach vegetation: formed by grasses and bushes in areas close to the sea.

These systems have been used by productive businesses of tannins, for extraction, aquaculture (mainly shrimp pools) and have been highly modified and affected by population growth (Sánchez *et. al*, 1997). Sediment accumulation is usual with high organic matter concentrations (Vides & Sierra, 2003).

Caracterización socioeconómica

Aspectos Sociales

Demografía

Según el Censo de 1993, el municipio de Tumaco contaba con 62.606 habitantes en la zona urbana, que representan el 48% de la población total y 68.130 en la rural. A continuación se presentan las proyecciones realizadas por el equipo técnico de ajuste del POT de Tumaco.

Tabla . Tumaco, población según área y sexo 2000-2005

AÑO	TOTAL	TOTAL		ZONA URBANA		ZONA RURAL	
		HOMBRES	MUJERES	HOMBRES	MUJERES	HOMBRES	MUJERES
2000	152.354	77.701	74.653	37.509	36.038	40.192	38.615
2001	155.764	79.440	76.324	38.392	36.887	41.047	39.438
2002	159.182	81.183	77.999	39.130	35.596	42.051	40.401
2003	162.604	82.928	79.676	39.971	38.404	42.957	41.272
2004	166.030	84.675	81.355	40.813	39.213	43.862	42.142
2005	168.454	85.912	82.542	41.410	39.786	44.502	42.757

Fuente: Plan de Desarrollo Municipal 2.002 – 2.004. Municipio de Tumaco – Nariño

En el área rural se diferencias cuatro zonas (POT de Tumaco, 2000):

Zona de Carretera: Conformada por los asentamientos poblacionales localizados sobre el eje de la carretera Tumaco – Pasto o dentro del área de influencia

Zona de los Ríos: Área comprendida dentro de la Ensenada de Tumaco y las veredas en la ribera de los ríos que desembocan en esta Ensenada.

Zona de la Costa: Localizada al norte del municipio de Francisco Pizarro, pero administrativamente pertenece al municipio de Tumaco.

Zona de Frontera: Corresponde a la Costa y Ríos del Pie de Monte fronterizo con Ecuador.

Aunque la distribución de la población por zona es casi equitativa, se observa una urbanización del municipio, en 2005 el 51% de los habitantes se encuentran en la zona urbana, lo que significa una variación del 6% respecto a 1993.

Las proyecciones de la población total y de su localización en el área urbana o rural, tienen un alto grado de incertidumbre debido a que las tasas de migración, obedecen a factores de índole económicos o sociales como lo son el narcotráfico, grupos alzados en armas, oferta de servicios públicos y otros factores (Plan de Desarrollo Municipal 2.002 – 2.004 de Tumaco).

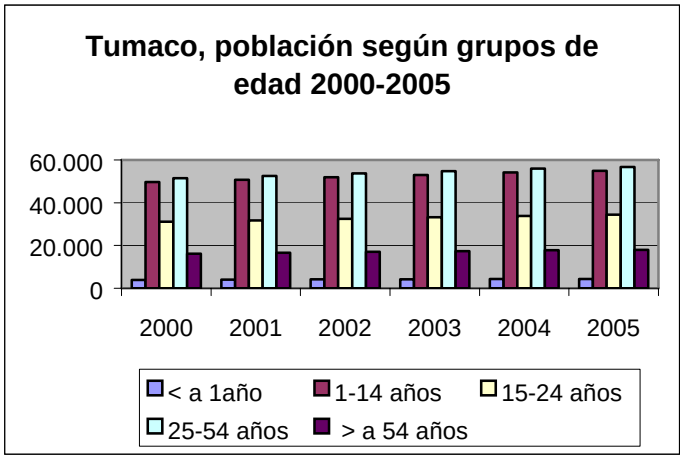

figura . Tumaco, población según grupos de edad 2000-2005

Fuente: Plan de Desarrollo Municipal 2.002 – 2.004. Municipio de Tumaco – Nariño

De acuerdo con las proyecciones por grupos etareos, los grupos mas representativos son los de 1 a 14 años que incluye los niños y jóvenes en edad escolar básica y los de 25-54 años que incluye la población económicamente activa. Las proyecciones mantiene una participación constante de los grupos de edad.

La población está compuesta por distintos grupos étnicos de la siguiente forma: 92% es de etnia negra, mestiza 6%, e indígena 2%. Presentando una densidad poblacional de 38.3 hab/km2 (Muñoz, 2002)La mayor parte de la población de la zona rural es negra la cual a solicitado la titulación colectiva de us terrirorio con base en la divsión de cuencas y microcuencas, a través de los consejos comunitarios (Tejada, 2003).

Pobreza y Calidad de vida

Según el Censo DANE/93, en Tumaco el 57.5% de las personas y el 50.3% de los hogares presentan necesidades básicas insatisfechas. El 24.1% de las personas y 17.6% de los hogares se encuentran en condiciones de miseria (Muñoz, 2002). Según las proyecciones, la población con NBI esta en continuo ascenso, en el periodo 2000-2004 presentó un incremento del 8 %.

Tabla : Tumaco, Personas con NBI, proyección 2004

AÑO	2000	2001	2002	2003	2004
Población con NBI	87.604	89.564	91.530	93.497	95.467

Fuente: Plan de Desarrollo Municipal 2.002 – 2.004. Municipio de Tumaco – Nariño

De acuerdo con el índice Sisben, el 47% de la población sisbenizada del municipio de Tumaco perteneces al nivel I y el 26% de esta población al nivel II. Esto indica que en 2002 el 33% de la población de Tumaco se encuentra en condiciones de extrema pobreza.

Tabla . Tumaco, Distribución de la población sisbenizada

NIVEL SISBEN	I	II	III	INDÍGENAS Y OTROS
No. DE HABITANTES	33.348	18.124	10.362	8.321

Fuente: Plan de Desarrollo Municipal 2.002 – 2.004. Municipio de Tumaco – Nariño

Educación

La educación en el municipio de Tumaco se cataloga como mala. La baja calidad educativa se refleja en las pruebas del ICFES, con resultados muy por debajo de los promedios nacionales (Muñoz, 2002).

Tabla : Tumaco, Población en edad escolar matriculada según sector 2000-2001

CONCEPTO	AÑO 2000 - 2001
MATRICULADOS SECTOR OFICIAL	40.388
MATRICULADOS SECTOR PRIVADO	2.612
FUERA DEL SISTEMA	14.512
POBLACIÓN 3-15 AÑOS	57.512

Fuente: Plan de Desarrollo Municipal 2.002 – 2.004. Municipio de Tumaco – Nariño

Del Total de la población en edad escolar el 70% se encuentra matriculada en el sector oficial, indicando que este sector es el principal oferente, mientras que solo el 4% lo está en el privado. Es preocupante que un 25% de la población en edad escolar no esta matriculado en ninguna institución, esto puede obedecer a problemas de oferta educativa o indica una alta deserción escolar.

Los principales problemas del sector educativo son su baja planificación y la deficiente calidad y cobertura , que se deben principalmente a deficiencias administrativas (POT de Tumaco, 2000).

Salud

Las primeras causas de mortalidad entre las que se encuentran: insuficiencia respiratoria, bajo peso al nacer, septicemia, bronconeumonía, paludismo, sepsis neonatal, infección perinatal, desnutrición, meningitis prematuras, diarrea aguda, neumonía, tétanos, anoxia perinatal, entre otras, están relacionadas principalmente con un inadecuado manejo del programa de control prenatal, así como de otros programas de promoción y prevención (Muñoz, 2002).

En el sector rural existen 17 puestos de salud, que trabajan con limitaciones de diverso tipo (POT de Tumaco, 200).

Los principales problemas que afronta el sistema de salud del municipio son las debilidades administrativas, la baja cobertura del servicio, los deficientes niveles de atención, calidad y oportunidad en el acceso al servicio. Lo anterior trae como consecuencia un bajo nivel de respuesta frente a situaciones de emergencia, disminución en los niveles de productividad laboral, altos costos en la prestación de los servicios y baja esperanza de vida de la población (POT de Tumaco, 2000)

De conformidad con lo establecido por la Ley 100, las personas clasificadas en los niveles I y II del Sisben, son beneficiaros del Régimen Subsidiado en Salud. El municipio de Tumaco en 2001 contaba con 51.472 personas clasificadas en estos niveles y 37.395 personas afiliadas al régimen subsidiado, lo que indica una cobertura del 73% en salud de las personas sisbenizadas. Sin embargo el 54% del total de la población no se encuentra cubierta por ningún régimen.

Tabla . Tumaco, Afiliados a la Seguridad Social en Salud por tipo de régimen 1998 y 2001

Tipo de Régimen	1998	2001
REGIMEN SUBSIDIADO	33.076	37.395
REGIMEN CONTRIBUTIVO	34.748	34.748
NO AFILIADOS	80.040	83.621
POBLACIÓN TOTAL	**145.556**	**155.764**

Fuente: Secretaría de Salud Municipal

Servicios Públicos Domiciliarios

Acueducto

La red de distribución es obsoleta, cumplió treinta años, el servicio que se presta es deficiente y de mala calidad. Se estima que más del 35% de la población urbana y más del 90% de la zona rural carecen del servicio. En algunos centros estratégicos importantes existen acueductos pero debido a sus condiciones se hace necesario rehabilitar , mejorar y/o ampliar como es el caso de Llorente, Guayacana, Cajapí, Palambí, El Carmen K 63, Espriella, Santa Rosa, Candelillas y Tangareal. Para la ciudad de Tumaco el servicio es prestado por Acuamira EICE – ESP, la cual es una dependencia municipal que administra el servicio de agua potable y adicionalmente recauda el servicio de aseo. También existen acometidas domiciliarias piratas o ilegales tomadas de la tubería principal que reducen la presión y el caudal por el desperdicio que ocasionan (Muñoz, 2002).

En la zona rural algunas veredas cuentan con infraestructura para el abastecimiento de agua: El acueducto de la cabecera municipal abastece 6 veredas de la zona de Carretera y el Acueducto de Palambi. Las poblaciones de frontera toman el agua principalmente de los ríos de su entorno en forma directa sin tratamiento (POT de Tumaco, 2000)

Alcantarillado

La cobertura en la ciudad solamente alcanza el 5% de las viviendas, que corresponde a los barrios Pradomar, La Florida y El Morro. Se caracteriza por no tener tratamiento alguno y tener bombeo hacia el Mar. Otro grupo poblacional vierte sus aguas residuales a los Pozos Sépticos y más del 90% las vierte directamente al mar sin ningún tipo de tratamiento, ocasionando problemas de contaminación al cuerpo de agua (Muñoz, 2002).

De los 570 predios del sector comercial e industrial, solo el 5% tienen tratamiento integral de aguas residuales, el resto carece de tratamiento alguno. La zona rural carece totalmente de cualquier tipo de alcantarillado sanitario, en algunos casos se tienen letrinas, generalmente las poblaciones disponen de inodoros públicos o colectivos para depositar las excretas en forma directa al medio ambiente (POT de Tumaco, 2001)

Energía eléctrica

El municipio dispone desde hace siete años, de energía eléctrica del sistema de interconexión nacional a cargo de ISA. La zona rural del municipio, para el área de carretera, dispone de dos subestaciones que pertenecen al municipio. La zona rural que cuenta con alrededor de 400 veredas, solamente están energizadas 60 (Muñoz, 2004).

En la zona de los Ríos en el área rural el 30% de las poblaciones no existe ningún tipo de equipamiento eléctrico. En la zona de Frontera el 60% de las poblaciones disponen de plantas eléctricas en funcionamiento (POT de Tumaco, 2000).

Aspectos Económicos

Comercio exterior y Movimiento portuario

El SRP de Tumaco, es un puerto de cabotaje petrolero con crecientes exportaciones de granel líquido principalmente de aceite de palma, de acuerdo con sus características físicas y localización geográfica (DNP, 2005).

Tabla. Evolución del trafico portuario de la SRP Tumaco 2002-2004

	2002	2003	2004
Exportaciones	44.315	45.967	62.134
Importaciones	3.367	7.457	

De acuerdo con la información de las sociedades portuarias, en 2004 por el puerto Tumaco el comercio exterior solo consistió en la exportación de 393.368,40 toneladas, de estas 62.134 corresponden a la SRP Tumaco a pesar de no registrarse importaciones, el comercio es esta SRP presento un crecimiento del 14 % con respecto al 2003.

Turismo

Si bien el turismo no es una de sus principales actividades económicas, el puerto y la ciudad de Tumaco, tienen gran potencial frente al turismo cultural y científico de origen nacional y/o internacional, gracias a su vecindad al archipiélago de los Galápagos. Por otra parte Tumaco podría explorar sus posibilidades frente a su vecindad con la isla Gorgona, los parques nacionales de la Planada y de Sanquianga, al igual que el sendero peatonal sobre el acantilado existente en la Ensenada entre Bocas de Curay, Soledad, Olivo y Llanaje (POT de Tumaco, 2000).

Finanzas Municipales

Durante el periodo 1996-200º los ingresos totales en precios constantes de 1996 presentaron un crecimiento del 29%. Los ingreso tributarios aunque presentan una tendencia descendente, durante el periodo registran un incremento de 215 debido al repunte en este rubro en el 2000.

Los ingresos no tributarios provienen principalmente de las tasa por la venta de servicios y la venta de bienes y servicios, que tienen su origen en los servicios que prestan las Secretarios de Planeación y salud Municipal (POT de Tumaco, 2000).

Las transferencias constituyen la principal fuente de los ingreso corrientes del Municipio, lo que lo hace altamente dependiente del Estado. Aunque crecen constantemente, gobierno central no los envía de manera continua lo que hace que no todas la obras se puedan ejecutar, dada la dependencia que se tiene de estos recursos.

Tabla . Tumaco, Composición de los Ingresos 1996-2000 pesos constantes de 1996

CONCEPTOS	1996	1997	1998	1999	2000
INGRESOS CORRIENTES	9.463.572	8.807.317	7.497.879	11.200.539	13.918.682
Tributarios	3.404.838	2.307.730	1.689.968	1.448.790	4.105.724
No tributarios	466.454	451.463	170.856	1.157.708	984.702
Transferencias	5.592.280	6.048.124	5.637.055	8.594.041	8.828.256

miles de pesos

Fuente: Secretaria de Hacienda Municipal. Contraloría Municipal

La generación de fuentes de recursos propios es baja e insuficiente para proveer los bienes y servicios de forma eficiente, y es necesario por tanto recurrir a los ingresos transferidos del nivel central y regalías (POT de Tumaco, 2000).

Los ingresos de capital los conforman los recursos de cofinanciación, las regalías petroleras y los créditos. Los recursos de cofinanciación son pocos, lo que indica una baja capacidad de gestión y dependencia de los recursos del Estado.

La regalías petroleras, constituyen la principal fuente de ingresos de capital, lo que las han convertido en fuente para financiar gastos de funcionamiento e inversión social (POT de Tumaco,2000).

Los egresos del Municipio los constituyen gastos de funcionamiento, servicio de la deuda, inversión social y el pago de déficit de vigencias anteriores.

En términos de precios constantes de 1996, los gastos de financiamiento están en descenso, sin embargo se presenta un continuo déficit en este rubro, lo que obliga a las administraciones futuras disminuir estos gastos de funcionamiento y/o generar incrementos es los ingresos públicos (POT de Tumaco, 2000).

La inversión social corresponde a lo estipulado en la Ley 60 de 1993, aunque representa el 75% de los gastos del municipio, no se ha ejecutado de la forma mas apropiada, lo que ha impedido que se erradiquen las verdaderas causas de los problemas sectoriales, principalmente en lo que se refiere a educación, agua potable y saneamiento básico (POT de Tumaco, 2000).

Empleo

El mayor porcentaje de la población en edad de trabajar está entre los 10 y los 24 años[4], indicando que corresponde a una población joven, que muy seguramente no ha terminado su formación escolar.

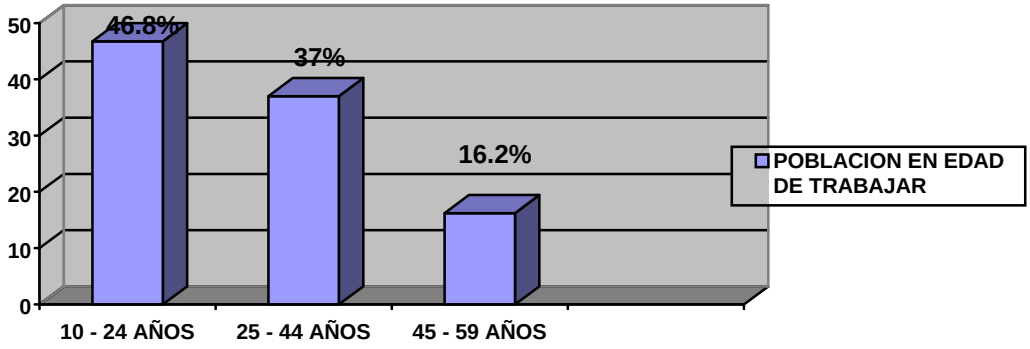

Figura Tumaco. Distribución Porcentual Población En Edad De Trabajar

Fuente: Plan de Desarrollo Municipal 2.002 – 2.004. Municipio de Tumaco - Nariño

Uso del suelo y Sistemas Productivos

Uso del suelo

El casco urbano esta divido en sectores cada uno de los cuales presenta diverso usos del suelo (POT de Tumaco, 2000)

Sector Isla del Moro: El uso del suelo es playa pública, uso institucional, mixto (residencial, comercia e industrial), residencial, industrial, zonas de uso recreativo, zonas verdes y ecológicas (zonas mangláricas) y zonas de invasión.

Sector Isla de Tumaco: Se diferencias zonas de uso mixto, institucional, recreativo, residencial, industrial y playas públicas.

Sector Continental: Se diferencian zonas de uso residencial, uso mixto, institucional, recreativo e industrial.

El territorio municipal presenta las siguientes características en uso y cobertura del suelo:

Unidad	Clase	Uso
Vegetación	Bosques	Extracción, recolección y caza en zonas de bosques de colinas y guadales. Extracción y recolección en zonas de bosques de manglar
	Rastrojos	Rastrojos parte baja
	Agricultura	Tecnificación de cultivos industriales de palma africana. Cultivo de cocoteros Sistemas tradicionales de producción. Cacao mezclado con especies forestales y plátano. Plátano solo o asociado, huertos mixtos, reductos de bosques y rastrojos acto, potreros en medio de cacao, área en cobertura de guadua.

[4] La Población en Edad de Trabajar (PET) son los mayores de 12 años en las zonas urbanas y mayores de 10 años en las zonas rurales. Tumaco por ser un municipio que cuenta con cerca de la mitad de su población en áreas rurales se tomo los 10 años como inicio de la PET.

	Pecuaria	Pasto y arbusto de parte baja dedicados al uso pecuario
Industrial	Agroindustrial	Área en uso agroindustrial procesamientos primario de palma aceitera
Cuerpo de agua	Acuícola	Área en uso para la producción acuícola principalmente camarón
	Esteros y ríos	Cuerpos de agua en esteros y ríos en uso medios de comunicación entre los pueblos y el centro urbano, actividades de pesca
Vías	Principal	Arterial principal que comunica a Tumaco con Pasto
	Secundarias	Arterias secundarias, comunica a los centros poblados rurales ocn la vía principal y con el centro urbano
Asentamientos humanos	Urbano	Suelo de uso urbano: isla del Morro – Tumaco y los sectores comprendidos entre el Porvenir y el puente del Pindo
	Rurales	Son las áreas en donde están ubicados los poblados nucleados y subpoblados, en los ríos

Tomado de POT de Tumaco, 2000

Sistemas productivos

La actividades económicas básicas están relacionadas directamente con la agroindustria, la pesca y la camaricultura, cuya producción esta orientada a abastecer la demanda interna y externa del municipio, y por lo tanto constituye la principal fuente de ingresos y acumulación de capital (POT de Tumaco, 2000).

Agricultura

Principal generador de empleo, el cultivo de palma africana genera 4000 empleos, constituyéndose en el principal producto, adicionalmente cuenta con industria propia en la extracción de aceite crudo, cuya producción abastece mercado nacional e internacional. Los cultivos de palma se encuentran ubicados en la zona de Espriella – Candelillas, Tangareal – Imbilí.

La producción de cacao viene en descenso, sin embargo su cultivo constituye una actividad que presenta buenas posibilidades dadas las condiciones de su producción y los precios internacionales.

El cultivo de coco constituye una oportunidad para el pequeño productor y presenta la posibilidad de desarrollar agroindustria en la producción de coco industrial.

Existen cultivos alternativos con potencialidades en la industria tales son: caucho, palma de chontaduro, especies frutales. Otra opción de explotación son las especies nativas, dadas las posibilidades de exportación y las condiciones climáticas del municipio.

Pesca

Actividad tradicional de la región, cuya generación de empleo es significativa. Se clasifica de acuerdo con las técnicas utilizadas en artesanal e industrial.

La pesca artesanal no cuenta con un desarrollo debido a la falta de recursos (no existe una línea de crédito específico), la producción depende en gran medida de la época y el clima, lo que ocasiona una gran variabilidad de los ingresos. Adicionalmente los productores no cuentan con un centro de acopio que les permita ofrecer sus productos a un mejor precio.

La pesca industrial se caracteriza por que el destino de la producción es el mercado externo, para el consumo nacional se destinan los productos de pesca blanca (pescado). Las principales falencias que presenta son las

artes de pesca inadecuadas, la carencia de políticas y planificación, carencia de tecnologías apropiadas, poco apoyo institucional, deficientes sistemas de comercialización.

Acuicultura

El principal cultivo es el de camarones, su producción se destina principalmente al mercado externo, haciendo de esta actividad un componente esencial dentro de la actividad industrial y de exportación del Municipio.

De igual forma, esta actividad ha causado deterioro ambiental y desplazamiento de población.

VA- Vulnerability assessment

Includes the identification of the biophysical systems susceptibility and the quantification of impacts over the socioeconomic system.

The possibility to determine and reduce vulnerability is emerging as a critical part of any sustainable development strategy, as it considers present situations and possible future conditions. If taken into account for local planning strategies (towards reducing ASRL rise as an example), it becomes an important tool to reduce the associated risks for a given area (Pratt et. al. 2004).

In order to reduce the vulnerability of a region to ASLR, one must first try to identify priority sectors to focus on; because it is currently not possible to accurately predict the adverse effects of ASLR, particularly at the local and regional levels, the IPCC maintains very strongly that learning to deal with climate variability and extremes is an excellent way of building adaptive capacity in the long run [7].

There are many different definitions of vulnerability nonetheless, in this study we use the term applied to the vulnerability of a specified system to a specified hazard or range of hazards. The term hazard is used to refer to physical manifestations of climatic variability or change, such as droughts, floods, storms, heavy rainfall or potential future shifts in climatic regimes. Climate hazards are referred to as climate events.

A disaster as measured in human terms (lives lost, people affected, economic losses) is therefore the outcome of a hazard, mediated by the properties of the human system that is exposed to and affected by the hazard. A flood associated with a heavy rainfall is viewed as a primary impact or outcome of the rainfall event; coastal floods are often the outcome of storm surges. In these cases it is the rainfall event or storm surge that constitute the principal hazard [22].

Strategies to cope with current climate variability and extremes exist at the community level. Hence the starting point could be to identify urgent action needed to expand the current coping range and enhance resilience in a way that would promote the capacity to adapt to current climate variability and extremes, and consequently to future climate change [21]. Prioritizing targets toward reducing the vulnerability of the system (bio-geophysical, economic, institutional and socio-cultural factors) can be analyzed under three situations: those that occur independently of any external climatic situation; those that are triggered when extreme climatic events occur (hurricanes, strong storms, surges or flooding) and those conditions that could be worsen under ASLR effects.

A preliminary evaluation on these three situations served as a discussion focus for the First Regional Workshop "*Como nos afecta el acelerado ascenso del nivel del mar*" carried out in Cartagena with key stakeholders on July 1st, 2005. The Driving Force, Pressure, State and Impact - DPSIR methodology was applied for two purposes: first, to prioritize based on the stakeholders perception, those social, economic and ecological sectors that are currently under risk of extreme climatic events that could worsen in a "business as usual" scenario; and second, to establish a set priority impacts that could be handled by the project and thus guide the selection of indicators on which the capacity building facility can be established. These results are resumed in the matrix shown in Table 13.

Furthermore as an outcome of the Workshop, we could identify under the stakeholders perspective those sites and effects along the District that could be prioritized in the study. As a general recommendation, the study area needed to be reduced; the entire administrative limits were considered to be too complex to be managed because of the strong differences and variety of issues to be encountered. The study area was therefore limited to the portion of territory between La Boquilla (the northern limit of Cienaga de la Virgen), all the urban area of Cartagena and the Cartagena Bay system as shown in **¡Error! No se encuentra el origen de la referencia.**.

Table 13. DPSIR associated impacts matrix to non external climatic situations.

Driving Force	Pressure	State	Impact	Indicators
Illegal settlements Cienaga de la Virgen – CDV -	Mangrove lodging – coal and handcraft (for housing and as an alternative sources of energy)	Degraded mangrove areas	Mangrove coverage reduction	Mangrove hectares
	Inadequate public service coverage and solid sewage disposal..	High organic matter and heavy metal water contents	Pollution	Physical and chemical water properties
			Low oxygen levels and pollution causing diminish artisan fisheries	Fish capture rate
Loss of vegetal cover in rivers and bogs	Erosion processes –> Soil instability	High turbidity levels in water	Loss of depth (colmatación) of estuaries	CDV depth
		Blocked canals entering the CDV	Bogs salinization	Water and soil salinity
		Higher water polluted discharges into the Bay	Sea grasses coverage reduction (light penetration reduction)	Sea grass hectares
			Coral reefs coverage reduction (bleaching)	Coral reef coverage
Land use changes in CDV and other estuaries	Artisan lodging for lumber and energy production	Mangrove degraded zones and diminished resilience	Mangrove coverage reduction	Mangrove hectares
	Habitat destruction by opening of artificial channels			
	Served water poured directly to estuaries			
Dependence of communities on unsustainable related forest resources	illegal lodging and burning to create spaces for agriculture and transitional crops	Tropical dry forest highly intervened	Tropical dry forest coverage reduction	TDF hectares
Unsustainable exploitation and extraction of natural resources	Natural habitat fragmentation	Local biodiversity reduction	Disappearance of important faunistic species by its commercial and ecological value	Number of species reported in the Colombian red books
	National and international demand of wild fauna commerce			
Marine contamination in coastal water bodies and Cartagena Bay	Heavy metals and industrial discharges from Mamonal Industrial sector and El Bosque Commercial Zone	High levels of anoxia in superficial water due to waist water contamination	Species impoverishment below the 10 m depth. Morbidity increase	Mobility index
		High levels of soil contamination by hydrocarbons; mercury accumulations in sediment		Species density
	Lixiviation material from waist accumulation	Contamination values causing detrimental human health		Water quality parameters
Marine contamination in coastal water bodies: Castillo Grande, Laguito and Isla de Manzanillo	Untreated water sewage discharge system. Water bodies used as emergency sanitary emissaries.; direct unloading without any treatment.	Marine and coastal water bodies with microbiological contamination	Non-permissible coliform values in water	Coliform levels
	Degraded natural barriers against marine water efects: coastal erosion	Coastal erosion	Beach extension lost	Beach area
Forced displacement	Ilegal settlement on Islas del Rosario-San Bernardo. Illegal settlements	Inadequate life conditions	Greater number of settlers at risk	Number of illegal houses in the CDV
	Lack of opportunity activities that generate a reasonable income among the native population	Foreign population settled in new spontaneous districts	Growth of informal economic activities in the city	Under employment rate
Excessive poverty levels among the population located in marginal sectors of the District	Migrations from the rural areas towards the city	Low income; impossibility to access houses in urbanized ground	Population economic stratification imbalance	Stratified population
	Search of incorporation to the labor force	High risk urbanization zones	Salubrity problems due to the presence of sewers and l very contaminated lagoons	Morbidity causes and rates
	habitat deterioration caused by the population that lives in the marginality	Social problems such as alcoholism, promiscuity, crowding and health deterioration	Social unbalance	
	A young population structure due mainly to the recent establishments of immigrants	restricted access to secondary and higher education		

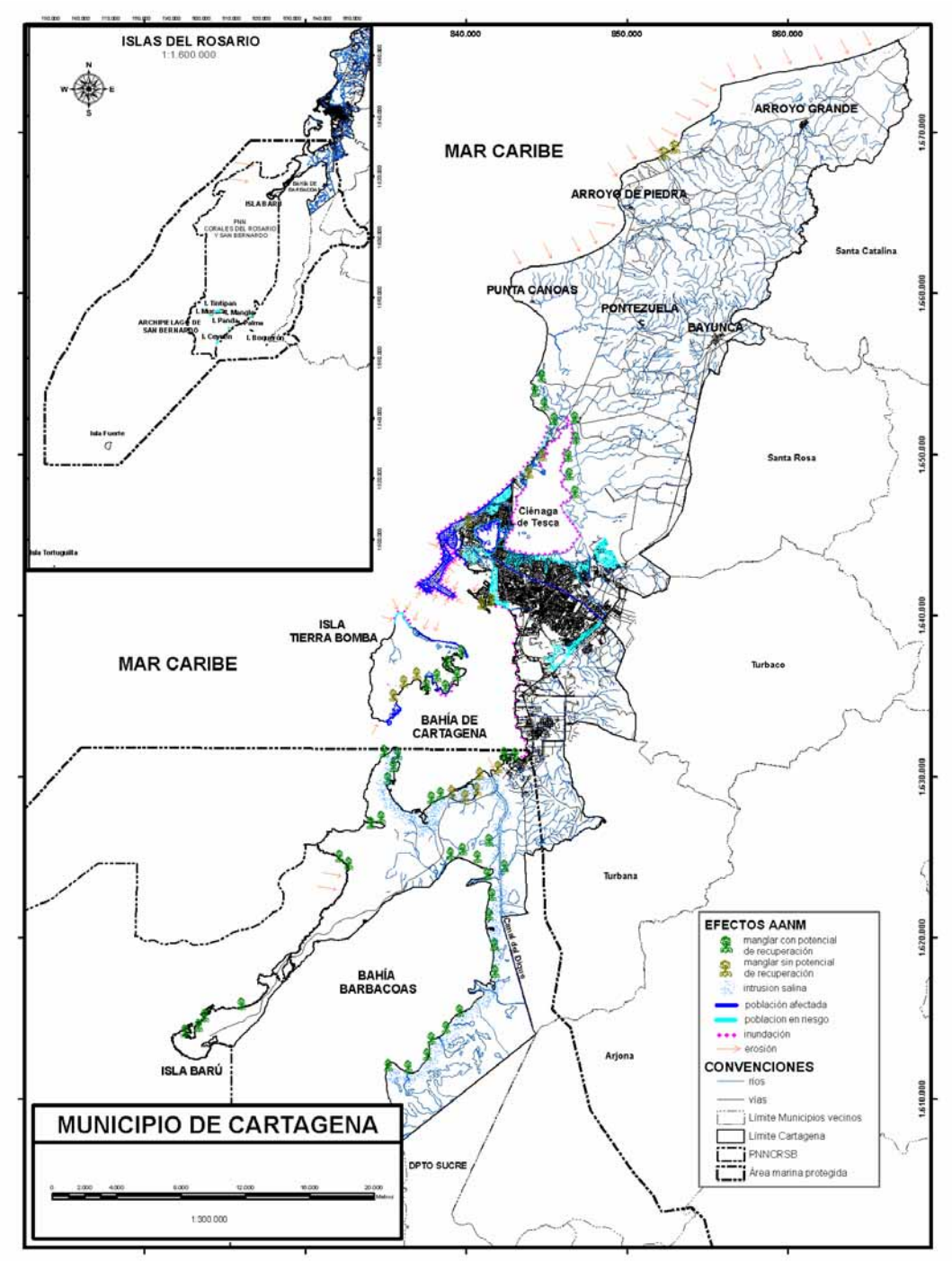

Figure 9. Potential ASLR effects based on the key stakeholders perception on the equivalent of a flooding caused by an extreme climatic event.

The mapping of the perception of the stakeholders towards the areas at risk and the associated effects of ASLR was also achieved during the workshop. The participants were asked to use as flood scenario an extreme situation caused by the sum of high tide and heavy rain occurred in Cartagena (November 2003); almost 60 % of the city was flooded at the time. The perception to the questions on "which would be the most

affected areas?" and "what would be the more severe effects caused by this ASLR scenario?" where used to construct the map shown in Figure 9.

Using these results and following the methodological framework proposed on the study, the susceptibility of the natural system and the impacts on the economical sectors were used to construct the vulnerability assessment of the selected study area within the Cartagena District and Tumaco Area as explained as follows.

In the sea level rise context, vulnerability of the natural system can be referred as the effects of such phenomena on a given ecosystem and it's capacity to survive within time. This survival capacity is given by the ecosystems ability to quickly recover from shock, injury or depression (*resilience*). It is important to note that resilience can either be natural (intrinsic to a given system) or acquired (if it is gained from previous damage). Therefore a system's susceptibility is decreased as it's resilience increases [22].

1 Susceptibility of the natural system

Susceptibility/resilience for a single issue can be examined; as well it can be studied in an overall sense for a collection of issues. Therefore overall susceptibility would be the result of many factors working together. It can be considered as suggested by Pratt et. al. (2004) in the following way:

Overall Susceptibility = inherent characteristics of an area (Biophysical) + forces of nature + human use + sea level rise effects (for this particular study)

This approach considers the system's natural resilience and resistance to damage, the risk of hazards and the acquired resilience / susceptibility to damage which is increased risk to future damage because of some past events. Given the characteristics of natural systems, developing an index to determine their susceptibility must be done considering the information available and their units of measurement, which implies the need to convert them into a common scale to be able to carry out comparisons. Such information is given by indicators which are components that can estimate the condition of a given resource.

Environmental susceptibility for a system is given in terms of it's integrity and its exposure to natural and anthropogenic hazards. For a better understanding of this, one must consider risks (natural and anthropogenic), systems resistance (characteristics of the system which would reduce its susceptibility) and damage (acquired susceptibility) [23].

Indicators chosen for a given system depend on it's characteristic and current situation. Nevertheless it's important to mention that in natural systems is necessary to evaluate susceptibility through different means, taking different aspects into consideration. Such indicators are also taken in different spatial and temporal scales to be able to obtain the information needed. Ecosystem integrity depends on biodiversity, ecosystem functioning and resilience. The risks to the environment are any events or processes that can cause damage to ecosystem integrity. These include natural and human events and processes [23].

It is important to understand that the present study did not generate any information to establish natural susceptibility, but rather used other sources of information to generate such indicators and the final index. For this reason, although indicators measure mainly the same, the information used to compute them, an the periods of time in which it was taken, change for each study area and even for the different indicators.

Values for indicators are given accordingly to what they imply for the system, and how the system is acting in terms of sustainability. It is different if a system is able to sustain, than if it faces no impact at all. This in turn is also defined by the characteristics not only of the system itself and of the pressures it must face, but it depends also on associated policies or other protective measures (such as protected areas) that regulate and control the use and exploitation of such system. The environmental susceptibility index model assumes that resilience is greater for a system the less damaged it is. Also these systems serve better for human necessities that degraded ones and the way humans use or interact with a given system is crucial and define part of the systems susceptibility [23].

The susceptibility index results of computing the values from six indicators that reflect the current state of the system within the study area of Cartagena and Tumaco, separately. Indicators are summarized and a total value is obtained for each area, which defines it's susceptibility. Despite this, it is very important to understand the process as the total value wont give as much information as each indicator by itself, which in

turn defines what measures should be taken to be able to relief the main problems for a given area. With the index the idea is to reflect the extent to which the natural environment is prone to damage and degradation.

1.1 Selection of indicators to assess natural susceptibility

The purpose of this study was to use available information for each area, to be able to determine susceptibility of the systems involved and later suggest possible adaptation measures. With this in mind is important to understand then that information used for calculating the indexes is taken from different sources, done by different entities in different moments; nevertheless is important to understand that it is recent information and that it reflects accurately the actual sate of the systems, as it has been crossed over with local expert knowledge.

CIOH and CARDIQUE (1998) carried out a study to characterize and diagnose the general state of Cartagena. Information comes mainly from this study, but information gathered by Cartagena's POT (2002) and sources like INVEMAR's environmental quality network were also used.

Something similar occurs in Tumaco, were the main sources are the actualization of the diagnose study of fisical – biotic components of mangroves in Tumaco's bay (1997), Tumaco's POT (2000), local environmental plans of community councils (2003) and INVEMAR's environmental quality network as well. However is important to point that information was available only for Tumaco's inlet mangroves, for the southern part no information was available on the quantitative level, so qualitative information based on local documents was used to build most indicators (except for Water Quality and Hydrographic processes integrity). Each of the indices used to calculate the average susceptibility index for each system is presented as follows.

1.1.1 Ecosystem coverage

Coverage is an important measure to estimate the total extent of an ecosystems in a given area. This indicator focuses on changes of natural vegetation cover in which to disguised impacts on biodiversity and ecosystem integrity. The loss of natural vegetation may result in biodiversity lost and may be also reflected on perceivable impacts on ecosystem structure and function through complex ecological interactions (Pratt et. al. 2004).

The total area occupied by mangroves and sea grasses (this last one just for Cartagena) for the given study areas, were measured in hectares. At different points in recent history, cover changes allows to measure land-cover changes throughout the years. These changes may help to define the way these systems will behave under different situations, such as if protective measures are taken to preserve them. This indicator can give an idea on diversity changes and may evaluate the incidence of protective measures and policies taken over a certain area [24].

To be able to determine how these areas have been changing, may not only help to clarify how vulnerable they are (as the consequence of their reduction in total area and fragmentation), but may as well provide instruments to generate policies concerning risk areas with recovery potential.

For Cartagena's beaches it is important to be able to determine what is left, to understand the consequences of what will be lost as result of erosion processes and general degradation. Specially since they are already seen as vulnerable areas. For Tumaco, the lack of studies resulted in a lack of information that made that for these areas the final index does not include this indicator.

An area's resilience to future hazards is related to the rate and total loss of naturally vegetated areas, specially if these are highly vulnerable to anthropogenic distress, as is the case with Cartagena and Tumaco. It will also be a measure of pressure on these ecosystems, relating to habitat disturbance and degradation (Pratt et. al. 2004).

1.1.2 Water Quality and Hydrographic processes integrity

Water Quality and Hydrographic processes integrity is used for areas where water supports natural life and their associated terrestrial environments. It reflects the ability to allow reproduction, survival, growth, extraction and use of hydro-biological species, in any form (CIOH, 1998).

Water quality is the set of organoleptic, physicochemical and microbiological characteristics of water. These values must lie between accepted parameters which provide a base to estimate quality. These parameters are

given either by local legislation or by international standards adopted for this purpose. *Degraded* water quality is the result of inadequate waste water disposal resulting from home use, industrial use and farming has sanitary, economic and ecological effects, resulting in a potential danger for the species that inhabit or use such areas [25]

Water contaminants can be of diverse kind: solid, liquid and gas wastes, suspended solids, toxic substances, infectious microorganisms, radioactive sewage, among others. These substances give water undesirable characteristics as are toxicity, bad taste, bad smell and bad appearance [25]. Water quality evaluation is based on data obtained from measures that record physical, chemical and microbiological agents concentrations. Such evaluation depends on the kind of water to be studied, given that the mentioned parameters behave accordingly to the kind of water (eg. Marine v.s. estuarine waters) (CIOH, 1998).

The indicator is constituted by five sets of variables (physicochemical, fuels, metals, microbiological and pesticides), that describe environmental quality from natural and anthropogenic activities. The indicator itself is comprised of the following variables:

Physicochemical	- Total Suspended Matter
	- Salinity
	- pH
	- Dissolved Oxygen
	- Nitrates
Hydrocarbons	- Hydrocarbons
Trace elements	- Lead
Microbiological	- Fecal Coliform Bacteria
	- Total Coliform Bacteria
Pesticides	- Total organochlorides

Information used came from data taken by INVEMAR's environmental quality network from 2001 up to 2004. Extreme values were taken for this periods and such ranges were used to calculate the value of the indicator for each of the stations the network has in each study area. It is important to note that the indicator does not represents presence or absence of flora or fauna, it just gives a value that reflects water conditions and it's sate (CIOH, 1998).

1.1.3 Ecosystem quality

Actual condition of the main ecosystems found in the area. Its an important measure that complement the total area index, as it provides an idea of the actual state of the ecosystems and the different threats affecting them, allowing an idea of their resilience capacity. It provides an important tool to determine conservation priorities and regulations to be taken regarding the use and other effects caused by human action upon them.

Different approaches to measure such quality exist and have been used in this study, depending on available information done previously for these two areas.

For Cartagena the indicator is composed by several aspects, depending on the system evaluated. It includes fragmentation, associated fauna, forest development and conservation levels. Fragmentation is an important indicator of ecosystem quality as it interrupts natural gene flow of the populations the ecosystems support.

For seagrasses it is measured in number of species of associated epibenthonic fauna. This particular system is found in Cartagena's Bay, and it's cover has diminished significantly in the last years, and so have the different groups associated [18]. Cartagena's mangroves are evaluated in terms of forest development and conservation levels. It turns out as a map that shows the different areas with mangroves covers and the different degrees of intervention within them. This allows a comparison of the actual state of the resource and permits the identification of conservation priorities according to the necessities in each area. Information available did not made it possible to include this indicator for Cartagena's beaches.

Tumaco's ecosystem quality was measured through different strategies. For instance previous studies on mangroves have established areas where these systems existed, but that at the moment are completely degraded. This is one of the parameters used, mangrove area lost. The indicator also had associated a qualification given to the presence of certain desirable associated parameters for each area, as a signal of ecosystem quality. Such associated parameters included associated species of fauna and flora.

Finally, the other ingredient used for this indicator is the comparison between expected Holdridge Index and obtained. HOLDRIDGE Complexity Index is used to establish the complexity of mature forestall units. It considers height, basal area per unit area, number of species present and density. Tumaco's mangroves can be thought of as complex forests. Differences between the expected and the obtained indexes can be result of intrinsic environmental characteristics, which allow stability and ecosystem development, given the availability of nutrients.

Information described above is available for the mangroves located in Tumaco's inlet (A1, A2, B1, B2 & C), for the southern part of the study area, almost no information exists for this systems, as these areas don't have much coverage of mangroves, but rather of other different vegetation types. Something similar occurs with the other system studied for Tumaco: beaches. The lack of studies resulted in a lack of information that made that for these areas the final index does not include this indicator.

1.1.4 Recovery areas

Areas in which measures and policies have been adopted to improve ecosystems quality and diminish pressures on them, specially in the anthropogenic level. It also includes areas where natural recovery processes are taking place. This indicator can give an idea of general resilience building. It can reflect new necessities for the ecosystems to be preserved.

For Cartagena's mangroves, it is seen in figures that show the different areas that according to the zonation done in 1998, are being used with certain restrictions or are being completely preserved to be recuperated. For sea grasses no measures or direct policies have been taken. Something similar occurs with beaches, for no direct measures have been taken to alleviate their degradation.

In Tumaco no policies or mangrove areas have been institutionally protected, however some of them are naturally recovering, and this were the areas used for the present study for this indicator, compared with total mangrove area. This information is available only for Tumaco's inlet, therefore the southern part of the study area and beaches resulted in the final index not including this indicator.

1.1.5 Land- Use: habitat conversion

Land use reflects transformation processes and pressures imposed over certain ecosystems. Seen through maps and available information for these study areas. However, in Cartagena, sea grasses face a constant area loss as a result of habitat quality degradation, but there's no direct transformation that has been measured to be able to build this indicator for this particular system. In Tumaco, this information doesn't exist for beaches, so this indicator wasn't included in the final index, for this particular system.

1.1.6 Hazards

Environmental susceptibility for a system depends of it's integrity and its exposure to natural and anthropogenic hazards. Because of this it results critical to identify these Hazards in each system, to be able to understand what is making a system more or less vulnerable, and foresee possible responses it could present for long term situations as sea level rise.

The main hazards Cartagena's natural systems face, other that anthropogenic caused degradation, are liquation, soil remotion and flooding risks. These were evaluated with maps produced by the city, which showed the different areas of the cities with the different identified hazards for them. Something similar was done for Tumaco, but the hazards identified for this area include: tsunami exposure, erosive processes, floods, hydrocarbon spills, biodiversity loss and agroindustrial activities.

1.2 Natural susceptibility

1.2.1 Cartagena de Indias: Cienaga de La Virgen and Cartagena Bay

Given the information available, and to present results in an orderly manner, Cartagena's study area was divided depending on the system evaluated. The Cienaga de la Virgen was divided in North and South, being "La Bocana" the boundary.

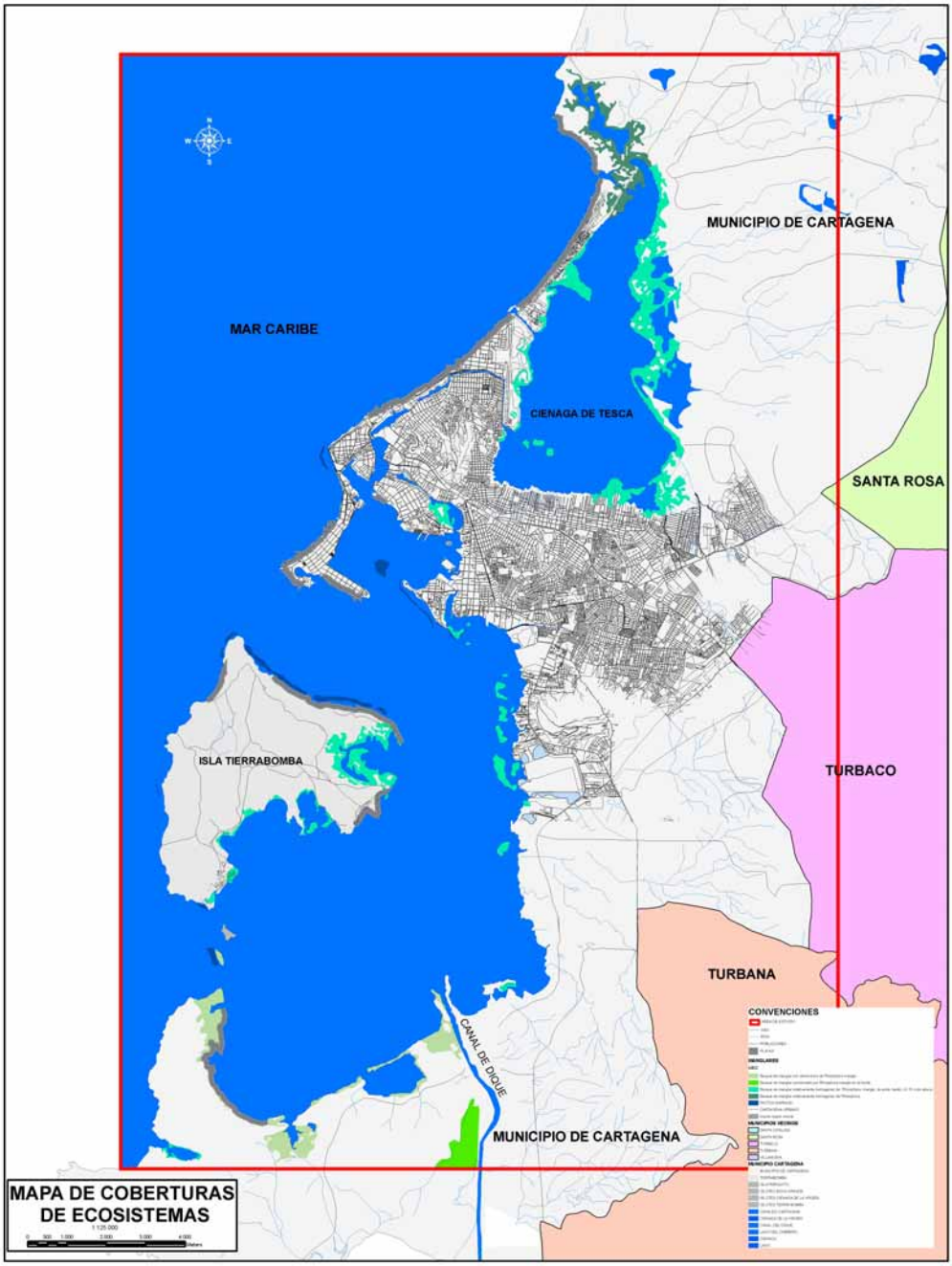

Figure 10. Map showing ecosystem land cover for study area. Data for Mangroves is from 1998, data for seagrasses from 2001 and beaches were plotted with data from Ingeominas (2001).

Ecosystem coverage

Information used to calculate this indicator for Cartagena for mangroves is from 1998, for seagrasses from 2001 and beaches were plotted with data from Ingeominas (2001).

As described in study area, these two sectors of Cartagena (Cienaga de la Virgen and Cartagena's Bay) have mainly three types of marine ecosystems: Mangroves, Seagrasses and Beaches (Figure 9). To be able to compute a value for this indicator, a value reflecting how they have changed in time, was assigned.

Mangroves in these areas are deteriorated as a consequence of the pressures they must face. This land cover has been changing, resulting in a total loss of 10 – 24% for la Cienaga de la Virgen. In Cartagena's Bay this loss reaches 90% of total cover for the last 20 years (CIOH, 1998) (**¡Error! No se encuentra el origen de la referencia.**).

Sea grasses are very susceptible to changes in the surrounding environment, in the year 2001 only 76 hectares were left, after there were records of over 1000 hectares for the 1930's (Figure 9). In the southeast the effects have been more evident, since the cover loss began, which probably reflects the starting point of the problems, though at the moment the loss has generalized for the entire bay. This means that the entire area has faced a loss of over 92% of sea grasses (Diaz et. al. 2003).

Beaches experience a constant loss and gain of area due to climatic processes that result in erosion and accretion in some areas. For this reason, trying to determine beach gain or loss is very difficult, as this processes take place along the year, changing constantly and resulting in constant gain or loss depending on environmental factors. Nevertheless information on how some areas have lost or gained area has been documented by the CIOH (1998).

Results of this indicator can be seen in Table 14, as well as the susceptibility degree they exhibit. It can be seen that the most threatened system for the entire area are sea grasses and beaches seen the areas of Castillo Grande, Bocagrande, El Laguito and Tierrabomba. Sea grasses are highly threatened mainly by habitat degradation, whereas these beaches experience highly erosive processes, due to water movements. As opposed to this, beaches from Bochica and Marbella have important areas and aren't threatened by erosive processes.

Table 14. Total habitat loss for Cienaga de La Virgen and Cartagena's Bay

SYSTEM	LOCATION	TOTAL AREA (m2)	ECOSYSTEM COVERAGE: TOTAL HABITAT LOSS		
			AREA QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Sea grasses	Cartagena Bay	606854,25	45,00	A 90% loss is considered	High
	Cartagena Bay Continental Areas	5018148,08	30,46		Mid-high
Mangroves	Cartagena Bay Insular Areas	1819181,99	19,38	A 10% loss is considered	Mid-low
	Cienaga de la Virgen North	3555412,07	16,25	Dosel spaces as a result of wood exploitation or other human alterations.	Mid-low
	Cienaga de la Virgen South	2882564,11	14,37		Mid-low
Beaches	Bocagrande	7034,68	40,00	Comparison between accretion and erosion processes in beaches	High
	Bochica	3568,92	6,00		Low
	Cano del Oro	7621,51	17,50		Mid-low
	Castillo Grande	7550,10	48,50		High
	El Laguito	6260,73	48,50		High
	La Boquilla	27007,05	23,43		Mid
	Marbella	24013,85	8,00		Low
	Tierrabomba	36694,39	46,52		High

Water Quality and Hydrographic processes integrity

For the Cienaga de la Virgen and Cartagena's Bay, environmental quality obtained from values gathered by INVEMAR's marine quality network for these areas, during 2001 – 2004, don't result as threatening as expected given the uses they've been subject to as receptors of untreated waste (Table 15). The values obtained therefore reflect that water quality is not a hazard for associated flora and fauna.

Table 15. Water Quality and Hydrographic processes integrity for Cienaga de La Virgen and Cartagena's Bay

SYSTEM	LOCATION	WATER QUALITY AND HYDROGRAPHIC PROCESSES INTEGRITY		
		AREA QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Sea grasses	Cartagena Bay	2,14	Ponderate value for variables considered as physicochemical and microbiological indicators for marine and estuarine waters that support flora and fauna	Mid-low
Mangroves	Cartagena Bay Continental Areas	2,58		Mid-low
	Cartagena Bay Insular Areas	2,04		Mid-low
	Cienaga de la Virgen North	2,61		Mid-low
	Cienaga de la Virgen South	2,68		Mid-low
Beaches	Bocagrande	2,62		Mid-low
	Bochica	1,89		Low
	Cano del Oro	2,56		Mid-low
	Castillo Grande	2,41		Mid-low
	El Laguito	2,39		Mid-low
	La Boquilla	1,40		Low
	Marbella	2,41		Mid-low
	Tierrabomba	1,99		Low

Ecosystem quality

Unplanned urban and industrial development in Cienaga de la Virgen and Cartagena´s Bay, has resulted in a lack of sewage treatment that has deteriorated the environment in these areas. Additionally, garbage accumulation an infrastructure have interrupted water exchange between the Cienaga de la Virgen and the sea, resulting in further damage. Cartagena's Bay is also subject to contamination from other sources, such as the second sea national port receiving fuel, oil and ballast waters among other contaminants. These activities result in habitat degradation, evident through the loss of associated macrofauna and poor forest development with high contamination levels.

Table 16. Ecosystem Quality of Mangroves and sea grasses in the study area (Source: CIOH, 1998)

SYSTEM	LOCATION	NUMBER OF ISOLATED PATCHES	ECOSYSTEM QUALITY: FRAGMENTATION & OTHER CRITERIA		
			AREA QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Sea grasses	Cartagena Bay	12 Areas	45,00	Isolated patches. Significant loss of associated macrofauna	High
Mangroves	Cartagena Bay Continental Areas	30 Areas	15,49	Mangrove patches are connected	Mid-low
	Cartagena Bay Insular Areas	17 Areas	21,08	Most of the area is intervened, and in need for recuperation. Small Isolated Mangrove patches	Mid
	Cienaga de la Virgen North	14 Areas	21,02	Most fragments are small and very separated. Most of the area is greatly intervened, and in need for recuperation.	Mid
	Cienaga de la Virgen South	8 Areas	21,12	Most fragments are small and very separated. Most of the area is greatly intervened, and in need for recuperation.	Mid

For the 1970's over 30 species of epibenthonic fauna were found in seagrasses of Cartagena's Bay, being specially important sponges, gastheropods, epibenthonic bivalves, sea cucumbers, sea urchins and sea stars. In a study carried in May 2001, none of this groups were observed with the same frequency, and some of them weren't observed at all (Diaz *et. al.*, 2003) (Table 16).

Additionally, fragmentation is evident in mangroves and sea grasses in the study area, resulting in an additional threat for the biological communities they sustain (Table 16).

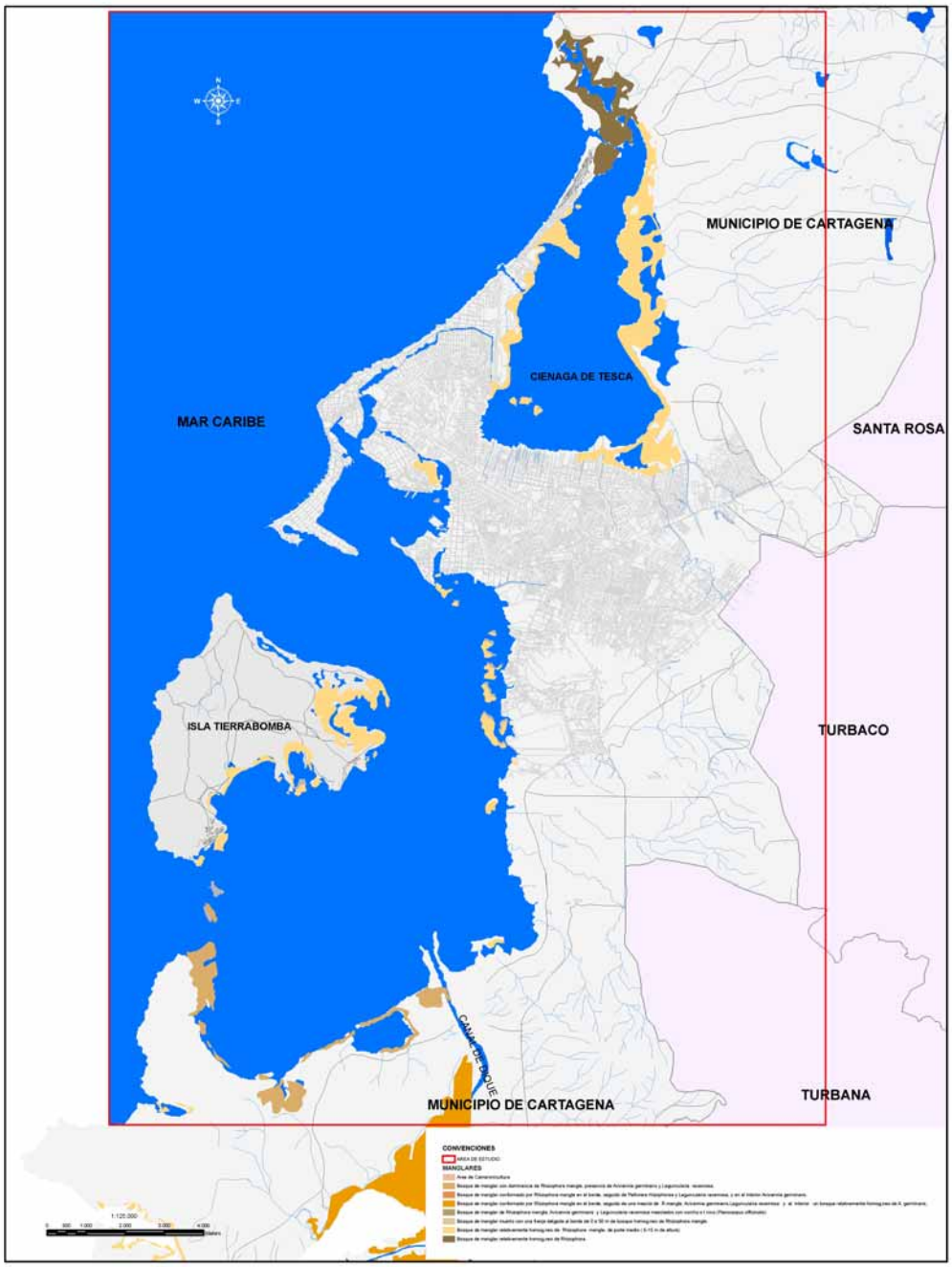

Figure 11. Mangrove areas with the different levels of intervention in which they occur

Recovery areas

Different studies carried out to evaluate the system's actual state have resulted in the recognition to start protecting and recuperating areas so that sustainability is regained. CARDIQUE (1998) proposes a organization for mangrove areas found in Cartagena's Bay and Cienaga de la Virgen (Figures 2.3 & 2.4.a and 2.4.b, respectively).

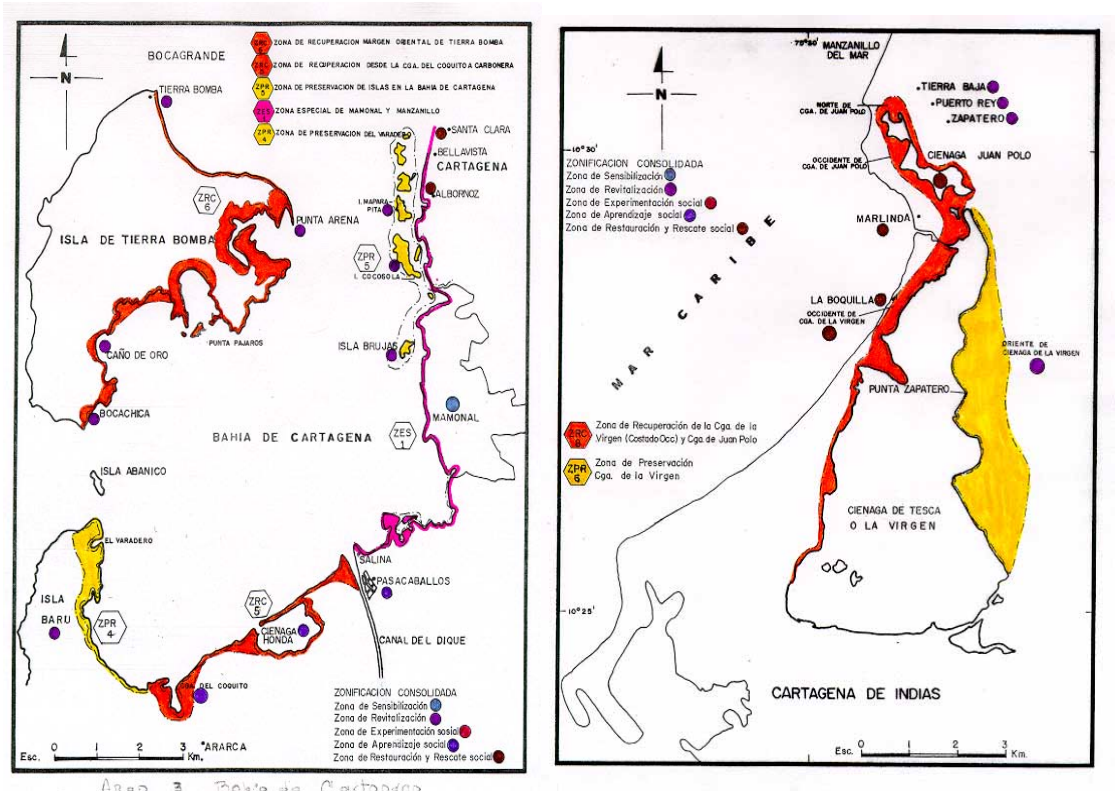

Figure 12. Zonation proposed by CARDIQUE (1998) for mangrove areas a). Cartagena's Bay and b). Cienaga de la Virgen.

Table 17. Recovery areas within the study area

SYSTEM	LOCATION	RECOVERY AREAS		
		AREA QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Sea grasses	Cartagena Bay	50,00	No protective measures for this system	High
Mangroves	Cartagena Bay Continental Areas	7,90	Protective and measures for preservation intended.	Mid-High
	Cartagena Bay Insular Areas	5,92	Protective measures suggested	Mid
	Cienaga de la Virgen North	7,41	Protective and measures for preservation intended.	Mid-High
	Cienaga de la Virgen South	7,08	Protective and measures for preservation intended.	Mid-High

Translating this into values is not an easy task and it is done depending on the mangrove area and the different categories that exist in the mentioned study (Table 17). for sea grasses there are no regulations concerning this area, therefore they this system is highly susceptible for this indicator.

Land Use: Habitat Conversion

The connective system between the Cienaga de La Virgen and Cartagena's Bay is currently interrupted as a result of unplanned urban invasion and garbage accumulation. In Cartagena's Bay urban and industrial areas can be found. In this area fishing activities and wood exploitation were mangrove areas are still available. Despite this, given its natural characteristics it is considered a natural port, being this the most important activity for this area, supporting industries as tourism, fishing and trade. Industry also takes place in the area and has a significant impact upon the ecosystem, given the constant inflows of wastes and fuels that go into the bay (CIOH, 1998).

Deeper into the continent in this area also residential use is found. This also occurs in Tierra Bomba, where some human settlements are found. The overall calculations were taken from comparing land use map with aptitude map and they can be seen in Table 10. For sea grasses habitat conversion is not studied, as this index refers to processes that change the landscape by human action as a result of direct intervention, which is not the case for sea grasses.

For beaches, habitat transformation results from invasion of these areas by buildings and other constructions established for different purposes.

Table 18. Habitat Conversion for Beaches and Mangroves within Cartagena's study area

		LAND USE: HABITAT CONVERSION		
SYSTEM	**LOCATION**	**AREA QUALIFICATION**	**ANALYSIS CRITERIA**	**SUSCEPTIBILITY**
Mangroves	Cartagena Bay Continental Areas	7,08	Destruction for building associated residences.	Mid-high
	Cartagena Bay Insular Areas	6,72	Exploitation for agricultural expansion and area preparation for building houses.	Mid-high
	Cienaga de la Virgen North	6,20		Mid-high
	Cienaga de la Virgen South	6,27	Habitat annual proportion converted from intact to altered	Mid-high
Beaches	Bocagrande	8,50		High
	Bochica	1,50		Low
	Cano del Oro	2,50		Mid-low
	Castillo Grande	9,00	Closeness of buildings to the sea, invasion of beach area	High
	El Laguito	9,00		High
	La Boquilla	4,10		Mid
	Marbella	7,00		Mid-high
	Tierrabomba	7,86		Mid-high

Figure 13 shows the different ways in which land is used in the study area. In the Cienaga de la Virgen a social problem can be seen in the way the area is being used. At present, poor people live in this area under subnormal conditions, generating not only severe conditions for the inhabitants, but also for the ecosystem, as it must face greater pressures than the one that it can handle. In this area agriculture, fishing, aquaculture and human settlements are the main uses found, being urbanization the principal.

This process has overcome dry areas, which means that flooded areas were mangroves are supposed to establish have been colonized by deforestation and filling flooded areas with different materials, to make the area available for building new structures. This has been done with no planning at all, which results in a complete lack of basic infrastructure for public services and waste disposal, which makes the impact even worse on the natural system (CIOH, 1998).

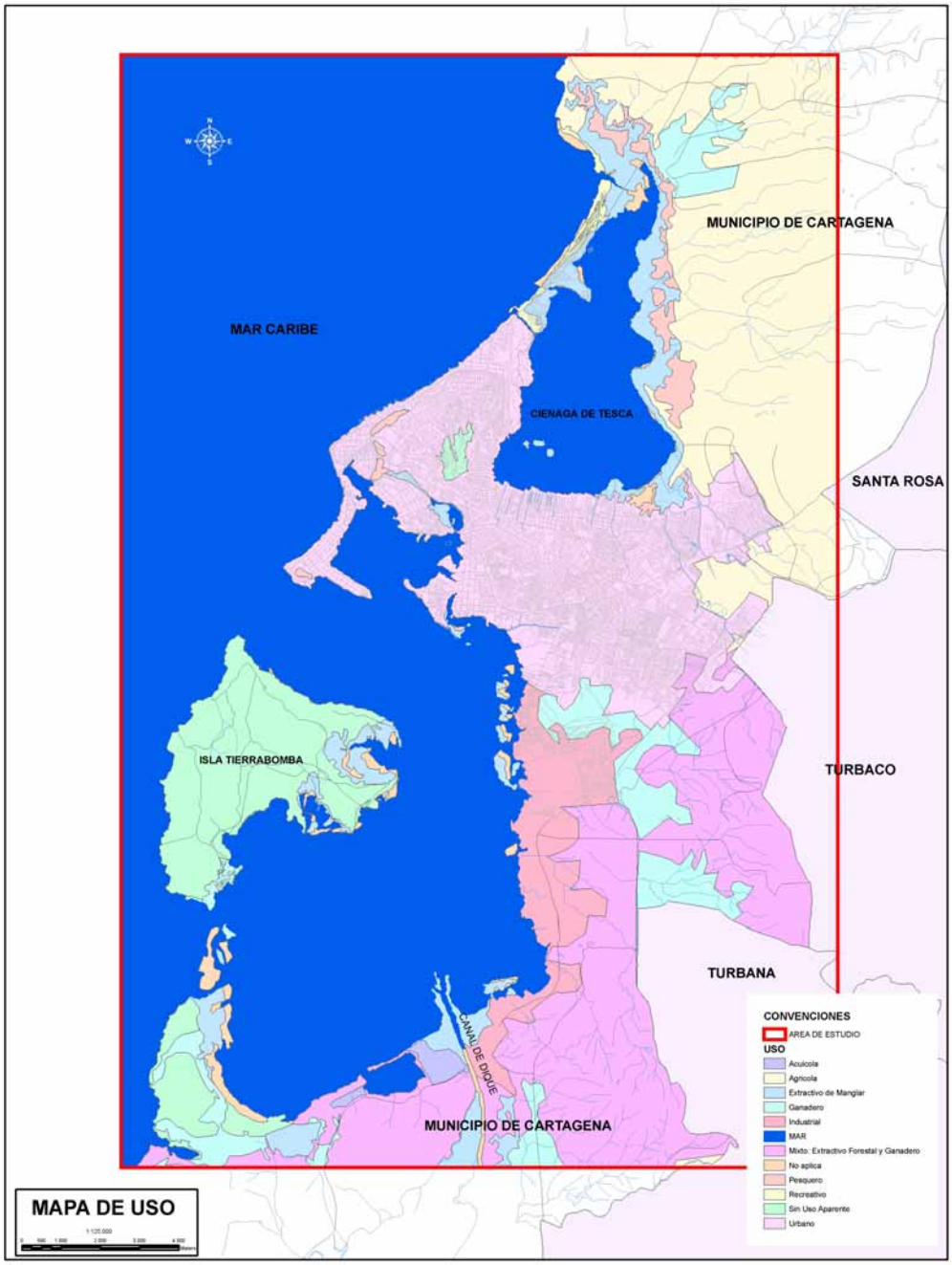

Figure 13. Land Use in the study area.

Other than this problems, in this area also inflow untreated wastes from other areas of the city, resulting in an incoming daily volume of 15 tons of organic matter. Additionally urbanization and agroindustrial activities affect the natural water exchange with the sea and produce agrochemicals inflows that enter the system (CIOH, 1998).

Hazards

Contrary to what is expected for Cartagena, the hazards that these areas face (liquation, soil remotion and inundation risks) are not as severe for the natural system. It is very important to understand that this evaluation was done using a map that shows the different risks for the different areas, along with expert

knowledge that determined how negative, or positive such hazards could result for the natural systems (Table 11).

Table 19. Risk qualification for Cartagena's natural systems

SYSTEM	LOCATION	HAZARDS		
		AREA QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Sea grasses	Cartagena Bay	1,68		Low
Mangroves	Cartagena Bay Continental Areas	1,00		Low
	Cartagena Bay Insular Areas	2,60		Mid-low
	Cienaga de la Virgen North	2,97		Mid-low
	Cienaga de la Virgen South	2,72		Mid-low
Beaches	Bocagrande	0,00	Sum of the different hazards (natural and anthropogenic) a given area faces	Low
	Bochica	6,00		Mid
	Cano del Oro	5,00		Mid
	Castillo Grande	5,00		Mid
	El Laguito	5,00		Mid
	La Boquilla	0,00		Low
	Marbella	0,00		Low
	Tierrabomba	5,87		Mid

1.2.2 San Andres de Tumaco

Given the natural characteristics of the area, the differences seen and to present results in an orderly manner, Tumaco's study area was divided according to information available. Indicators differed depending on the area, as zones A1, A2, B1, B2 and C, quantitative information was available, which as mentioned above, was not the case for zone CCBM.

Ecosystem coverage: Total Habitat Loss

Information used to calculate this indicator for Tumaco for mangroves is from the actualization of the diagnose study of fisical – biotic components of mangroves in Tumaco's bay (1997) and from local environmental plans of community councils (2003).

Data from total mangrove area and the state in which it is found, was used to calculate total habitat loss by comparing it with the given values for intervened and degraded areas. No comparable historical records were found, so this indicator was done for just one moment in time (1997), as this was the information available. As stated before, information on the area that was not covered by this study, was taken from qualitative descriptions and converted into ranges to obtain a value for the area.

Table 20. Total habitat loss for Tumaco's Mangroves

SYSTEM	ZONE	ECOSYSTEM COVERAGE: TOTAL HABITAT LOSS		
		QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Mangroves	A1	15,72	Intervened and degraded areas over total mangrove area	Mid-low
	A2	43,44		High
	B1	26,96		Mid
	B2	43,63		High
	C	31,98		Mid-high
	CCB.M	35,00	Qualitative description of intervened and degraded areas over total mangrove area	Mid-high

According to what is explained in the cited study, mangroves in these areas are deteriorated mainly as a result of the pressure imposed on them by local communities which use them as a source for fuel and wood mainly (zones B1 and C) . In some areas, as is the case with zones A1 and A2, the main threat is area lost as a result of agricultural activities (mainly coconut plantations) and the zone that is closer to the most urbanized area (B2) faces as major hazards contamination and use by local population.

As seen in table 12, the higher intervened areas are zones A2 and B2, which in turn are the densely populated areas of this division. Beaches information wasn't found for this indicator.

Figure 14. Map Showing Ecosystem Land Cover for Tumaco

Water Quality and Hydrographic processes integrity

For Tumaco, environmental quality obtained from values gathered by INVEMAR's marine quality network during 2001 – 2004, don't result as threatening as expected, given the uses they've been subject to as receptors of untreated waste (Table 21), consequence of the lack of sanitary services and appropriate waste disposal.. The values obtained therefore reflect that water quality is not the main hazard for associated flora and fauna.

Table 21. Water Quality and Hydrographic processes integrity for Tumaco

SYSTEM	ZONE	WATER QUALITY AND HYDROGRAPHIC PROCESSES INTEGRITY		
		QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Mangroves	A1	2,58	Ponderate value for variables considered as physicochemical and microbiological indicators for marine and estuarine waters that support flora and fauna	Mid-low
	A2	3,47		Mid-low
	B1	2,55		Mid-low
	B2	3,12		Mid-low
	C	3,19		Mid-low
	CCB.M	3,65		Mid-low
Beaches	C	3,08		Mid-low
	CCA.M	2,32		Mid-low
	CCB.M	3,24		Mid-low

Ecosystem quality

Ecosystem quality seen as lost mangrove area, associated representative parameters and Holdridge's complexity index, did not show the state of Tumaco's mangroves as critical, but is important to mention how the highest qualification for this indicator (being the mostly threatened area) is zone B2. This is the highest populated area, where major impacts are expected, as extraction processes are the strongest of all (Table 22).

Table 22. Ecosystem quality for Tumaco's Mangroves

SYSTEM	ZONE	ECOSYSTEM QUALITY		
		QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Mangroves	A1	34	Area where recovery processes are very unlikely to occur, leading to permanent mangrove area loss Absent parameters out of 14 that indicate environmental quality. Complexity index obtained compared with the expected to get an idea of forest behavior Qualitative description of areas where recovery processes are very unlikely to occur, leading to permanent mangrove area loss Qualitative description of absent parameters out of 14 that indicate environmental quality.	Mid-low
	A2	35		Mid-low
	B1	29		Mid-low
	B2	48		Mid
	C	25		Mid-low
	CCB.M	35		Mid-low

Unplanned urban development is evident through a lack of sewage treatment that has deteriorated the environment in these areas, and although not evident at the moment, these processes tend to worsen with time

and measures to prevent this are to be taken immediately. Other major stress source for these systems are occasional hydrocarbon spills that occur in the area and have a profound impact on mangroves and associated fauna. No information exists to be able to use this indicator for overall beaches susceptibility.

Figure 15. Mangrove areas with the different levels of intervention in which they occur

Recovery areas

As explained above, in Tumaco no protective measures have been taken by the government to declare mangrove areas as protected. Despite this, some areas are naturally recovering from highly destructive processes that took place in the 1960's and 1970's, consequence of tannin extraction in the area. For this indicator, these recovering areas where used to be able to obtain a value that gave an idea of areas that although previously degraded, are currently in recovering processes.

However as seen in table 14 these are very small areas. The lack of recovery areas, compared with areas that are currently being degraded is one of the indicators that turn Tumaco's mangroves into susceptible systems in case they need to recover from climatic events. A2, B2 and CCB.M are the zones where naturally recovery processes are almost completely absent.

Table 23.. Areas where natural recovery processes are taking place in mangrove systems

SYSTEM	ZONE	RECOVERY AREAS		
		QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Mangroves	A1	15,72	Natural recovery areas plus not intervened areas over total coverage	Mid-low
	A2	43,44		High
	B1	26,96		Mid
	B2	43,63		High
	C	31,98		Mid-high
	CCB.M	42,50	Qualitative description of natural recovery areas plus not intervened areas over total coverage	High

Land Use: Habitat Conversion

Figure 16. Land Use in the study area.

Agriculture and domestic uses are the main hazards these areas face. Zones densely populated exhibit greater transformation processes resulting from domestic mangrove use for fuel an wood; other areas are being transformed to be converted into agriculture areas and in a lesser extent to aquaculture area (mainly shrimp pools). This is one of the most important hazards for such areas, as recovery processes are very slow and damage results from different sources, including pesticides, land properties transformation, vegetation coverage and loss of associated resources among others (Table 24).

Table 24. Habitat Conversion for Tumaco's mangroves

SYSTEM	ZONE	LAND USE: HABITAT CONVERSION		
		QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Mangroves	A1	3,14	Degraded areas and intervened areas over total area	Mid-low
	A2	8,69		High
	B1	5,39		Mid
	B2	8,71		High
	C	6,40		Mid-low
	CCB.M	6,00	Qualitative description of degraded areas and intervened areas over total area	Mid

Regulations don't exist and people use the resources with no major restrictions or directions so that impact is not as high as it actually is. There is no available information for beaches, and given the very ample tide

variations and how erosion and accretion processes change constantly the area's topography, the indicator could not be built from available maps for the zone.

Hazards

Tumaco beaches and mangrove areas face important hazards (tsunami, erosion, inundation, hydrocarbon spills, biodiversity loss) that increase their susceptibility. This evaluation was done using a map that shows the different risks for the different areas (Table 14).

Table 25. Risk qualification for Tumaco's studied natural systems

SYSTEM	ZONE	HAZARDS		
		QUALIFICATION	ANALYSIS CRITERIA	SUSCEPTIBILITY
Mangroves	A1	4,26	Sum of the different hazards (natural and anthropogenic) a given area faces	Mid
	A2	5,88		Mid
	B1	4,85		Mid
	B2	3,53		Mid-low
	C	5,59		Mid
	CCB.M	3,92		Mid-low
Beaches	C	5,29		Mid
	CCA.M	2,94		Mid-low
	CCB.M	5,29		Mid

1.3 Environmental susceptibility Index

To be able to obtain a unique value for each area, the results of each independent indicator were added, resulting in a numerical value. The largest the value obtained, the more vulnerable from a natural system's perspective, the areas were regarded.

1.3.1 Cartagena de Indias: Cienaga de La Virgen and Cartagena Bay

Figure 17. Environmental susceptibility for main natural systems found in the study area.

Figure 17 shows how susceptibility values are distributed along the study area. As seen in the figure, ecosystems in the area face important pressures that make them highly vulnerable, diminishing in that way their resilience capacity to be able to face in an adaptative way problems that may arise as a result of climatic events, either extreme situational events or aspects resulting from long term processes as sea level rise.

Table 26. Susceptibility categories for natural system's found in the study area

SYSTEM	LOCATION	TOTAL QUALIFICATION	OVERALL SUSCEPTIBILITY
Sea grasses	Cartagena Bay	188,81	High
Mangroves	Cartagena Bay Continental Areas	79,99	Mid
	Cartagena Bay Insular Areas	78,83	Mid
	Cienaga de la Virgen North	77,48	Mid
	Cienaga de la Virgen South	75,36	Mid
Beaches	Bocagrande	11,12	Low
	Bochica	15,39	Low
	Cano del Oro	27,56	Mid-low
	Castillo Grande	64,91	High
	El Laguito	64,89	High
	La Boquilla	28,94	Mid-low
	Marbella	9,41	Low
	Tierrabomba	62,24	Mid-high

The most vulnerable system at present are sea grasses, which face constant hazards that have resulted in an almost total loss of this cover in the area, and which has little recovering capabilities as it's sustaining

environment is highly degraded and no measures to reduce such hazards have been taken or proposed (Table 26). As far as mangroves, the most threatened are the ones located in Tierra Bomba's urban area, which is expected given the pressures faced as a result of urbanization and direct exploitation, and general environmental quality found in the area.

The loss in ecosystem land cover, as a result of direct degradation and water quality and hydrographic processes integrity is reflected in these most vulnerable areas. This is also evident regarding fragmentation, as these areas are formed by isolated small patches. Given the degradation and unsustainable use to which these systems have been exposed, it is not strange that ecosystem quality is highly degraded. Nevertheless is important to note that for mangroves, efforts to recuperate and regulate the use of this areas have been done, the problem is the real effects they have performed.

For beaches erosive processes and habitat transformation hazards are the main responsible for some of them exhibiting a high susceptibility. Changes in landscape are evident and highly threatening were human settlements are found.

Sea level rise implies changes in local conditions that may impose greater pressures or may be good in environmental terms. This is the case of sea level rise, as it may turn areas into suitable for maintaining mangroves. Despite this, it is important to understand that suitability is not enough, as environmental quality is what at the end defines how capable is a system of prevailing in time.

In Cartagena environmental susceptibility is directly related with human presence in the different areas, and is mainly the result of the activities that these populations generate and the impacts that result from them. These conditions summed to the loss in area due to land use conversion processes make some of the mangrove areas highly susceptible. Beaches on the other hand are affected as well by such processes and considerable areas are being lost.

1.3.2 Tumaco

Figure 18. Environmental susceptibility for Tumaco beaches and mangroves.

Figure 18 shows how susceptibility values are distributed along the study area. As seen in the figure, ecosystems in the area face important pressures that make them vulnerable, diminishing in that way their resilience capacity to be able to face in an adaptative way problems that may arise as a result of climatic events, either extreme situational events or aspects resulting from long term processes as sea level rise. Mangroves and beaches face constant hazards mainly resulting from anthropogenic activities that deteriorate their general state. The lack of local policies and of territory arrangement make degrading processes harder to control and is highly complicated the fact that the resources are being constantly used and no areas have been declared to be able to preserve the systems (Table 16).

Respecting mangroves, the most threatened of these are the ones located in B2, the area closer to Tumaco's urban area, which is expected given the pressures faced as a result of urbanization and direct exploitation, and general environmental quality found in the zone.

Table 27. Susceptibility categories for natural system's studied in Tumaco

SYSTEM	ZONE	Total Qualification	Overall Susceptibility
Mangroves	A1	75,16	Mid-low
	A2	139,98	Mid
	B1	95,89	Mid-low
	B2	151,01	Mid-high
	C	104,35	Mid
	CCB.M	126,07	Mid
Beaches	C	8,38	Mid
	CCA.M	5,26	Mid-low
	CCB.M	8,53	Mid

2 Socioeconomic vulnerability

Socioeconomic impacts refers to potential loss, measured by the natural exposition degree susceptibility to hazards and recuperation capacity. It is created as a result of localization and societal differences, in such a way that the lack of empowerment diminishes access to resources and the range of viable options in tense moments.(Barnett, 2001). The socioeconomic vulnerability is given by the system's potential impact or susceptibility and technical, institutional, economical and cultural ability of society to face or prevent such impacts. As in resilience and resistance of natural systems, potential for a planed autonomous adaptation determines the ability to prevent or face potential impacts (Klein & Nicholls, 1999).

In a local level, vulnerability and adaptation capacity are influenced by processes that operate on a national scale as is the case of economical policies that influence economical well being of vulnerable groups. Because of this inversion in critical areas (education, health, physical infrastructure) influence vulnerability as they determine opportunities to diminish vulnerability and improve adaptation. At a national scale, economical vulnerability assumes a country is economically vulnerable despite it's development.

2.1 Selection of indicators to assess the impacts of the socioeconomic system

A social economic vulnerability index involves three aspects: exposition to conditions of foreign trade, isolation and propensity to natural disasters (Briguglio,1995). The first of these three aspects relates to economical vulnerability in the sense that the greater the exposure, the more the country's development depends upon foreign economical conditions. The second relates with economical vulnerability as it introduces uncertainty, delays and indivisible costs in international trade, and the third as it creates additional costs and resource deviation from productive activities.

For the indicators selection to be included in the Socioeconomic vulnerability index, theoretical concepts previously mentioned are considered, information availability to the required level of disaggregation for the analysis and the results of the DPSIR analysis. Table 28 shows the indicators description, justification and measurement methodology.

Basic data used to calculate socioeconomic vulnerability index (SVI), belongs mainly to SISBEN's questionnaire results for each of the urban and rural areas of Cartagena and Tumaco. SISBEN is a proxy means test index widely used as a targeting system for social programs in Colombia. This index is a function of a set of household variables related to the consumption of durable goods, human capital endowment and current income.

SISBEN was created by the Colombian government with the purpose of simplifying, expediting and reducing the cost of targeting individual beneficiaries of social programs at the various government levels. The overall objective is to obtain reliable socio-economic information on poor and vulnerable groups of the Colombian population to be used in the targeting of social programs, particularly in the subsidized program of the newly reformed public health system [19].

Table 28. Indicators selection to compose the socioeconomic vulnerability index

INDICATOR	DEFINITION / JUSTIFICATION	MEASUREMENT
Population	All the inhabitants of a given sex and/or age group that live effectively within a country's, territory or geographical area's boundaries at a given moment in time.	Number inhabitants
Children under 7 years of age	Total population percentage of a given country, territory or geographical area, under seven years of age, for a certain sex and at a particular moment in time.	Percentage of children under 7 years of age
Public investment	Expenses destined for health, education, infrastructure, basic sanitation, household and disaster prevention.	Amount of money (thousands of pesos) destined to each item

INDICATOR	DEFINITION / JUSTIFICATION	MEASUREMENT
Tendency to natural disasters	Knowledge of potential destruction risk, partial or total, of the house in case of natural vents, given that it's localization is not appropriate. It is a key indicator as in case an event takes place, adaptation measures must be adopted.	Number of houses at risk of: flooding, sliding, avalanche, sinking, geological faults, others.
Sewage disposal	This set of variables is part of the Life Conditions Index (LCI), it makes possible to identify poor sectors of the population. Additionally those related with households characteristics show interactions with the environment.	Number of houses per options
Water Suply		Number of houses according to water supply sources for human intake
Waste recollection		Number of houses that receive waste recollection services
Cooking Fuel		Number of houses per kind of fuel used to cook
House walls Materials		Number of houses per main material of exterior walls
House floor material		Number of houses per floor material
Scholarship (children from 6 to 11 years of age)		Number of children assisting to school from ages 6 to 11
Scholarship (children from 12 to 18 years of age)		Number of children assisting to school from ages 12 to 18
Iliteracity	Population over 15years of age that can't read and write a text that comprises no difficulty. It is considered a standard indicator of vulnerability since apart from reflecting quality of the system, it also is associated to access to other services.	People over 15 years of age that can not read and write
Morbility	People proportion that get sick at a given place and time. It considers illnesses associated to the place of residence, life conditions and those with greater incidence in case of floods.	Number of cases per main diseases reported

For Tumaco the results of the questionnaire for socioeconomic characterization will be used, which will allow the inclusion in the SVI morbility and analphabetism variables.

The proposed index has four components

$$SVI = LQI + NCRI + PII + P$$

where,

LQI = Life Quality Indicator

NCRI = Natural Catastrophe Risk Indicator

PII = Public Investment Indicator

PI = Population Indicator

Calculating Life Quality Index is based on the methodology[5] proposed for calculating Colombia's Life Quality Index, which doesn't imply that a new Index is being calculated for Cartagena and Tumaco.

[5] For greater detail on this methodology check Gamboa, González, Cortes, 2000

$$ICV_i = \sum_{f=1}^{F} \sum_{j=1}^{C_f} W_f W_{fj} V_{fj}^i$$

where,

W_f is factor associated weight, factors are sets of variables incorporated to the indicator.

W_{fj} is variable *j* weight, belonging to factor f

V_{fj}^i is the valuation received by *i* commune in the response category that belongs to *j* variable of *f* Factor

F is the number of factors

C_f Variable number in each factor

i is the commune

Natural Catastrophe Risk Indicator is the potential risk of partial or total household destruction as a result of natural events, given an inadequate household location. Nearness to a river, sea or to geologic faults must be known, or if the area is suitable for building.

$$IRCN_i = \sum Y_j Z_j^i$$

Where,

Y_j is variable *j* weight, belonging to the factor

Z_j^i commune *i* value in *j* variable

Public Investment Indicator are the expenses destined to health, education, infrastructure, aqueduct and sewer, household and disaster prevention. Additional to actual vulnerability, this indicator allows us to evaluate adaptive capacity in case of natural disasters, among them flooding as a result of rapid sea level rise.

$$IIP = \sum X_j K_i^j$$

Where,

X_j is variable *j* weight, belonging to the factor

K_i^j commune *i* weight in *j* variable

Finally, Population Indicator is population participation in a given geographic area (Government Commune Unit for Cartagena) over municipality's total population.

$$IP = \sum J_j R_i^j$$

Where,

J_j is variable *j* weight, belonging to the factor

R_i^j is the value received by *i* commune in *j* variable

Socioeconomic Vulnerability index values are located in the range [0,100], as it increases their value it indicates that the vulnerability diminishes. To simplify the analysis of the SVI, the following division is used:

Table 29. SVI Clasificación IVS

Value	Vulnerability
Under 15	Very High
15 to 28,9	High
29 to 42,9	Mid High
43 to 56,9	Mid
57 to 69,9	Mid Low
70 and above	Low

This classification is also used in the qualification of each one of the indicators that compose the SVI. Annex 1 presents the SVI and its components in a detailed way, for the districts and *corregimientos* of in the study area

2.1.1 Cartagena de Indias

Life Quality

The indicator is composed by the variables that evaluate water supply, sewage disposal, garbage disposal and cooking fuel. In concordance to the results of the First Workshop of Cartagena, the sewage system and the lack of maintenance from sedimentation caused by erosion of the system of sewers become insufficient to overcome the city annual flood (**¡Error! No se encuentra el origen de la referencia.**).

Table 30. Cartagena life quality indicator

			LIFE QUALITY INDICATOR								
			High	**Low**	**Mid**	**Mid High**	**Mid High***	**Mid Low**	**Mid Low***	**Mid***	**Very High**
Area	Rural	*Corregimientos*	3	0	11	15	0	0	0	0	1
		Area %	10,0%	0,0%	36,7%	50,0%	0,0%	0,0%	0,0%	0,0%	3,3%
	Urban	Districts	1	28	36	5	3	73	3	6	0
		Area %	0,6%	18,1%	23,2%	3,2%	1,9%	47,1%	1,9%	3,9%	0,0%
Total			4	28	47	20	3	73	3	6	1
%			2,2%	15,1%	25,4%	10,8%	1,6%	39,5%	1,6%	3,2%	0,5%

This situation is reflected in the low values of the Services. Factor 39.5% of the City has mid low vulnerability. In the urban area, 23% of the districts have mid vulnerability. In the rural area 50% of the *corregimientos* have mid vulnerability.

Services

This factor groups together cooking fuel, water supply source and sanitary service kind. For each of the answer alternatives, an upward qualification was assigned, as they represent a better life quality condition.

Table 31. Cartagena. Service

CARTAGENA			SERVICES					
			High	**Low**	**Mid**	**Mid High**	**Mid Low**	**Very High**
Area	Rural	Corregimientos	15	0	0	3	0	12
		% de área	50,0%	0,0%	0,0%	10,0%	0,0%	40,0%
	Urban	Neighborhood	1	103	24	7	19	1
		% de area	0,6%	66,5%	15,5%	4,5%	12,3%	0,6%

	Total	16	103	24	10	19	13
	%	8,6%	55,7%	13,0%	5,4%	10,3%	7,0%

In the urban area the neighborhood with the lowest classification was Henequen (12.63), in the UCG 15 Almirante Colon 87.5 UCG 12.

Housing

This factor includes external walls materials and type of floor in which the house is built.

Table 32. Cartagena. Housing

CARTAGENA			HOUSING FACTOR				
			High	**Low**	**Mid**	**Mid High**	**Mid Low**
Area	Rural	Corregimientos	0	8	3	7	12
		% de área	0,0%	26,7%	10,0%	23,3%	40,0%
	Urban	Neighborhood	1	111	6	3	34
		% de área	0,6%	71,6%	3,9%	1,9%	21,9%
Total			1	119	9	10	46
%			0,5%	64,3%	4,9%	5,4%	24,9%

64% of the study area has low vulnerability in the housing factor. However a difference is appreciated among the rural and urban areas. While 40% of the rural area has mid low vulnerability 72% of the neighborhoods have Low vulnerability.

Human Capital Factor

This factor refers to population's preparation. It is composed by population's proportion that assists to an education institution by age ranges. In Cartagena it also includes children under 7 years of age.

Table 33. Cartagena. Human Capital Factor

CARTAGENA			HUMAN CAPITAL FACTOR					
			S.I	**High**	**Mid**	**Mid High**	**Mid Low**	**Very High**
Area	Rural	Corregimientos	0	4	12	13	0	1
		% de área	0,0%	13,3%	40,0%	43,3%	0,0%	3,3%
	Urban	Neighborhood	13	23	56	56	1	6
		% de área	8,4%	14,8%	36,1%	36,1%	0,6%	3,9%
Total			13	27	68	69	1	7
%			7,0%	14,6%	36,8%	37,3%	0,5%	3,8%

Most of the neighborhoods and corregimientos have mid high vulnerability, this shows the low coverage of basic education that Cartagena presents. Access to education in rural areas is more difficult, where 43% of the corregimientos have mid high vulnerability.

Natural disaster

Given that information comes from questionnaires done to each house, it measures inhabitants perception of house location. Natural disasters include flood, avalanche, sidings and others.

Table 34. Cartagena. NDI

Cartagena			NATURAL DISASTER INDICATOR					
			High	**Low**	**Mid**	**Mid High**	**Mid Low**	**Very High**
Area	Rural	Corregimientos	1	22	2	1	1	3
		% de área	3,3%	73,3%	6,7%	3,3%	3,3%	10,0%

Urban	Neighborhood	0	130	7	3	10	5
	% de área	0,0%	83,9%	4,5%	1,9%	6,5%	3,2%
Total		1	152	9	4	11	8
%		0,5%	82,2%	4,9%	2,2%	5,9%	4,3%

Both urban and rural area exhibit low vulnerability, which reflects that most of Cartagena's inhabitants feel safe in the place where their houses are located.

Public Investment Indicator

Investment sectors included are health, education, basic reparation, infrastructure, housing and disaster prevention. Disaster prevention received the highest ponderador, to evaluate vulnerability of the municipalities regarding RSLR.

Table 35. Cartagena. PII

Cartagena			PUBLIC INVESTMENT INDICATOR							
			High	Low	Mid	Mid High	Mid Low	Very High	S.D	S.I
Area	Rural	Corregimiento	1	7	2	0	4	1	1	14
		% de Área	3,3	23,3	6,7	0,0	13,3	3,3	3,3	46,7
	Urban	Neighborhood	0	56	7	4	23	1	6	58
		% de Área	0,0	36,1	4,5	2,6	14,8	0,6	3,9	37,4
Total			1	63	9	4	27	2	7	72
			0,5	34,1	4,9	2,2	14,6	1,1	3,8	38,9

Generally, Cartagena has Low vulnerability regarding public investment.

Population Indicator

Composed of the number of inhabitants and the number of houses inside all the Government Commune Units. The total study area exhibits very high vulnerability.

Table 36. Cartagena. PI

Cartagena			Population Indicator	
			Very High	S.I
Area	Rural	Corregimiento	29	1
		% de área	96,7%	3,3%
	Urban	Neighborhood	148	7
		% de área	95,5%	4,5%
Total			177	7
%			95,7%	3,8%

2.2 Overall socioeconomic vulnerability index

A High socioeconomic vulnerability reflects in general low life quality, which is seen through public service coverage, use of firewood as cooking fuel, houses built of materials different from cement, such as wood. All this characteristics have direct impacts over the ecosystems (mangroves and sea grasses in cases where habitat degradation is involved), degrading its general quality and diminishing its area.

Neighborhoods located in the southern border of the Cienaga de la Virgen (UCG 5 and 6), exhibit high socioeconomic and biophysical vulnerability. North western urban area, and neighborhoods along Santander avenue, exhibit high and very high vulnerability levels; those close to Chambacu and San Lorenzo lagoons exhibit high and mid high vulnerability, which can be correlated with mangroves susceptibility in areas

nearby. The same occurs with the Tierra Bomba, which exhibits mid high and mid vulnerability (southern area).

Populations located in the rural area of the Cienaga de la Virgen present mid socioeconomic vulnerability, as they have some of the indicators to a certain degree of fulfillment. The same happens with populations close to la Boquilla. These areas cook mainly with firewood, and sanitary conditions are not optimum as some don't have sanitary services connected to sewage systems. No adequate means for water supply and no investment in basic sanitation is present in the area. these facts can explain part of the reason for the degradation of some of the mangroves in these areas.

Table 37.Cartagena .SVI

			SOCIOECONOMIC VULNERABILITY INDEX								
			High	**High***	**Low**	**Mid**	**Mid High**	**Mid High***	**Mid Low**	**Mid***	**Very High***
Area	Rural	Corregimiento	3	2	0	9	4	10	1	0	1
		Area %	10,0	6,7	0,0	30,0	13,3	33,3	3,3	0,0	3,3
	Urban	District	1	6	1	36	9	37	51	12	2
		% de Área	0,6	3,9	0,6	23,2	5,8	23,9	32,9	7,7	1,3
Total			4	8	1	45	13	47	52	12	3
%			2,2	4,3	0,5	24,3	7,0	25,4	28,1	6,5	1,6

* Some *corregimientos* and districts don't have Population or Public Investment information

2.3 San Andres de Tumaco

As for Cartagena, the SVI is calculated based on the SISBEN 2005.survey data. For the analysis of the urban area of Tumaco, secure area division was taken from OSSO report. In the rural area, the *corregimientos* that besides having SISBEN information, are located in the coastal area of Tumaco, were taken. Annex 1 and 2 present SVI results for the *corregimientos* and neighborhoods that compose the study area, in a detailed manner.

Life Quality Indicator

LQI in the three secure areas of Tumaco's urban area, present mid high vulnerability.

Table 38. Tumaco. LQI urban area

SECURE AREA	LIFE QUALITY INDICATOR
ISLA TUMACO Y LA VICIOSA	Mid High
ISLA EL MORRO	Mid High
ZONA CONTINENTAL	Mid High

On the other hand the LQI in the rural coastal area, shows that 80.6% of the *corregimientos* have High vulnerability and 19,4 Very High vulnerability. These results evidence the great difference on Life conditions among the urban and rural area and how this affects the vulnerability regarding RSLR.

Table 39. Tumaco. LQI rural area

		LIFE QUALITY INDICATOR	
		High	**Very High**
Rural	*Corregimiento*	25	6
	% de area	80,6%	19,4%

Field work carried in Tumaco's coastal area during September, helped ratify such differences.

Services Factor

Housing characteristics regarding cooking fuel, water supply source and sanitary service's type, result in a mid vulnerability in the 3 secure areas for the urban area of Tumaco.

Table 40. Tumaco. Services Factor urban area

SECURE AREA	SERVICES FACTOR
ISLA TUMACO Y LA VICIOSA	Mid
ISLA EL MORRO	Mid
ZONA CONTINENTAL	Mid

In the rural area, houses exhibit a services factor of 32.3% with very high vulnerability, 48.4 High% and 19.4 Mid High.

Table 41. Tumaco. Services Factor rural area

		SERVICES FACTOR		
		High	**Mid High**	**Very High**
Rural	*Corregimiento*	15	6	10
	% de area	48,4%	19,4%	32,3%

Housing Factor

Tumaco's urban area exhibit housing characteristics similar to those that show mid vulnerability. However in each of the secure areas, neighborhoods exist with high vulnerability, as is the case of Luis Avelino Pérez in the Island of Tumaco, Pradomar in the Island El Morro and Ciudadela in the Continental Area.

Table 42. Tumaco. Housing Factor urban area

SECURE AREA	HOUSING FACTOR
ISLA TUMACO Y LA VICIOSA	Mid
ISLA EL MORRO	Mid
ZONA CONTINENTAL	Mid

93% of the coastal rural area presents mid high vulnerability in the housing factor, showing the differences among both areas of the municipality.

Table 43. Tumaco. Housing Factor rural area

		HOUSING FACTOR	
		High	**Mid High**
Rural	Corregimiento	2	29
	% de area	6,5%	93,5%

Human Capital Factor

Proxy variable used to analyze human capital factor is population on the SISBEN that is studying, this variable allows us to have an idea on how much invest the inhabitants of Tumaco in their preparation, and with this on their expectancies regarding improving their life style, as better education levels allow access to better employments and this insides on income level for its inhabitants.

Tumaco's urban area exhibit a low vulnerability regarding human capital factor, except for el Pindo and Ciudadela which have mid low vulnerability.

Table 44. Tumaco. Human Capital Factor urban area

SECURE AREA	HUMAN CAPITAL FACTOR
ISLA TUMACO Y LA VICIOSA	Low
ISLA EL MORRO	Low
ZONA CONTINENTAL	Low

In contrast, the entire rural area of the corregimientos present Very High vulnerability.

Natural Disaster Indicator

Although the classification of the urban area corresponds to the secure areas, the inhabitants perception of their houses location in risk areas exhibits mid high vulnerability for Tumaco's island and La Viciosa. Perception of vulnerability is mid for continental areas and mid low for el Morro island.

Table 45. Tumaco. NDI urban area

SECURE AREA	NATURAL DISASTER INDICATOR
ISLA TUMACO Y LA VICIOSA	Mid High
ISLA EL MORRO	Mid Low
ZONA CONTINENTAL	Mid

Rural coastal area exhibits 45.2% very high vulnerability, and only 4 areas have low vulnerability.

Table 46. Tumaco. . NDI rural area

		NATURAL DISATER INDICATOR				
		High	**Low**	**Mid**	**Mid High**	**Very High**
Rural	Corregimiento	7	4	3	3	14
	% de área	22,6%	12,9%	9,7%	9,7%	45,2%

Public Investment Indicator

Given that Tumaco doesn't have direct investment in the neighborhoods or urban area levels, neither for corregimientos or community councils, the same value was taken for the entire municipality. It is important to underline that given that Tumaco is under the broke law (Ley de Quiebra), investment resources decrease as they are redirected to pay public debt. Additionally no investment is made for disaster prevention and housing, two of the components of the PII which have the biggest ponderate value to evaluate the vulnerability of the coastal area Because of the above, the urban and rural areas present very High vulnerability.

Population Indicator

All the corregimientos and neighborhoods exhibit very high vulnerability, except for Chajal which shows high vulnerability.

2.4 Overall socioeconomic vulnerability index

In general terms the urban area of Tumaco presents High vulnerability. In The Island of Tumaco and Visiosa over half of the secure areas present High vulnerability. Additionally Miramar urbanization presents Very high vulnerability regarding RSLR.

Table 47.Tumaco. IVS urban area

SECURE AREA	SOCIOECONOMIC VULNERABILITY INDEX
ISLA TUMACO Y LA VICIOSA	High
ISLA EL MORRO	High
ZONA CONTINENTAL	High

In the Island of El Morro, most of the secure areas that have information, present mid high vulnerability. The secure areas of the Continental area of Tumaco, have high vulnerability regarding ASLR.

Table 48. Tumaco. IVS rural area

		SOCIOECONOMIC VULNERABILITY INDEX			**Total**
		High	Mid High	S.I	
Rural	*Corregimiento*	15	7	9	31
	% de area	48,4%	22,6%	29,0%	100,0%

In the rural coastal zone of Tumaco 48.4% of the *corregimietos* exhibit High vulnerability and 22.6% mid high vulnerability.

Scenario development

To develop adaptation measures needed for ASLR, different scenarios where designed to characterize future states of Cartagena and Tumaco. Such scenarios do not pretend to predict what will happen, but are merely descriptions of different possibilities these cities may face according to present situations and the way local governments are planning their future.

Scenarios are placed in the year 2019. This year was chosen as a National vision by the present administration, which describe how the country is seen as it should be in that year. The country has reached different documents describing the dispositions for this year, as this is the time when Colombia celebrates two centuries as a political independent country (DNP, 2005).

Local government plans are also considered, to foresee the real possibilities each city has on a regional level to fulfill Colombia's general vision for this year. Such plans are not thought up to this year, but they are done for a shorter term, usually periods established depending on actual governments and national planning laws.

Colombia in the year 2019 involves many aspects that are not going to be mentioned and only those considered relevant for the creation of scenarios are listed below.

In the socioeconomic aspect economy is expected to be growing at a rate of 6% yearly. Urban coverage of water supply and sewage coverage must reach 100% (at the moment they are of 97.4% and 90.2% respectively) and rural coverage must be of 82.2% for water supply (against a 68.6%) and of 75.2% for excrement elimination (against an actual 57.9%).

Basic education coverage must be universal, with 100% of bachelors of capital cities bilingual. Education must reach an average of 11.3 years for people between 15 and 24 years of age (against an actual of 8.7 years), with a gross coverage of 40% in higher education (currently it is of 25.7%).

To avoid the establishment of new unsafe settlements, 3.9 millions of new houses are to be build, and 804000 houses must be improved, reducing total household deficit to a 12% (against an actual 30%).

In the year 2019, Colombia must have reconsidered it's vision of the oceans, involving the 928.660 km2 of marine area (44.8% of total territory extension) in the development of the country, seizing sea potentialities and continental zones as well, through tourism (increasing foreign tourism eight times it's actual number) and bio - commerce.

Important velocity corridors must be established on the roads: a) North – South direction: The new Western highway, Magdalena's highway, Central- Northern highway and Marginal Forest highway. b) East- West direction: Tumaco – Rio Putumayo corridor, Buenaventura-Puerto Carreño corridor, Media Luna de los Valles Fértiles highway and Caribbean Marginal highway.

For port development Colombia must seize it's strategic location on the main marine commerce corridor of the world, to increase to 285 millions of tons per year port's capacity of public use (currently it is 150 million ton/year).
Colombia must also increase to 99.4% energy service in interconnected areas (against an actual 90%). The state must be working completely by results and the decentralization process must result in a complete competence definition among the nation and territorial entities. All territorial entities must be financially viable.

Environmentally, Colombia's vision for 2019 implies a constant development, based on the sustainable use of natural resources, involving society in the different decisions to be taken on environmental matters and on the costs and benefits such development implies (DNP, 2005). To be able to get to this point, national development must be based upon the sustainable development principles that seek to respect the interests of all and protect the integrity of the global environmental and developmental system, recognizing the integral and interdependent nature of the Earth (United Nations, 1972).

Colombia's vision for 2019 involves environmental issues that are following exposed.The need for the country to involve environmental issues in every planning aspect is highly recognized. It must also rely on a regulatory background that guarantees the solution of different priorities, equity and security. Institutional capacity must also be strengthened so that laws and regulations are see into order.

As a direct result, biodiversity loss and degradation processes should be solved and reversed, as the different contamination problems that are found in the different urban centers of the country. As a result the goods and services that natural systems may offer, should be enhanced and result in bigger benefits for the population.

Environmental tasks must be based upon the principles of efficiency (objectives fulfilled in a rapid manner with few resources), efficacy (objectives fulfilled as planned), equity (costs and benefits for the entire population), transparency (policies, strategies, standards and regulations are to be public), participation (environmental planning must involve the public in general), recognition (of social, economical, environmental, territorial, cultural and ethnic diversity), complementary (policies, regulations, projects and activities that involve environmental aspects must be inter - institutionally coordinated and be complimentary so that they reinforce each other and are more effective and efficient).

For 2019 the country also seeks some specific objectives that are to be fulfilled all over the country,. These include:

- Ecosystems and soils: adopt strategies, mechanisms and actions that prevent, recover and stop degradation processes.
- Maintain the country's forestall coverage
- Guarantee biodiversity and ecosystem's conservation through the strengthening of the National system of Protected Areas.
- Promote sustainable use of biodiversity, defining clearly conditions of use and access of biological resources.
- Reduce hydrographic vulnerability and guarantee water offer for all the country.
- Promote rational and efficient water use in the different productive sectors.
- Reaching a 50% of water disposals that fulfill regulations and standards
- Reaching particle concentrations that fulfill standards.
- Contributing to global reduction of climatic problems.
- Reduction of contamination problems and environmental and health hazards related to waste disposal.
- Improve information and early alert systems to prevent disasters.
- Improve risk preparation through economic planning instruments that guarantee an enhanced well being.
- Reduce state's physical vulnerability in case a disaster takes place.
- Guarantee the inclusion of environmental aspects in policies, plans and programs, and in planning processes an problem solving as well.
- Strengthen National Environmental System (SINA, for it's name in Spanish) entities, so that they help enhance development's environmental benefits, assure fair distribution and internalize their environmental costs.
- SINA's research tasks are to be optimized and efficient. Information should be systemized.
- Guarantee international country's rights and capitalize the opportunities that result from instruments and international environmental agreements.
- Strengthen citizen participation mechanisms y environmental decision taking and in the fight for environmental rights.

ASLR is a phenomena that is taking place gradually and people are having to deal with it. By the year 2019, this phenomena will be even more accentuated than today, but still not as bad as it will be in one hundred years. It is important therefore to start generating coping strategies that will help population at risk and will diminish the loss of biodiversity as a consequence of this process.

Adaptability may be enhanced therefore, by reducing the susceptibility of natural systems to ASLR, it is important to note that in such a context, natural systems not only provide a source of resources for human populations for the goods and services they provide, but also act as natural barriers that help mitigate negative effects of ASLR and other climatic phenomena.

With this in mind, is important to face the development of scenarios as a process in which the idea is to foresee what might happen with natural systems, depending on some different courses of action considered for a city. According to what is expected for Colombia in 2019 documents, and what local plans state, a very important aspect that will be strengthened in this year is local institutional capacity.

This will result in the focusing of plans, programs and actions agreed with local communities, which implies entities that have the capacity to design and generate policies that arrange territory and that are connected with regional and national policies and regulations.

In this vision is important to note that the solution to social problems is not exclusively technical or resource dependent, it is mainly political and institutional, being critical the adjustment of laws and regulations, institutional arrangements and consensus to implement policies effectively. The success of public policies is related to permanent existence of expenditure evaluation programs that assure efficiency, efficacy and a major impact of public investment.

3 Desired Scenario – 2019

3.1 Cartagena

Cartagena has positioned as a major tourism destiny in Colombia's Caribbean coast. It is recognized for it's historic value and natural systems beauty. Cartagena's vision for the future is of a city developed, exploiting its potential in a sustainable manner, highly positioned in the tourism sector, both nationally and internationally.

3.1.1 Environmental dimension

Cartagena's vision as stated in city documents as Territorial Arrangement Plan (POT for its name in spanish), Territorial Environmental Management Plan (PGAT for its name in spanish) and Colombia 2019, involves incorporating the environmental dimension to territorial policies. This means restoring and protecting natural systems to assure conservation, and sustainable use, improving life quality for populations that use and depend upon these systems and for the population in general seen through better environmental quality.

In Cartagena, the natural system's susceptibility is based upon secondary sources and expert knowledge. Because of this is difficult to establish direct relations among variables. As in many cases, the major threats Cartagena faces come from anthropogenic impacts. However, territorial arrangement is already being implemented and this means that if fulfilled at future the scenario tends to improve.

The social variables that affect directly natural's system susceptibility are expected to change in the following way for 2019:

- Population increase of 2.12%/ yearly for the study area
- Urban coverage of water supply and excrement elimination of 100%
- Rural coverage of 82.2% for water supply and of 75.2% for excrement elimination
- 99.4% energy service in interconnected areas

The idea is to improve environmental offer for the territory and diminish negative impacts, seeking for better equity in populations access to the goods and services they provide. In this context, the recuperation of the Cenaga de la Virgen and Cartagena bay is explicit in such vision, being highlighted the importance of the restoration of the connections that la Cienaga has with the sea.

Waste treatment is also expected to improve, and the idea is that no more untreated sewage will be disposed in the Cienaga. This is expected to improve in general water and ecosystem quality, not only of this area, but of Cartagena Bay as well, for better disposal systems will have an impact over the entire area. Arrangement plans for La Cienaga de la Virgen are already at hand, and territory in this area has been divided according to the uses suitable and necessary according to vegetation condition.

All natural systems are intended to be recovered, including mangroves and sea grasses. Territory management is supposed to be paired with appropriate use of land and water resources.

Water Quality and Hydrographic processes integrity is supposed to improve as water disposal treatments are to be implemented, as well as an increase in the service of excrement elimination. Although water quality wasn't significantly threatening flora and fauna preservation. However, such increase in population and industry as tourism, the difference in system susceptibility due to this indicator is not going to be significant, even if water treatment is improved.

The northern area of the Cienaga de la Virgen is to be drained and turned suitable for urban expansion, which means that the mangroves in that area are destined to disappear. Because of this ecosystem quality for the mangroves located in such area is expected to decrease significantly, as the environment will be highly modified and intervened. However the susceptibility for mangroves in Cartagena Bay seems to diminish as a result of regulations.

Given territorial management processes and regulations, recovery areas are expected to be maintained or even grow in most cases, which in turn reduces general susceptibility for such index. However, habitat conversion is expected to increase as a major demand for land and expansion areas will be reflected in natural system's coverage changes. The threats these system's face wont change much, although they are expected to increase, specially because weather change and sea level rise will result in harsher environmental conditions.

Table 49. Natural Susceptibility for Cartagena 2019 vision

SYSTEM	LOCATION	ECOSYSTEM COVERAGE: TOTAL HABITAT LOSS	WATER QUALITY AND HYDROGRAPHIC PROCESSES INTEGRITY	ECOSYSTEM QUALITY
Mangroves	Cartagena Bay Continental Areas	Mid-low	Mid-low	Mid-low
	Cartagena Bay Insular Areas	Mid	Mid-low	Mid
	Cienaga de la Virgen North	Mid	Mid-low	Mid-high
	Cienaga de la Virgen South	Mid-low	Mid-low	Mid-high
Beaches	Bocagrande	Mid-high	Mid-low	N.A.
	Bochica	Mid-low	Low	N.A.
	Cano del Oro	Mid	Mid-low	N.A.
	Castillo Grande	High	Mid-low	N.A.
	El Laguito	High	Mid-low	N.A.
	La Boquilla	Mid	Mid-low	N.A.
	Marbella	Mid-low	Mid-low	N.A.
	Tierrabomba	High	Low	N.A.
Sea grasses	Cartagena Bay	Mid-high	Mid-low	Mid-high

SYSTEM	LOCATION	RECOVERY AREAS	LAND USE: HABITAT CONVERSION	THREATS
Mangroves	Cartagena Bay Continental Areas	Low	Mid	Low
	Cartagena Bay Insular Areas	Mid	Mid	Mid-low
	Cienaga de la Virgen North	Mid-high	Mid-high	Mid-low
	Cienaga de la Virgen South	Low	Mid	Mid-low
Beaches	Bocagrande	N.A.	High	Low
	Bochica	N.A.	Low	Mid-high
	Cano del Oro	N.A.	Mid-low	Mid
	Castillo Grande	N.A.	High	Mid
	El Laguito	N.A.	High	Mid
	La Boquilla	N.A.	Mid	Low
	Marbella	N.A.	Mid-high	Low
	Tierrabomba	N.A.	Mid	Low
Sea grasses	Cartagena Bay	Mid-high	N.A	Mid

Overall susceptibility is seen to increase (table 17), compared with the present state, which only confirms that natural systems are directly affected by human populations and they take long time to recover.

Table 50.Overall susceptibility for Cartagena 2019 vision

SYSTEM	LOCATION	SUSCEPTIBILITY
Mangroves	Cartagena Bay Continental Areas	Mid-low
	Cartagena Bay Insular Areas	Mid
	Cienaga de la Virgen North	Mid-high
	Cienaga de la Virgen South	Mid
Beaches	Bocagrande	Mid-high
	Bochica	Mid-low
	Cano del Oro	Mid
	Castillo Grande	High
	El Laguito	High
	La Boquilla	Mid
	Marbella	Mid-low
	Tierrabomba	Mid-high
Sea grasses	Cartagena Bay	High

3.1.2 Socioeconomic Dimension

This scenario is characterized by the fulfillment of National Government goals for 2019. Equally, the goals of Cartagena's POT have been fulfilled, as they include the improvement of housing in the urban zone, development of social interest housing in the designed areas of the city and the corregimientos, and legalization of subnormal settlements and relocation of houses in high natural or technological risk areas.

Given the above, Cartagena in the 2019 exhibits:

- Constant population growth to the same rate calculated by DANE in its quinquennial projections. For Cartagena, the rate of the department of Bolivar (2.12) was used.
- 90% of the urban area houses cook with Gas connected by tubes, 6% with electricity and the remaining 4% with Gas cylinder or pipette.
- 70% of the rural area houses cook with Gas connected by tubes, 20% with electricity and 10% with Gas cylinder or pipette.
- Water supply coverage of 100% in urban areas and of 82.2% in rural areas. In the rest of the rural area, water source is inside the property, but outside the housing.
- Rural and urban areas have a 100% coverage in the trash harvesting service.
- Excrement elimination coverage in urban areas is of 100% and of 75.2% in rural areas. The rest of the houses in rural areas use toilets with connection to septic well.
- Housing's floors is no longer soil, arena, rough wood or boards.
- Exterior walls material of the houses in the rural and urban areas are Blocks, bricks, stones, prefabricated material or treated wood.
- Basic and high school education coverage of 100% in rural and urban areas.
- Risk perception given housing location is diminished by 80%.
- The gap of existing conditions between the rural and urban zone has been reduced notably, therefore participation of sectorial investment (90% of the total investment) is the same for all the territory of Cartagena. In this manner, 25% is destined to education, 25% to Health, Infrastructure 10%, basic sanitation 5%, housing 10% and disaster prevention 15%.
- House number increases by 10%

3.1.3 Socioeconomic Vulnerability Index Interpretation

The execution of the previously mentioned goals makes the vulnerability of the study area mid low. In Annex 4 the variation of the SVI can be seen, as well as its components for each of the *corregimientos* and districts analyzed.

The district *Las Gaviotas* received the highest qualification, with a 66.7 contrasting a 47,6 in 2005, which implies an increase of 40%. On the other hand *Ciudadela* obtains a 44.8, being this the lowest value for 2019.

Table 51. Cartagena. SVI 2019

			SOCIOECONOMIC VULNERABILITY INDEX 2019			
			Mid	**Mid Low**	**Mid Low***	**Mid***
Area	Rural	Corregimiento	2	27	0	1
		% de Área	6,7%	90,0%	0,0%	3,3%
	Urban	neighborhood	0	148	5	2
		% de Área	0,0%	95,5%	3,2%	1,3%
Total			2	175	5	3
% de Área			1,1%	94,6%	2,7%	1,6%

Life Quality Indicator

Services

A universal coverage of basic services in urban area and over 80% in rural area, reduces the gap between the two areas. In 2019, services factor will have a Low qualification. The urban area will have a total qualification of 88.4 and the rural area of 86.6.

Housing

Change in the materials used for building the houses, as a result of housing improvement policies, reduces vulnerability to low in all of Cartagena's *corregimiento*s and districts.

The housing factor for all the neighborhoods of the urban area and *corregimientos* of the rural area, obtained scores over 70 which means they have low vulnerability. The lowest score (75) was shown by the Matuna district, located in the UCG 1 and the highest (92) the Almirante Colon in the UCG 12.

Human Capital

Cartagena presents mid low vulnerability. Although a cover of 100% in basic education is achieved, the maximum score is not obtained as the proportion of children under 7 years remains constant.

The human Capital factor in the rural area obtained a mid low qualification, in the urban area all the districts obtained mid low vulnerability, except for Almirante Colon which has low vulnerability.

Natural disaster

In 2019 this indicator is expected to be low as a result of the relocation of the houses that were in risk areas, both in the urban and rural areas. 21 neighborhoods and 4 *corregimientos* would obtain the maximum score.

Public investment

In 2019 the financial situation of Cartagena allows it to increase social investment to 90%, and specifically the item of Disaster Prevention to 15%. This, together with the decision that all the neighborhoods and corregimientos should manage the same distribution of the budget, results in a low qualification for the PII for 2019.

Population

A presumed constant growth rate, makes that this indicator doesn't present modifications.

3.2 Tumaco

Given the environmental qualities and development potential of Tumaco, it can become a well positioned area according to the expectancies found in various documents as the Territorial Arrangement Plan (POT for its name in spanish), The Regional Environmental Management Plan 2002- 2012 (PGAR for its name in spanish) and the Development Plan 2004 – 2007.

3.2.1 Environmental Dimension

Tumaco is one of the poorest areas of the country, and it has adopted the law of broken entities, which means that no public investment will be made in this area for the next years. Nevertheless on the environmental level, Tumaco has been depending on some scarce public resources and projects carried out with external aid that allow some processes to continue, as is the case of the present study. With this in mind is important to understand that investment on the environmental level will be restricted and scarce and probably highly focalized.

Tumaco makes emphasis on environmental education through strategies that allow community's commitment and understanding of their responsibility with sustainable development. Having in mind the possibility of generating an environmental conscience in the population, the idea is that many of the threats that Tumaco faces will be reduced, not only as a result of more efficient and effective institutional action, but also as a result of population conviction as well. Another strategy to be considered involves the promotion, establishment, recuperation and implementation of protected areas, either by the nation or by civil society (Corponariño, 2002).

The main objective is to guarantee it's inhabitants alimentary security, without threatening the natural systems, resulting in sustainable development. This in turn strengthens the green market programs resulting in new sources of income and in the possibility of promoting practices as ecotourism, and organic agriculture, which is in turn less harmful for the environment. This will create a greater environmental awareness and will promote the need to regenerate degraded areas (Corponariño, 2002).

To be able to obtain such results, traditional productive systems are to be promoted with certain improvements that don't cause negative impacts on the natural systems. Research in science and technology must be enhanced as well, as should business promotion. Management of water sources should also be regarded as a key point in the environmental processes (Corponariño, 2002).

Given that the natural system's susceptibility is based upon secondary sources and that information available varies, it results very difficult to be able to establish direct relations among variables. However as the major threats Tumaco faces come from anthropogenic impacts, the way natural systems will change and behave throughout time is directly related with population changes and the conditions under which they are at a given time. This in turn results as well in the fact that territorial arrangement becomes the main tool to be able to plan the area in a sustainable manner.

As social variables affect directly natural's system susceptibility, the following are changes that were assumed to modify individual indices and to finally generate de index:

- Population increase of 1.59%/ yearly for the study area
- Urban coverage of water supply and excrement elimination of 100%
- Rural coverage of 82.2% for water supply and of 75.2% for excrement elimination
- 99.4% energy service in interconnected areas

If governmental projections fulfill and Colombia 2019 fits the different parameters mentioned, the impact generated by a growing population will be mitigated. Ecosystem coverage can be enhanced, as total habitat loss can be reduced as a result of the recognition of the need to protect and preserve the ecosystem, and of using it in a sustainable manner. Therefore although total coverage might not be increased, the fact that the use given to this area will be more "environmentally friendly", might result in a system that although exhibits more intervened areas, degraded area will be probably reduced.

Water Quality and Hydrographic processes integrity is one of the most affected indicators by population growth, as this is the main source of contamination water faces. However, the fact that with population

growth, there is a projected increase in sanitary services (excrement elimination) and an improvement in waste disposal and in agricultural practices, reducing agrochemical use, a general diminish in these contaminants can be expected. Despite this, as was seen in the system's susceptibility chapter, water quality wasn't significantly threatening flora and fauna preservation. With a scenario in which sanitary coverage improves as well as other practices, regarding the fact that population grows, the difference in system susceptibility due to this indicator is not going to be significant.

Ecosystem Quality is directly related with what was described for Ecosystem coverage, as although some areas that weren't intervened may become intervened, through education and change in practices, through an increase in sustainable alternatives for the population that reduce impact on the natural system and through an improvement in environmental conditions (resulting from better systems coverage), the quality of ecosystems will improve with time. This will be reflected in lost areas, recovering from degradation, representative parameters as diversity and abundance of related species might be improved and general complexity indexes will be increased as a result of natural dynamics in recovery areas.

In this order of ideas, recovery areas will also increase, resulting in the recuperation of degraded areas and probably the establishment of areas that are to be merely preserved and not used at all.

Habitat conversion is one of the most affected indicators by population growth, as it is the result of agricultural processes and of the establishment of human settlements in a given area. Both of these factors increase, in case population grows, and no matter how sustainable and educated the population becomes, transformation processes still take place and generate important impacts upon the physical system.

The different threats Tumaco faces will vary if they depend on human action. If they come from natural sources, by 2019 no real changes can be presumed, except for inundation areas as they will probably be exacerbated with sea level rise. Tsunami and erosive processes threats are going to be left within the same values. Regarding fuel accidents, agroindustrial activities and biodiversity loss, these threats are susceptible to population growth. However, given the idea that at this time environmental education, use of organic agriculture, use of traditional crops and improved waste disposal will be at hand, the impacts these activities are currently generating may be greater than they will be in the year 2019.

Overall susceptibility is seen to remain the same (Table 52) , compared with the present state, which only confirms that natural systems take long time to recover and are highly affected by changes in human populations.

Table 52. Natural Susceptibility for Tumaco's 2019 vision

Ecosystem coverage

System	ZONE	Susceptibility
Mangroves	A1	mid-low
	A2	high
	B1	mid-low
	B2	mid-high
	C	mid-high
	CCB.M	mid

Environmental Susceptibility Index

System	ZONE	Natural Susceptibility
Mangroves	A1	mid-low
	A2	mid
	B1	mid
	B2	mid
	C	mid
	CCB.M	mid
Beaches	C	mid
	CCA.M	mid-low
	CCB.M	mid

Water Quality and Hydrographic processes integrity

System	ZONE	Susceptibility
Mangroves	A1	mid-low
	A2	mid-low
	B1	mid-low
	B2	mid-low
	C	mid-low
	CCB.M	mid-low
	C	mid-low
Beaches	CCA.M	low
	CCB.M	mid-low

Ecosystem Quality

System	ZONE	Susceptibility
Mangroves	A1	low
	A2	mid-low
	B1	mid-low
	B2	low
	C	mid-low
	CCB.M	low

Recovery areas

System	ZONE	Susceptibility
Mangroves	A1	mid-low
	A2	high
	B1	mid-low
	B2	mid-high
	C	mid-high
	CCB.M	mid

Habitat Conversion

System	ZONE	Susceptibility
Mangroves	A1	mid-low
	A2	high
	B1	mid-low
	B2	mid-high
	C	mid-high
	CCB.M	mid-high

Threats

System	ZONE	Susceptibility
Mangroves	A1	mid-high
	A2	mid
	B1	mid-high
	B2	mid
	C	high
	CCB.M	mid
	C	high
Beaches	CCA.M	mid
	CCB.M	high

3.2.2 Socioeconomic Dimension

As in Cartagena, population growth is assumed constant, in the same rate calculated by DANE in its five-year projections. For Tumaco the rate of Narino is taken (1.59).

Given that no information on education coverage is available per levels, the proxy used is the population's proportion that assists to an education institution. In such a way 100 coverage in basic education and 40% in high school education, represents a 70% of the population assisting to an educational center.

National policy of reducing housing deficit by 40%, together with a relocation of houses located in risk areas, turns people perception regarding house location to improve. In such a way, 80% of the households are to be located in areas with no associated risks, 3% are in sliding risk, 1.5% in flooding risk, 0.5% in avalanche risk and the remaining 15% are located in areas where inhabitants perceive different risks.

Following such line of ideas, housing policies make suburban settlements to be reduced, and as such housing conditions are improved. Firewood, mineral coal and kerosene are not used as cooking fuels any more. Cooking is done mainly with electricity (70%) and gas. Moreover, external wall materials are made from wood and bricks exclusively and floors aren't dirt, soil or arena any more.

This scenario for 2019, with a universal coverage of basic services, with housing conditions improved and where fiscal sustainability exists, implies that before 2019 a great investment in health, education, basic sanitation, infrastructure, housing and disaster prevention is made. From 2019, investment is destined to maintaining the levels reach, rather than increasing coverage. Because of this the same investment percentage is destined to each of the sectors (14%), given the awareness that they are highly related.

In rural areas water supply reaches 82.2% and excrement elimination is of 75.2%. Following local plans, rural houses have basic services and improve the materials in which they are built, using only bricks and wood in external walls and not using soil, dirt or arena for the floor.

Electric interconnection in the rural areas exists, for firewood, mineral coal and kerosene aren't used as cooking fuels any longer. Nevertheless as opposed to the urban area, gas (80%) is the main source of fuel followed by electricity.

Considering that national government lines of action, and local plans seek equity and equality in the access of services for the entire population, as in urban area a coverage in basic education of 100% is attained and 40% for high school. As such, population proportion assisting to an education institution is of 70%.

According to the plan of government in the rural areas, houses located in high risk zones are to be moved to low risk areas, so that the risk of being in an area with flood, avalanche or sliding risk is reduced by 80%.

3.2.3 Socioeconomic Vulnerability Index Interpretation

Given the socioeconomic characteristics of Tumaco in 2019, the SVI was calculated. In attachments 5 and 6 the detailed variation of the SVI and each corrregimiento and neighborhood can be seen.

In the rural area, except for Piñal Salado and Chajal whose vulnerability would be mid low, the other corregimientos exhibit mid vulnerability. This represents an increase in this index. An increase in the population's well-being is reflected, as in 2005 most of the corregimientos showed high vulnerability.

In the urban area, all the secure areas are qualified as mid low vulnerable, with the exception of the neighborhoods Carbonera and el Bajito, which have mid vulnerability.

Life Quality Indicator

Services

Given the fulfillment of goals in enhancing basic services coverage, Tumaco will reach a low vulnerability, meaning a remarkable improvement in life quality for inhabitants in rural areas were classified with High and Very High vulnerability in 2005 in near 70% of the *corregimientos*.

Housing

Compared with 2005 when the minimum qualification was of 25 and 29.6 in the urban and rural areas respectively, in 2019 the minimum qualification is close to 70. This means that the vulnerability of this factor for the urban and rural areas is low.

Table 53. Tumaco. Housing

Area		Housing 2005	Housing 2019
Urban	Min	25,00	75,00
	Max	90,00	92,00
Rural	Min	29,64	76,47
	Max	78,49	85,29

Human Capital

Given that the population proportion assisting to education institutions increased to 70%, vulnerability for this factor changes to mid high in urban and rural areas. in both areas

Natural disaster

In 2019 as a result of housing policies, and of moving houses to low risk areas, the total of the urban area obtains a qualification of 93.6 and the rural area 96.7. In such a way Tumaco changes from having almost all it’s neighborhoods and corregimientos with high vulnerability, to have the total of the municipality with Low vulnerability.

Public Investment Indicator

Although the percentage of social investment remains constant, including investment in the housing and disaster prevention, makes this indicator obtain a qualification of 63, with a mid low vulnerability in both rural and urban areas.

Population Indicator

The same as Cartagena, this indicator presents no variations.

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ANNEX 1. CARTAGENA SOCIOECONOMIC VULNERABILITY INDEX CALCULATED PER DISTRICT 2005

CODSIS	DISTRICT	SERVICES	SERVICES	HOUSING	HOUSING	HUMAN CAPITAL	HUMAN CAPITAL
100	MARBELLA	75,00	Low	75,00	Low	0,00	
150	DANIEL LEMAITRE	68,70	Mid Low	74,28	Low	42,86	Mid High
200	SANTA MARIA	79,76	Low	80,44	Low	41,82	Mid High
250	CANAPOTE	80,64	Low	81,05	Low	45,76	Mid
300	SAN PEDRO Y LIBERTAD	71,09	Low	74,49	Low	43,50	Mid
350	SIETE DE AGOSTO	79,68	Low	81,89	Low	35,33	Mid High
400	TORICES	65,71	Mid Low	71,51	Low	43,05	Mid
450	SAN FRANCISCO	55,98	Mid	68,85	Mid Low	31,93	Mid High
500	PABLO VI - II	62,25	Mid Low	75,91	Low	42,67	Mid High
501	REPUBLICA DEL LIBANO	63,58	Mid Low	71,21	Low	28,49	High
504	OLAYA ST PLAYAS DE ACAPULCO	49,01	Mid	60,77	Mid Low	23,91	High
507	OLAYA SECTOR FOCO ROJO	52,66	Mid	61,29	Mid Low	23,33	High
511	OLAYA SECTOR RAFAEL NUÑEZ	55,15	Mid	62,94	Mid Low	28,49	High
513	OLAYA SECTOR 11 DE NOVIEMBRE	54,05	Mid	63,79	Mid Low	28,39	High
516	OLAYA SECTOR CENTRAL	52,71	Mid	65,36	Mid Low	27,68	High
519	OLAYA SECTOR RICAURTE	48,21	Mid	62,89	Mid Low	25,22	High
521	REPUBLICA DE VENEZUELA	77,93	Low	81,08	Low	28,47	High
524	TESCA	81,23	Low	81,64	Low	28,51	High
527	CHIQUINQUIRA	83,34	Low	84,55	Low	35,01	Mid High
530	CASTILLETE	86,49	Low	89,59	Low	55,45	Mid
532	COSTA LINDA	85,54	Low	89,02	Low	47,59	Mid
550	PEDRO SALAZAR	84,36	Low	84,77	Low	46,59	Mid
600	LOS COMUNEROS	79,05	Low	82,70	Low	46,81	Mid
650	EL CABRERO	71,25	Low	50,00	Mid	0,00	
700	PETARE	48,04	Mid	65,50	Mid Low	46,31	Mid
750	PALESTINA	38,87	Mid High	62,58	Mid Low	35,94	Mid High
800	REPUBLICA DEL CARIBE	49,63	Mid	65,82	Mid Low	42,76	Mid High
850	PARAISO II	27,41	High	52,83	Mid	22,19	High
900	LA PAZ	43,22	Mid	55,00	Mid	28,84	High
950	LOMA FRESCA	42,50	Mid High	57,97	Mid Low	39,87	Mid High
1000	PABLO VI - I	64,70	Mid Low	76,08	Low	47,16	Mid
CodSis	NEIGHBORHOOD	LIFE QUALITY INDICATOR 2005	LIFE QUALITY INDICATOR 2005	Natural Catastrophe Risk Indicator 2005	Natural Catastrophe Risk Indicator 2005	PUBLIC INVESTMENT INDICATOR 2005	PUBLIC INVESTMENT INDICATOR 2005

100	MARBELLA	Mid*	50,00	0,00	Very High		S.I
150	DANIEL LEMAITRE	Mid Low	61,95	91,36	Low	64,86	Mid Low
200	SANTA MARIA	Mid Low	67,34	88,09	Low	78,94	Low
250	CANAPOTE	Mid Low	69,15	92,59	Low	80,42	Low
300	SAN PEDRO Y LIBERTAD	Mid Low	63,03	89,08	Low	60,00	Mid Low
350	SIETE DE AGOSTO	Mid Low	65,63	82,79	Low		S.I
400	TORICES	Mid Low	60,09	90,53	Low	62,83	Mid Low
450	SAN FRANCISCO	Mid	52,26	84,85	Low	58,67	Mid Low
500	PABLO VI - II	Mid Low	60,28	90,39	Low	60,00	Mid Low
501	REPUBLICA DEL LIBANO	Mid	54,43	73,41	Low	52,41	Mid
504	OLAYA ST PLAYAS DE ACAPULCO	Mid	44,56	59,79	Mid Low		S.I
507	OLAYA SECTOR FOCO ROJO	Mid	45,76	68,65	Mid Low	60,00	Mid Low
511	OLAYA SECTOR RAFAEL NUÑEZ	Mid	48,86	51,25	Mid	60,00	Mid Low
513	OLAYA SECTOR 11 DE NOVIEMBRE	Mid	48,74	51,55	Mid	68,28	Mid Low
516	OLAYA SECTOR CENTRAL	Mid	48,58	62,08	Mid Low	70,16	Low
519	OLAYA SECTOR RICAURTE	Mid	45,44	52,94	Mid		S.I
521	REPUBLICA DE VENEZUELA	Mid Low	62,50	87,55	Low		S.I
524	TESCA	Mid Low	63,79	71,47	Low	60,00	Mid Low
527	CHIQUINQUIRA	Mid Low	67,64	94,18	Low	72,13	Low
530	CASTILLETE	Low	77,18	51,35	Mid		S.I
532	COSTA LINDA	Low	74,05	89,13	Low		S.I
550	PEDRO SALAZAR	Low	71,90	91,40	Low	0,00	S.D
600	LOS COMUNEROS	Mid Low	69,52	88,37	Low		S.I
650	EL CABRERO	Mid High*	40,42	50,00	Mid		S.I
700	PETARE	Mid	53,28	80,32	Low	51,89	Mid
750	PALESTINA	Mid	45,80	78,75	Low	90,00	Low
800	REPUBLICA DEL CARIBE	Mid	52,74	85,77	Low		S.I
850	PARAISO II	Mid High	34,14	66,00	Mid Low		S.I
900	LA PAZ	Mid High	42,36	74,29	Low	100,00	Low
950	LOMA FRESCA	Mid	46,78	83,66	Low		S.I
1000	PABLO VI - I	Mid Low	62,65	84,19	Low	53,91	Mid

CodSis	POPULATION INDICATOR 2005	POPULATION INDICATOR 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005
100	2,60	Very High	13,15	Very High*

150	10,66	Very High	57,21	Mid Low
200	3,76	Very High	59,53	Mid Low
250	4,30	Very High	61,61	Mid Low
300	4,81	Very High	54,23	Mid
350	4,51	Very High	38,23	Mid High*
400	17,26	Very High	57,68	Mid Low
450	28,89	Very High	56,17	Mid
500	4,63	Very High	53,82	Mid
501	13,67	Very High	48,48	Mid
504	0,00	S.I	26,09	High*
507	0,00	S.I	43,60	Mid
511	16,69	Very High	44,20	Mid
513	11,05	Very High	44,91	Mid
516	15,94	Very High	49,19	Mid
519	16,97	Very High	28,84	High*
521	5,37	Very High	38,85	Mid High*
524	4,13	Very High	49,85	Mid
527	9,66	Very High	60,90	Mid Low
530	0,00	S.I	32,13	Mid High*
532	0,00	S.I	40,80	Mid High*
550	3,20	Very High	41,62	Mid High
600	2,40	Very High	40,07	Mid High*
650	5,42	Very High	23,96	High*
700	3,63	Very High	47,28	Mid
750	4,61	Very High	54,79	Mid
800	4,06	Very High	35,64	Mid High*
850	5,93	Very High	26,52	High*
900	6,05	Very High	55,67	Mid
950	2,98	Very High	33,35	Mid High*
1000	1,41	Very High	50,54	Mid

CodSis	NEIGHBORHOOD	Services Factor 2005	Services Factor 2005	Housing Factor 2005	Housing Factor 2005	Human Capital Factor 2005	Human Capital Factor 2005

1050	SAN DIEGO	87,50	Low	90,00	Low	0,00	
1101	PUERTA DE HIERRO	48,32	Mid	56,74	Mid	47,35	Mid
1103	ARROZ BARATO	56,61	Mid	64,69	Mid Low	42,41	Mid High
1105	POLICARPA	40,70	Mid High	49,27	Mid	43,48	Mid
1150	SAN BERNARDO	51,27	Mid	69,23	Mid Low	39,82	Mid High
1200	CENTRO	31,25	Mid High	70,00	Low	0,00	
1250	NARIÑO	41,63	Mid High	59,48	Mid Low	39,30	Mid High
1300	LA MATUNA	75,00	Low	25,00	High	0,00	
1350	LA MARIA	58,42	Mid Low	71,50	Low	25,92	High
1400	ESPINAL	66,90	Mid Low	68,98	Mid Low	42,39	Mid High
1450	GETSEMANI	71,38	Low	69,76	Mid Low	39,49	Mid High
1500	LO AMADOR	73,60	Low	74,51	Low	42,24	Mid High
1550	PIE DEL CERRO	76,25	Low	50,00	Mid	0,00	
1600	EL POZON	51,27	Mid	58,06	Mid Low	38,58	Mid High
1700	MANGA	68,07	Mid Low	60,63	Mid Low	48,40	Mid
1800	LA ESPERANZA	63,31	Mid Low	71,13	Low	28,89	High
1850	LA QUINTA	63,25	Mid Low	72,04	Low	38,17	Mid High
1900	LA CANDELARIA	43,00	Mid	61,03	Mid Low	35,79	Mid High
1950	OLAYA HERRERA (COM 5)	51,78	Mid	62,66	Mid Low	28,68	High
2000	BOSTON	45,88	Mid	62,90	Mid Low	36,42	Mid High
2050	NEIGHBORHOOD CHINO	76,61	Low	75,98	Low	46,02	Mid
2150	ALCIBIA	81,25	Low	78,37	Low	14,91	Very High
2200	EL PRADO	82,04	Low	74,22	Low	47,98	Mid
2250	MARTINEZ MARTELO	75,00	Low	72,50	Low	69,74	Mid Low
2300	FREDONIA	54,20	Mid	61,84	Mid Low	31,79	Mid High
2350	NUEVO PARAISO	56,86	Mid	61,47	Mid Low	31,69	Mid High
2450	VILLA ESTRELLA	76,96	Low	71,11	Low	39,74	Mid High
2500	AMBERES	83,30	Low	81,18	Low	46,91	Mid
2550	ESPAÑA	79,39	Low	80,77	Low	42,02	Mid High
2600	ARMENIA	83,78	Low	85,59	Low	47,78	Mid

CodSis	NEIGHBORHOOD	LIFE QUALITY INDICATOR 2005	LIFE QUALITY INDICATOR 2005	Natural Catastrophe Risk Indicator 2005	Natural Catastrophe Risk Indicator 2005	PUBLIC INVESTMENT INDICATOR2005	PUBLIC INVESTMENT INDICATOR2005

1050	SAN DIEGO	Mid Low*	59,17	100,00	Low	90,00	Low
1101	PUERTA DE HIERRO	Mid	50,80	95,92	Low		S.I
1103	ARROZ BARATO	Mid	54,57	91,96	Low	52,71	Mid
1105	POLICARPA	Mid	44,48	85,89	Low	90,00	Low
1150	SAN BERNARDO	Mid	53,44	79,38	Low	43,18	Mid
1200	CENTRO	Mid High*	33,75	50,00	Mid	78,45	Low
1250	NARIÑO	Mid	46,80	62,69	Mid Low		S.I
1300	LA MATUNA	Mid High	33,33	0,00	Very High	88,20	Low
1350	LA MARIA	Mid	51,95	80,17	Low	89,48	Low
1400	ESPINAL	Mid Low	59,42	91,87	Low		S.I
1450	GETSEMANI	Mid Low	60,21	63,39	Mid Low	90,00	Low
1500	LO AMADOR	Mid Low	63,45	86,89	Low		S.I
1550	PIE DEL CERRO	Mid High*	42,08	0,00	Very High	53,89	Mid
1600	EL POZON	Mid	49,30	66,96	Mid Low	58,44	Mid Low
1700	MANGA	Mid Low	59,03	40,63	Mid High	78,81	Low
1800	LA ESPERANZA	Mid	54,44	70,39	Low	90,00	Low
1850	LA QUINTA	Mid Low	57,82	93,80	Low	65,74	Mid Low
1900	LA CANDELARIA	Mid	46,61	36,12	Mid High	63,84	Mid Low
1950	OLAYA HERRERA (COM 5)	Mid	47,71	75,02	Low	90,00	Low
2000	BOSTON	Mid	48,40	49,66	Mid	60,00	Mid Low
2050	NEIGHBORHOOD CHINO	Mid Low	66,20	98,85	Low	62,04	Mid Low
2150	ALCIBIA	Mid Low	58,18	86,81	Low	79,14	Low
2200	EL PRADO	Mid Low	68,08	100,00	Low	55,72	Mid
2250	MARTINEZ MARTELO	Low	72,41	100,00	Low		S.I
2300	FREDONIA	Mid	49,28	79,92	Low	62,45	Mid Low
2350	NUEVO PARAISO	Mid	50,01	76,03	Low	60,00	Mid Low
2450	VILLA ESTRELLA	Mid Low	62,60	92,18	Low	79,66	Low
2500	AMBERES	Low	70,46	96,48	Low	90,00	Low
2550	ESPAÑA	Mid Low	67,39	92,30	Low		S.I
2600	ARMENIA	Low	72,38	94,61	Low	90,00	Low

CodSis	NEIGHBORHOOD	POPULATION INDICATOR 2005	POPULATION INDICATOR 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005

1050	SAN DIEGO	4,59	Very High	63,44	Mid Low
1101	PUERTA DE HIERRO	1,42	Very High	37,04	Mid High*
1103	ARROZ BARATO		Very High	49,81	Mid
1105	POLICARPA	5,39	Very High	56,44	Mid
1150	SAN BERNARDO	4,35	Very High	45,09	Mid
1200	CENTRO	6,34	Very High	42,13	Mid High
1250	NARIÑO	5,55	Very High	28,76	High*
1300	LA MATUNA	0,28	Very High	30,45	Mid High
1350	LA MARIA	21,05	Very High	60,66	Mid Low
1400	ESPINAL	4,45	Very High	38,94	Mid High*
1450	GETSEMANI	8,19	Very High	55,45	Mid
1500	LO AMADOR	4,95	Very High	38,82	Mid High*
1550	PIE DEL CERRO	1,10	S.I	24,27	High
1600	EL POZON	0,00	Very High	43,68	Mid
1700	MANGA	11,08	Very High	47,39	Mid
1800	LA ESPERANZA	20,31	Very High	58,79	Mid Low
1850	LA QUINTA	11,18	Very High	57,13	Mid Low
1900	LA CANDELARIA	11,65	Very High	39,55	Mid High*
1950	OLAYA HERRERA (COM 5)	14,05	Very High	56,69	Mid
2000	BOSTON	13,04	Very High	42,77	Mid High
2050	NEIGHBORHOOD CHINO	3,07	Very High	57,54	Mid Low
2150	ALCIBIA	6,39	Very High	57,63	Mid Low
2200	EL PRADO	5,82	Very High	57,40	Mid Low
2250	MARTINEZ MARTELO	3,43	Very High	43,96	Mid*
2300	FREDONIA	12,42	Very High	51,02	Mid
2350	NUEVO PARAISO	21,16	Very High	51,80	Mid
2450	VILLA ESTRELLA	6,17	Very High	60,15	Mid Low
2500	AMBERES	6,42	Very High	65,84	Mid Low
2550	ESPAÑA	7,17	Very High	41,72	Mid High*
2600	ARMENIA	1,96	Very High	64,74	Mid Low

CodSis	NEIGHBORHOOD	Services Factor 2005	Services Factor 2005	Housing Factor 2005	Housing Factor 2005	Human Capital Factor 2005	Human Capital Factor 2005
2650	BRUSELAS	83,55	Low	79,29	Low	43,08	Mid
2800	ZARAGOCILLA	79,23	Low	78,86	Low	42,77	Mid High
2850	TRECE DE JUNIO	83,89	Low	81,58	Low	42,92	Mid High
2900	ESCALLON VILLA	79,76	Low	79,65	Low	47,68	Mid
2950	LAS GAVIOTAS	84,33	Low	85,86	Low	41,79	Mid High
3000	BOSQUE	68,53	Mid Low	72,81	Low	38,78	Mid High
3050	PIEDRA DE BOLIVAR	73,31	Low	75,43	Low	43,48	Mid
3100	SAN JOSE OBRERO	80,14	Low	78,41	Low	47,84	Mid
3150	PARAGUAY	79,18	Low	80,71	Low	39,05	Mid High
3200	NUEVO PORVENIR	82,71	Low	77,00	Low	32,15	Mid High
3250	LAS PALMERAS	86,90	Low	84,06	Low	41,94	Mid High
3300	JUAN XXIII	85,99	Low	86,57	Low	40,47	Mid High
3350	JUNIN	77,11	Low	80,06	Low	47,46	Mid
3400	LOS ALPES	84,08	Low	82,82	Low	42,30	Mid High
3450	VIEJO PORVENIR	84,97	Low	80,44	Low	43,63	Mid
3500	JOSE ANTONIO GALAN	55,87	Mid	64,08	Mid Low	43,32	Mid
3550	NUEVE DE ABRIL	72,26	Low	70,24	Low	47,68	Mid
3700	SAN ISIDRO	81,19	Low	79,31	Low	39,18	Mid High
3750	LAS BRISAS	63,96	Mid Low	65,65	Mid Low	46,95	Mid
3800	VILLA ROSITA	86,71	Low	82,08	Low	47,24	Mid
3850	REPUBLICA DE CHILE	83,56	Low	84,56	Low	43,67	Mid
4000	CALAMARES	86,81	Low	84,25	Low	47,35	Mid
4250	ANITA	87,50	Low	86,67	Low	0,00	
4300	NUEVA GRANADA	71,67	Low	75,00	Low	33,33	Mid High
4350	SAN ANTONIO	87,50	Low	75,00	Low	0,00	

CodSis	NEIGHBORHOOD	LIFE QUALITY INDICATOR 2005	LIFE QUALITY INDICATOR 2005	Natural Catastrophe Risk Indicator 2005	Natural Catastrophe Risk Indicator 2005	PUBLIC INVESTMENT INDICATOR 2005	PUBLIC INVESTMENT INDICATOR 2005
2650	BRUSELAS	Mid Low	68,64	96,54	Low	89,00	Low
2800	ZARAGOCILLA	Mid Low	66,96	95,47	Low		S.I
2850	TRECE DE JUNIO	Mid Low	69,46	89,64	Low	84,82	Low
2900	ESCALLON VILLA	Mid Low	69,03	99,19	Low	63,36	Mid Low
2950	LAS GAVIOTAS	Low	70,66	98,86	Low	0,47	Very High
3000	BOSQUE	Mid Low	60,04	87,09	Low	73,64	Low
3050	PIEDRA DE BOLIVAR	Mid Low	64,08	90,58	Low	90,00	Low
3100	SAN JOSE OBRERO	Mid Low	68,79	92,75	Low		S.I
3150	PARAGUAY	Mid Low	66,31	95,00	Low	90,00	Low
3200	NUEVO PORVENIR	Mid Low	63,95	95,00	Low	0,00	S.D
3250	LAS PALMERAS	Low	70,97	89,67	Low	33,98	Mid High
3300	JUAN XXIII	Low	71,01	99,16	Low	90,00	Low
3350	JUNIN	Mid Low	68,21	99,44	Low	90,00	Low
3400	LOS ALPES	Mid Low	69,73	66,81	Mid Low		S.I
3450	VIEJO PORVENIR	Mid Low	69,68	95,27	Low		S.I
3500	JOSE ANTONIO GALAN	Mid	54,42	84,59	Low	95,74	Low
3550	NUEVE DE ABRIL	Mid Low	63,40	88,18	Low	70,00	Low
3700	SAN ISIDRO	Mid Low	66,56	95,62	Low		S.I
3750	LAS BRISAS	Mid Low	58,85	98,12	Low	0,00	S.D
3800	VILLA ROSITA	Low	72,01	39,91	Mid High		S.I
3850	REPUBLICA DE CHILE	Low	70,60	97,51	Low	83,48	Low
4000	CALAMARES	Low	72,80	99,19	Low	70,12	Low
4250	ANITA	Mid Low*	58,06	100,00	Low	80,21	Low
4300	NUEVA GRANADA	Mid Low	60,00	100,00	Low		S.I
4350	SAN ANTONIO	Mid*	54,17	100,00	Low	90,00	Low

CodSis	NEIGHBORHOOD	POPULATION INDICATOR 2005	POPULATION INDICATOR 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005
2650	BRUSELAS	8,14	Very High	65,58	Mid Low
2800	ZARAGOCILLA	15,14	Very High	44,39	Mid*
2850	TRECE DE JUNIO	22,86	Very High	66,70	Mid Low
2900	ESCALLON VILLA	13,84	Very High	61,35	Mid Low
2950	LAS GAVIOTAS	20,40	Very High	47,60	Mid
3000	BOSQUE	23,54	Very High	61,08	Mid Low
3050	PIEDRA DE BOLIVAR	11,10	Very High	63,94	Mid Low
3100	SAN JOSE OBRERO	3,46	Very High	41,25	Mid High*
3150	PARAGUAY	7,91	Very High	64,81	Mid Low
3200	NUEVO PORVENIR	3,55	Very High	40,62	Mid High
3250	LAS PALMERAS	11,23	Very High	51,46	Mid
3300	JUAN XXIII	2,29	Very High	65,61	Mid Low
3350	JUNIN	3,09	Very High	65,19	Mid Low
3400	LOS ALPES	12,50	Very High	37,26	Mid High*
3450	VIEJO PORVENIR	6,90	Very High	42,96	Mid High*
3500	JOSE ANTONIO GALAN	3,25	Very High	59,50	Mid Low
3550	NUEVE DE ABRIL	5,60	Very High	56,79	Mid
3700	SAN ISIDRO	9,75	Very High	42,98	Mid High*
3750	LAS BRISAS	3,47	Very High	40,11	Mid High
3800	VILLA ROSITA	4,44	Very High	29,09	Mid High*
3850	REPUBLICA DE CHILE	13,81	Very High	66,35	Mid Low
4000	CALAMARES	20,13	Very High	65,56	Mid Low
4250	ANITA	1,76	Very High	60,01	Mid Low
4300	NUEVA GRANADA	12,52	Very High	43,13	Mid
4350	SAN ANTONIO	0,95	Very High	61,28	Mid Low

CodSis	NEIGHBORHOOD	Services Factor 2005	Services Factor 2005	Housing Factor 2005	Housing Factor 2005	Human Capital Factor 2005	Human Capital Factor 2005
4400	ALTOS DE SAN ISIDRO	83,91	Low	79,38	Low	43,73	Mid
4450	MIRADOR NUEVO BOSQUE	81,62	Low	78,56	Low	48,23	Mid
4500	LA CAMPIÑA	79,77	Low	78,45	Low	42,97	Mid High
4600	LOS CERROS	86,16	Low	84,71	Low	43,99	Mid
4700	TACARIGUA	87,50	Low	90,00	Low	38,33	Mid High
4800	VILLA SANDRA	87,50	Low	90,00	Low	0,00	
4850	NUEVO BOSQUE	85,42	Low	85,81	Low	47,92	Mid
4900	RUBI	85,83	Low	80,00	Low	13,33	Very High
4950	LA TRONCAL	87,50	Low	90,00	Low	33,33	Mid High
5000	BUENOS AIRES	85,16	Low	82,21	Low	49,49	Mid
5050	LAS DELICIAS	87,50	Low	75,00	Low	0,00	
5100	EL COUNTRY	87,50	Low	90,00	Low	14,17	Very High
5150	SAN PEDRO	87,50	Low	90,00	Low	33,33	Mid High
5250	ALTO BOSQUE	82,50	Low	78,00	Low	0,00	
5300	BLAS DE LEZO	85,87	Low	84,49	Low	47,26	Mid
5350	SAN JOSE DE LOS CAMPANOS	71,56	Low	70,77	Low	43,87	Mid
5500	LOS CARACOLES	86,65	Low	87,85	Low	47,70	Mid
5550	TERNERA	80,24	Low	78,06	Low	41,81	Mid High
5600	ALMIRANTE COLON	87,50	Low	90,00	Low	7,78	Very High
5800	EL SOCORRO	87,37	Low	88,53	Low	47,17	Mid
5850	CEBALLOS	69,66	Mid Low	68,35	Mid Low	42,86	Mid High
5900	LA CENTRAL	84,62	Low	82,31	Low	47,18	Mid
5950	SAN FERNANDO	82,36	Low	79,77	Low	43,18	Mid
6000	EL MILAGRO	82,23	Low	77,04	Low	43,04	Mid
6050	EL CAMPESTRE	84,88	Low	79,78	Low	43,67	Mid

CodSis	NEIGHBORHOOD	LIFE QUALITY INDICATOR 2005	LIFE QUALITY INDICATOR 2005	Natural Catastrophe Risk Indicator 2005	Natural Catastrophe Risk Indicator 2005	PUBLIC INVESTMENT INDICATOR 2005	PUBLIC INVESTMENT INDICATOR 2005
4400	ALTOS DE SAN ISIDRO	Mid Low	69,01	96,55	Low		S.I
4450	MIRADOR NUEVO BOSQUE	Mid Low	69,47	85,66	Low	90,00	Low
4500	LA CAMPIÑA	Mid Low	67,06	99,27	Low		S.I
4600	LOS CERROS	Low	71,62	98,24	Low	90,00	Low
4700	TACARIGUA	Low	71,94	100,00	Low		S.I
4800	VILLA SANDRA	Mid Low*	59,17	100,00	Low	41,63	Mid High
4850	NUEVO BOSQUE	Low	73,05	99,70	Low		S.I
4900	RUBI	Mid Low	59,72	100,00	Low		S.I
4950	LA TRONCAL	Low	70,28	100,00	Low	60,00	Mid Low
5000	BUENOS AIRES	Low	72,29	100,00	Low		S.I
5050	LAS DELICIAS	Mid*	54,17	100,00	Low	90,00	Low
5100	EL COUNTRY	Mid Low	63,89	100,00	Low		S.I
5150	SAN PEDRO	Low	70,28	100,00	Low		S.I
5250	ALTO BOSQUE	Mid*	53,50	100,00	Low	70,20	Low
5300	BLAS DE LEZO	Low	72,54	96,09	Low	58,73	Mid Low
5350	SAN JOSE DE LOS CAMPANOS	Mid Low	62,07	69,84	Mid Low		S.I
5500	LOS CARACOLES	Low	74,07	98,91	Low	89,26	Low
5550	TERNERA	Mid Low	66,70	97,36	Low	0,00	S.D
5600	ALMIRANTE COLON	Mid Low	61,76	100,00	Low	31,17	Mid High
5800	EL SOCORRO	Low	74,36	96,32	Low	36,95	Mid High
5850	CEBALLOS	Mid Low	60,29	88,68	Low	90,00	Low
5900	LA CENTRAL	Low	71,37	97,66	Low	79,67	Low
5950	SAN FERNANDO	Mid Low	68,44	92,56	Low	79,58	Low
6000	EL MILAGRO	Mid Low	67,44	96,20	Low		S.I
6050	EL CAMPESTRE	Mid Low	69,44	96,21	Low	70,00	Low

CodSis	NEIGHBORHOOD	POPULATION INDICATOR 2005	POPULATION INDICATOR 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005
4400	ALTOS DE SAN ISIDRO	11,78	Very High	44,33	Mid*
4450	MIRADOR NUEVO BOSQUE	3,77	Very High	62,22	Mid Low
4500	LA CAMPIÑA	8,82	Very High	43,79	Mid*
4600	LOS CERROS	5,81	Very High	66,42	Mid Low
4700	TACARIGUA	5,21	Very High	44,29	Mid*
4800	VILLA SANDRA	1,18	Very High	50,49	Mid
4850	NUEVO BOSQUE	18,45	Very High	47,80	Mid*
4900	RUBI	1,63	Very High	40,34	Mid High*
4950	LA TRONCAL	2,30	Very High	58,14	Mid Low
5000	BUENOS AIRES	2,05	Very High	43,58	Mid*
5050	LAS DELICIAS	7,18	Very High	62,84	Mid Low
5100	EL COUNTRY	6,83	Very High	42,68	Mid High*
5150	SAN PEDRO	18,98	Very High	47,31	Mid*
5250	ALTO BOSQUE	7,86	Very High	57,89	Mid Low
5300	BLAS DE LEZO	6,36	Very High	58,43	Mid Low
5350	SAN JOSE DE LOS CAMPANOS	19,09	Very High	37,75	Mid High*
5500	LOS CARACOLES	23,49	Very High	71,43	Low
5550	TERNERA	19,71	Very High	45,94	Mid
5600	ALMIRANTE COLON	14,68	Very High	51,90	Mid
5800	EL SOCORRO	10,96	Very High	54,65	Mid
5850	CEBALLOS	17,77	Very High	64,19	Mid Low
5900	LA CENTRAL	7,36	Very High	64,02	Mid Low
5950	SAN FERNANDO	18,26	Very High	64,71	Mid Low
6000	EL MILAGRO	4,78	Very High	42,10	Mid High*
6050	EL CAMPESTRE	15,19	Very High	62,71	Mid Low

CodSis	NEIGHBORHOOD	Services Factor 2005	Services Factor 2005	Housing Factor 2005	Housing Factor 2005	Human Capital Factor 2005	Human Capital Factor 2005
6100	SANTA CLARA	86,01	Low	86,06	Low	43,69	Mid
6150	EL CARMELO	84,76	Low	82,19	Low	42,81	Mid High
6200	VISTA HERMOSA	84,35	Low	79,62	Low	25,12	High
6250	CIUDADELA 11 DE NOVIEMBRE	86,99	Low	88,68	Low	45,66	Mid
6300	URBANIZACION SIMON BOLIVAR	86,42	Low	87,61	Low	46,66	Mid
6350	SAN PEDRO MARTIR	74,11	Low	71,04	Low	23,49	High
6400	LA VICTORIA	82,35	Low	78,44	Low	16,24	High
6450	LOS JARDINES	86,70	Low	84,76	Low	41,81	Mid High
6500	LA CONSOLATA	85,67	Low	84,45	Low	27,22	High
6550	VILLA RUBIA	86,18	Low	84,39	Low	31,41	Mid High
6600	JORGE ELIECER GAITAN	82,33	Low	79,74	Low	39,16	Mid High
6650	LA FLORIDA	84,43	Low	78,80	Low	28,80	High
6700	VEINTE DE JULIO SUR	69,44	Mid Low	74,00	Low	44,09	Mid
6750	NELSON MANDELA	31,77	Mid High	41,11	Mid High	39,31	Mid High
6800	CESAR FLOREZ	81,13	Low	78,15	Low	15,62	High
6850	LUIS CARLOS GALAN	86,57	Low	76,41	Low	48,04	Mid
6900	EL REPOSO	78,71	Low	74,02	Low	32,29	Mid High
6950	EL EDUCADOR	70,58	Low	66,66	Mid Low	28,50	High
7000	ROSSENDAL	85,58	Low	80,58	Low	32,04	Mid High
7050	MARIA CANO	81,22	Low	80,11	Low	46,17	Mid
7100	CAMILO TORRES	79,05	Low	74,09	Low	38,59	Mid High
7150	NUEVA DELHI	83,44	Low	75,66	Low	43,57	Mid
7200	BELLAVISTA	80,27	Low	74,95	Low	43,14	Mid
7250	ANTONIO JOSE DE SUCRE	56,26	Mid	64,33	Mid Low	39,78	Mid High
7300	ALBORNOZ	71,57	Low	75,58	Low	40,01	Mid High

CodSis	NEIGHBORHOOD	LIFE QUALITY INDICATOR 2005	LIFE QUALITY INDICATOR 2005	Natural Catastrophe Risk Indicator 2005	Natural Catastrophe Risk Indicator 2005	PUBLIC INVESTMENT INDICATOR 2005	PUBLIC INVESTMENT INDICATOR 2005
6100	SANTA CLARA	Low	71,92	89,45	Low	90,00	Low
6150	EL CARMELO	Mid Low	69,92	97,15	Low	90,00	Low
6200	VISTA HERMOSA	Mid Low	63,03	95,60	Low	0,00	S.D
6250	CIUDADELA 11 DE NOVIEMBRE	Low	73,78	100,00	Low		S.I
6300	URBANIZACION SIMON BOLIVAR	Low	73,56	99,25	Low	0,00	S.D
6350	SAN PEDRO MARTIR	Mid	56,21	95,94	Low	90,00	Low
6400	LA VICTORIA	Mid Low	59,01	98,81	Low		S.I
6450	LOS JARDINES	Low	71,09	99,80	Low		S.I
6500	LA CONSOLATA	Mid Low	65,78	96,93	Low		S.I
6550	VILLA RUBIA	Mid Low	67,33	96,33	Low	89,21	Low
6600	JORGE ELIECER GAITAN	Mid Low	67,08	84,63	Low		S.I
6650	LA FLORIDA	Mid Low	64,01	96,41	Low		S.I
6700	VEINTE DE JULIO SUR	Mid Low	62,51	89,52	Low	90,00	Low
6750	NELSON MANDELA	Mid High	37,40	79,94	Low		S.I
6800	CESAR FLOREZ	Mid Low	58,30	77,54	Low	90,00	Low
6850	LUIS CARLOS GALAN	Low	70,34	99,19	Low	80,11	Low
6900	EL REPOSO	Mid Low	61,68	94,59	Low		S.I
6950	EL EDUCADOR	Mid	55,25	93,83	Low		S.I
7000	ROSSENDAL	Mid Low	66,07	100,00	Low	80,18	Low
7050	MARIA CANO	Mid Low	69,17	98,86	Low	60,00	Mid Low
7100	CAMILO TORRES	Mid Low	63,91	92,79	Low		S.I
7150	NUEVA DELHI	Mid Low	67,56	94,90	Low	70,00	Low
7200	BELLAVISTA	Mid Low	66,12	98,56	Low	70,00	Low
7250	ANTONIO JOSE DE SUCRE	Mid	53,46	87,39	Low	65,45	Mid Low
7300	ALBORNOZ	Mid Low	62,39	79,29	Low		S.I

CodSis	NEIGHBORHOOD	POPULATION INDICATOR 2005	POPULATION INDICATOR 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005
6100	SANTA CLARA	4,43	Very High	63,95	Mid Low
6150	EL CARMELO	5,24	Very High	65,58	Mid Low
6200	VISTA HERMOSA	8,51	Very High	41,79	Mid High
6250	CIUDADELA 11 DE NOVIEMBRE	5,07	Very High	44,71	Mid*
6300	URBANIZACION SIMON BOLIVAR	7,06	Very High	44,97	Mid
6350	SAN PEDRO MARTIR	16,54	Very High	64,67	Mid Low
6400	LA VICTORIA	18,18	Very High	44,00	Mid*
6450	LOS JARDINES	10,97	Very High	45,47	Mid*
6500	LA CONSOLATA	14,20	Very High	44,23	Mid*
6550	VILLA RUBIA	12,11	Very High	66,24	Mid Low
6600	JORGE ELIECER GAITAN	4,64	Very High	39,09	Mid High*
6650	LA FLORIDA	2,10	Very High	40,63	Mid High*
6700	VEINTE DE JULIO SUR	2,75	Very High	61,20	Mid Low
6750	NELSON MANDELA	11,77	Very High	32,28	Mid High*
6800	CESAR FLOREZ	0,79	Very High	56,66	Mid
6850	LUIS CARLOS GALAN	1,92	Very High	62,89	Mid Low
6900	EL REPOSO	2,65	Very High	39,73	Mid High*
6950	EL EDUCADOR	5,08	Very High	38,54	Mid High*
7000	ROSSENDAL	0,39	Very High	61,66	Mid Low
7050	MARIA CANO	1,40	Very High	57,36	Mid Low
7100	CAMILO TORRES	1,15	Very High	39,46	Mid High*
7150	NUEVA DELHI	0,65	Very High	58,28	Mid Low
7200	BELLAVISTA	1,81	Very High	59,12	Mid Low
7250	ANTONIO JOSE DE SUCRE	2,22	Very High	52,13	Mid
7300	ALBORNOZ	1,24	Very High	35,73	Mid High*

CodSis	NEIGHBORHOOD	Services Factor 2005	Services Factor 2005	Housing Factor 2005	Housing Factor 2005	Human Capital Factor 2005	Human Capital Factor 2005
7350	LA ESMERALDA I	85,82	Low	76,82	Low	43,42	Mid
7400	LOS SANTANDERES	73,23	Low	75,00	Low	42,02	Mid High
7450	EL LIBERTADOR	74,68	Low	65,27	Mid Low	42,54	Mid High
7500	SECTORES UNIDOS	68,85	Mid Low	73,70	Low	48,38	Mid
7550	NUEVA JERUSALEN	63,08	Mid Low	74,40	Low	40,90	Mid High
7600	LA SIERRITA	55,40	Mid	66,01	Mid Low	43,87	Mid
7650	NAZARENO	82,28	Low	76,34	Low	35,78	Mid High
7700	MANUELA VERGARA DE CURI	76,20	Low	73,11	Low	8,54	Very High
7750	JAIME PARDO LEAL	64,26	Mid Low	71,77	Low	3,03	Very High
7800	LA ESMERALDA II	84,48	Low	75,33	Low	35,66	Mid High
7850	VILLA BARRAZA	84,85	Low	83,69	Low	43,80	Mid
7900	VILLA FANNY	50,24	Mid	68,48	Mid Low	43,53	Mid
7950	ARROZ BARATO	60,24	Mid Low	58,89	Mid Low	42,41	Mid High
8000	PUERTA DE HIERRO	50,50	Mid	58,29	Mid Low	47,35	Mid
8050	POLICARPA	37,11	Mid High	37,80	Mid High	43,48	Mid
8100	PROVIDENCIA	66,67	Mid Low	69,17	Mid Low	25,47	High
8150	ARROYO GRANDE	24,72	High	64,36	Mid Low	34,75	Mid High
8151	ARROYO DE LAS CANOAS	6,40	Very High	63,85	Mid Low	43,88	Mid
8152	LAS EUROPAS	4,11	Very High	40,16	Mid High	28,46	High
8153	PALMARITO	13,13	Very High	60,00	Mid Low	41,77	Mid High
8154	BUENOS AIRES	20,00	High	75,00	Low	43,70	Mid
8200	PONTEZUELA	18,18	High	70,54	Low	38,77	Mid High
8250	BAYUNCA	19,39	High	59,97	Mid Low	29,04	Mid High
8300	PUNTA CANOA	17,04	High	71,01	Low	42,38	Mid High
8350	TIERRA BOMBA	16,09	High	78,49	Low	35,97	Mid High

CodSis	NEIGHBORHOOD	LIFE QUALITY INDICATOR 2005	LIFE QUALITY INDICATOR 2005	Natural Catastrophe Risk Indicator 2005	Natural Catastrophe Risk Indicator 2005	PUBLIC INVESTMENT INDICATOR 2005	PUBLIC INVESTMENT INDICATOR 2005
7350	LA ESMERALDA I	Mid Low	68,69	95,95	Low		S.I
7400	LOS SANTANDERES	Mid Low	63,42	73,37	Low	84,88	Low
7450	EL LIBERTADOR	Mid Low	60,83	97,04	Low		S.I
7500	SECTORES UNIDOS	Mid Low	63,64	87,46	Low		S.I
7550	NUEVA JERUSALEN	Mid Low	59,46	83,59	Low	90,00	Low
7600	LA SIERRITA	Mid	55,09	89,67	Low	90,00	Low
7650	NAZARENO	Mid Low	64,80	97,66	Low	60,00	Mid Low
7700	MANUELA VERGARA DE CURI	Mid	52,62	98,53	Low		S.I
7750	JAIME PARDO LEAL	Mid	46,35	95,83	Low		S.I
7800	LA ESMERALDA II	Mid Low	65,15	99,13	Low	90,00	Low
7850	VILLA BARRAZA	Low	70,78	100,00	Low		S.I
7900	VILLA FANNY	Mid	54,08	87,35	Low		S.I
7950	ARROZ BARATO	Mid	53,85	88,89	Low		S.I
8000	PUERTA DE HIERRO	Mid	52,04	58,00	Mid Low	70,00	Low
8050	POLICARPA	Mid High	39,47	7,32	Very High		S.I
8100	PROVIDENCIA	Mid	53,77	8,33	Very High	64,40	Mid Low
8150	ARROYO GRANDE	Mid High	41,27	97,25	Low		S.I
8151	ARROYO DE LAS CANOAS	Mid High	38,04	90,77	Low		S.I
8152	LAS EUROPAS	High	24,24	100,00	Low		S.I
8153	PALMARITO	Mid High	38,30	100,00	Low		S.I
8154	BUENOS AIRES	Mid	46,23	100,00	Low	44,70	Mid
8200	PONTEZUELA	Mid High	42,50	95,53	Low		S.I
8250	BAYUNCA	Mid High	36,13	89,33	Low	90,00	Low
8300	PUNTA CANOA	Mid	43,47	99,28	Low	60,00	Mid Low
8350	TIERRA BOMBA	Mid	43,52	93,02	Low	0,00	S.D

CodSis	NEIGHBORHOOD	POPULATION INDICATOR 2005	POPULATION INDICATOR 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005
7350	LA ESMERALDA I	0,43	Very High	41,27	Mid High*
7400	LOS SANTANDERES	0,49	Very High	55,54	Mid
7450	EL LIBERTADOR	3,26	Very High	40,28	Mid High*
7500	SECTORES UNIDOS	0,90	Very High	38,00	Mid High*
7550	NUEVA JERUSALEN	0,71	Very High	58,44	Mid Low
7600	LA SIERRITA	1,08	Very High	58,96	Mid Low
7650	NAZARENO	3,40	Very High	56,47	Mid
7700	MANUELA VERGARA DE CURI	2,98	Very High	38,53	Mid High*
7750	JAIME PARDO LEAL	1,44	Very High	35,91	Mid High*
7800	LA ESMERALDA II	0,47	Very High	63,69	Mid Low
7850	VILLA BARRAZA	0,38	Very High	42,79	Mid High*
7900	VILLA FANNY	1,42	Very High	35,72	Mid High*
7950	ARROZ BARATO	4,61	Very High	36,84	Mid High*
8000	PUERTA DE HIERRO	1,67	Very High	45,43	Mid
8050	POLICARPA	7,34	Very High	13,53	Very High*
8100	PROVIDENCIA	2,89	Very High	32,35	Mid High
8150	ARROYO GRANDE	2,99	Very High	35,38	Mid High*
8151	ARROYO DE LAS CANOAS	0,63	Very High	32,36	Mid High*
8152	LAS EUROPAS	0,24	Very High	31,12	Mid High*
8153	PALMARITO	0,18	Very High	34,62	Mid High*
8154	BUENOS AIRES	0,02	Very High	47,74	Mid
8200	PONTEZUELA	2,55	Very High	35,14	Mid High
8250	BAYUNCA	16,27	Very High	57,93	Mid Low
8300	PUNTA CANOA	1,31	Very High	51,02	Mid
8350	TIERRA BOMBA	3,10	Very High	34,91	Mid High

CodSis	NEIGHBORHOOD	Services Factor 2005	Services Factor 2005	Housing Factor 2005	Housing Factor 2005	Human Capital Factor 2005	Human Capital Factor 2005
8352	PUNTA ARENAS	23,55	High	75,66	Low	38,89	Mid High
8400	BOCACHICA	14,96	High	73,50	Low	43,12	Mid
8450	CAÑO DEL ORO	21,22	High	70,33	Low	47,77	Mid
8500	SANTA ANA	14,37	Very High	72,31	Low	43,69	Mid
8501	ARARCA	12,23	Very High	68,36	Mid Low	38,82	Mid High
8550	PASACABALLOS	36,34	Mid High	59,56	Mid Low	39,63	Mid High
8551	LETICIA	29,78	Mid High	50,87	Mid	48,25	Mid
8552	EL RECREO	25,98	High	51,32	Mid	45,23	Mid
8600	BARU	20,41	High	68,44	Mid Low	47,46	Mid
8650	LA BOQUILLA	41,55	Mid High	63,15	Mid Low	24,85	High
8651	MANZANILLO DEL MAR	19,12	High	67,23	Mid Low	48,34	Mid
8652	TIERRA LOW	18,19	High	57,98	Mid Low	43,33	Mid
8653	PUERTO REY	10,74	Very High	44,07	Mid	35,66	Mid High
8657	ZAPATERO	10,43	Very High	35,36	Mid High	48,39	Mid
8658	BOQUILLITA	19,23	High	37,79	Mid High	43,94	Mid
8659	MAR LINDA	20,50	High	35,04	Mid High	40,66	Mid High
8700	ARROYO DE PIEDRA	12,34	Very High	67,82	Mid Low	40,70	Mid High
8750	ISLAS DEL ROSARIO	6,60	Very High	29,64	Mid High	26,08	High
8800	ISLA FUERTE	7,89	Very High	36,37	Mid High	24,04	High
8852	MUCURA	8,23	Very High	31,88	Mid High	2,96	Very High
8856	ISLOTE	8,08	Very High	59,75	Mid Low	36,74	Mid High
8900	HENEQUEN	12,63	Very High	35,96	Mid High	25,69	High
8950	BOSQUECITO	81,51	Low	76,67	Low	0,00	
8960	CIUDADELA 2000	86,29	Low	75,00	Low	0,00	

CodSis	NEIGHBORHOOD	LIFE QUALITY INDICATOR 2005	LIFE QUALITY INDICATOR 2005	Natural Catastrophe Risk Indicator 2005	Natural Catastrophe Risk Indicator 2005	PUBLIC INVESTMENT INDICATOR 2005	PUBLIC INVESTMENT INDICATOR 2005
8352	PUNTA ARENAS	Mid	46,03	97,17	Low	60,00	Mid Low
8400	BOCACHICA	Mid	43,86	96,06	Low	10,25	Very High
8450	CAÑO DEL ORO	Mid	46,44	90,72	Low	71,70	Low
8500	SANTA ANA	Mid	43,46	90,81	Low		S.I
8501	ARARCA	Mid High	39,80	100,00	Low	64,81	Mid Low
8550	PASACABALLOS	Mid	45,18	89,78	Low		S.I
8551	LETICIA	Mid High	42,97	55,07	Mid		S.I
8552	EL RECREO	Mid High	40,84	38,42	Mid High	90,00	Low
8600	BARU	Mid	45,43	96,78	Low	53,45	Mid
8650	LA BOQUILLA	Mid	43,18	76,03	Low	89,94	Low
8651	MANZANILLO DEL MAR	Mid	44,90	96,45	Low	60,00	Mid Low
8652	TIERRA LOW	Mid High	39,83	83,72	Low		S.I
8653	PUERTO REY	Mid High	30,16	92,72	Low		S.I
8657	ZAPATERO	Mid High	31,39	85,71	Low		S.I
8658	BOQUILLITA	Mid High	33,65	52,47	Mid		S.I
8659	MAR LINDA	Mid High	32,06	68,63	Mid Low	82,28	Low
8700	ARROYO DE PIEDRA	Mid High	40,29	99,31	Low		S.I
8750	ISLAS DEL ROSARIO	High	20,77	27,97	High	23,52	High
8800	ISLA FUERTE	High	22,77	9,01	Very High		S.I
8852	MUCURA	Very High	14,36	0,00	Very High	90,00	Low
8856	ISLOTE	Mid High	34,86	0,00	Very High	76,44	Low
8900	HENEQUEN	High	24,76	84,54	Low		S.I
8950	BOSQUECITO	Mid*	52,72	100,00	Low		S.I
8960	CIUDADELA 2000	Mid*	53,76	99,06	Low		

CodSis	NEIGHBORHOOD	POPULATION INDICATOR 2005	POPULATION INDICATOR 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005	SOCIOECONOMIC VULNERABILITY INDEX 2005
8352	PUNTA ARENAS	0,78	Very High	51,00	Mid
8400	BOCACHICA	6,36	Very High	39,13	Mid High
8450	CAÑO DEL ORO	2,81	Very High	52,92	Mid
8500	SANTA ANA	5,33	Very High	34,90	Mid High*
8501	ARARCA	1,53	Very High	51,54	Mid
8550	PASACABALLOS	16,73	Very High	37,92	Mid High*
8551	LETICIA	0,55	Very High	24,65	High*
8552	EL RECREO	0,60	Very High	42,46	Mid High
8600	BARU	4,34	Very High	50,00	Mid
8650	LA BOQUILLA	11,06	Very High	55,05	Mid
8651	MANZANILLO DEL MAR	1,16	Very High	50,63	Mid
8652	TIERRA LOW	1,04	Very High	31,15	Mid High*
8653	PUERTO REY	1,27	Very High	31,04	Mid High*
8657	ZAPATERO	0,24	Very High	29,34	Mid High*
8658	BOQUILLITA	1,32	Very High	21,86	High*
8659	MAR LINDA	0,97	Very High	45,99	Mid
8700	ARROYO DE PIEDRA	2,29	Very High	35,47	Mid High*
8750	ISLAS DEL ROSARIO	1,37	Very High	18,41	High
8800	ISLA FUERTE	3,43	S.I	8,80	Very High*
8852	MUCURA	0,00	Very High	26,09	High
8856	ISLOTE	1,13	Very High	28,11	High
8900	HENEQUEN	1,85	Very High	27,79	High*
8950	BOSQUECITO	0,31	S.I	38,26	Mid High*
8960	CIUDADELA 2000			38,21	Mid High

Attachment 2. Tumaco. Socioeconomic Vulnerability Index Urban Area 2005

Zona Segura	Services Factor	Services Factor	Housing Factor	Housing Factor	Human Capital Factor	Human Capital Factor
ISLA TUMACO Y LA VICIOSA	54,65	Mid	51,73	Mid	1,07	Low
1 La Playa, Bischoff y Viento Libre.	48,77	Mid	47,12	Mid	1,00	Low
2 Neighborhoods Tumac y María Auxiliadora.	59,77	Mid Low	53,55	Mid	1,01	Low
3 Urbanización Miramar.	84,44	Low	61,67	Mid Low	1,03	Low
4 El Bajito.	36,46	Mid High	40,70	Mid High	0,90	Low
5 Villa Lola.	72,05	Low	63,70	Mid Low	0,96	Low
6 Zona aledaña al Hospital San Andrés de Tumaco.	S.I	S.I	S.I	S.I	S.I	S.I
7 Cementerio y neighborhood Luis Avelino Perez.	67,60	Mid Low	73,10	Low	0,90	Low
8 Pantano de Vargas.	61,27	Mid Low	60,17	Mid Low	1,01	Low
9 Puente Herrera.	62,13	Mid Low	59,24	Mid Low	0,85	Low
10 Tres Tablas.	67,22	Mid Low	61,18	Mid Low	0,73	Low
11 Puente Medio.	70,32	Low	67,97	Mid Low	0,86	Low
12 La Calavera y Potrero.	53,71	Mid	57,85	Mid Low	0,96	Low
13 Plaza Nariño - Mercado.	54,68	Mid	52,84	Mid	0,84	Low
14 Zona Comercial - Obelisco.	62,07	Mid Low	72,24	Low	0,86	Low
15 Puentes palafíticos.	48,81	Mid	45,48	Mid	0,82	Low
16 Calle del Comercio - Buenos Aires.	64,18	Mid Low	54,23	Mid	0,84	Low
17 Panamá.	51,42	Mid	42,98	Mid High	0,91	Low

Zona Segura	LIFE QUALITY INDICATOR	LIFE QUALITY INDICATOR	Natural Catastrophe Risk Indicator	Natural Catastrophe Risk Indicator	PUBLIC INVESTMENT INDICATOR	PUBLIC INVESTMENT INDICATOR
ISLA TUMACO Y LA VICIOSA	35,82	Mid High	36,38	Mid High	49,92	Mid
1 La Playa, Bischoff y Viento Libre.	32,30	Mid High	34,46	Mid High	49,92	Mid
2 Neighborhoods Tumac y María Auxiliadora.	38,11	Mid High	34,40	Mid High	49,92	Mid
3 Urbanización Miramar.	49,05	Mid	0,00	Very High	49,92	Mid
4 El Bajito.	26,02	High	27,81	High	49,92	Mid
5 Villa Lola.	45,57	Mid	76,30	Low	49,92	Mid
6 Zona aledaña al Hospital San Andrés de Tumaco.	S.I	S.I	S.I	S.I	S.I	S.I
7 Cementerio y neighborhood Luis Avelino Perez.	47,20	Mid	81,20	Low	49,92	Mid
8 Pantano de Vargas.	40,81	Mid High	56,04	Mid	49,92	Mid
9 Puente Herrera.	40,74	Mid High	46,97	Mid	49,92	Mid
10 Tres Tablas.	43,04	Mid	79,41	Low	49,92	Mid
11 Puente Medio.	46,38	Mid	79,66	Low	49,92	Mid
12 La Calavera y Potrero.	37,51	Mid High	52,50	Mid	49,92	Mid
13 Plaza Nariño - Mercado.	36,12	Mid High	38,04	Mid High	49,92	Mid
14 Zona Comercial - Obelisco.	45,06	Mid	60,21	Mid Low	49,92	Mid
15 Puentes palafíticos.	31,70	Mid High	17,13	High	49,92	Mid
16 Calle del Comercio - Buenos Aires.	39,75	Mid High	25,37	High	49,92	Mid
17 Panamá.	31,77	Mid High	16,37	High	49,92	Mid

Zona Segura	POPULATION INDICATOR	POPULATION INDICATOR	SOCIOECONOMIC VULNERABILITY INDEX	SOCIOECONOMIC VULNERABILITY INDEX
ISLA TUMACO Y LA VICIOSA	13,65	Very High	33,94	Mid High
1 La Playa, Bischoff y Viento Libre.	18,38	High	33,76	Mid High
2 Neighborhoods Tumac y María Auxiliadora.	2,74	Very High	31,29	Mid High
3 Urbanización Miramar.	0,05	Very High	24,75	High
4 El Bajito.	1,57	Very High	26,33	High
5 Villa Lola.	4,10	Very High	43,97	Mid
6 Zona aledaña al Hospital San Andrés de Tumaco.	S.I	S.I	S.I	S.I
7 Cementerio y neighborhood Luis Avelino Perez.	1,17	Very High	44,87	Mid
8 Pantano de Vargas.	12,81	Very High	39,90	Mid High
9 Puente Herrera.	2,43	Very High	35,02	Mid High
10 Tres Tablas.	0,28	Very High	43,16	Mid
11 Puente Medio.	1,43	Very High	44,35	Mid
12 La Calavera y Potrero.	2,03	Very High	35,49	Mid High
13 Plaza Nariño - Mercado.	7,30	Very High	32,85	Mid High
14 Zona Comercial - Obelisco.	2,45	Very High	39,41	Mid High
15 Puentes palafíticos.	17,00	High	28,94	High
16 Calle del Comercio - Buenos Aires.	5,46	Very High	30,13	Mid High
17 Panamá.	8,20	Very High	26,56	High

Zona Segura	Services Factor	Services Factor	Housing Factor	Housing Factor	Human Capital Factor	Human Capital Factor
ISLA EL MORRO	47,97	Mid	46,45	Mid	0,81	Low
18 Pradomar y Liceo Max Seidel.	77,85	Low	80,52	Low	0,90	Low
19 Batallón de Infantería Marina.	S.I	S.I	S.I	S.I	S.I	S.I
20 Aeropuerto La Florida.	S.I	S.I	S.I	S.I	S.I	S.I
21 Neighborhood Brisas del Aeropuerto.	29,54	Mid High	35,58	Mid High	0,77	Low
22 La Florida, El Morrito y Chapas de Nariño.	60,43	Mid Low	59,25	Mid Low	0,83	Low
23 Libertadores 1 y 2, Estadio y Escuela de Fútbol.	61,77	Mid Low	49,28	Mid	0,86	Low
24 Derivados forestales y zona manglárica.	S.I	S.I	S.I	S.I	S.I	S.I
25 Playa Arrecha e instalaciones portuarias.	S.I	S.I	S.I	S.I	S.I	S.I
26 Sector turístico.	S.I	S.I	S.I	S.I	S.I	S.I
27 Pesmaco y playas.	S.I	S.I	S.I	S.I	S.I	S.I
28 La Cordialidad.	46,79	Mid	45,90	Mid	0,86	Low
ZONA CONTINENTAL	51,46	Mid	45,83	Mid	0,73	Low
29 La Ciudadela.	69,00	Mid Low	70,06	Low	0,68	Mid Low
30 Ecopetrol y Licsa Texas.	S.I	S.I	S.I	S.I	S.I	S.I
31 El Pindo y estaciones de combustible.	48,94	Mid	43,07	Mid	0,70	Mid Low
32 Los Ángeles, Iberia, Obrero, California y Unión Victoria.	46,11	Mid	43,53	Mid	0,73	Low
33 Manglares.	S.I	S.I	S.I	S.I	S.I	S.I
34 La Carbonera.	41,25	Mid High	42,50	Mid High	0,88	Low

Zona Segura	LIFE QUALITY INDICATOR	LIFE QUALITY INDICATOR	Natural Catastrophe Risk Indicator	Natural Catastrophe Risk Indicator	PUBLIC INVESTMENT INDICATOR	PUBLIC INVESTMENT INDICATOR
ISLA EL MORRO	31,74	Mid High	61,72	Mid Low	49,92	Mid
18 Pradomar y Liceo Max Seidel.	53,09	Mid	66,67	Mid Low	49,92	Mid
19 Batallón de Infantería Marina.	S.I	S.I	S.I	S.I	S.I	S.I
20 Aeropuerto La Florida.	S.I	S.I	S.I	S.I	S.I	S.I
21 Neighborhood Brisas del Aeropuerto.	21,96	High	52,82	Mid	49,92	Mid
22 La Florida, El Morrito y Chapas de Nariño.	40,17	Mid High	79,70	Low	49,92	Mid
23 Libertadores 1 y 2, Estadio y Escuela de Fútbol.	37,30	Mid High	56,83	Mid	49,92	Mid
24 Derivados forestales y zona manglárica.	S.I	S.I	S.I	S.I	S.I	S.I
25 Playa Arrecha e instalaciones portuarias.	S.I	S.I	S.I	S.I	S.I	S.I
26 Sector turístico.	S.I	S.I	S.I	S.I	S.I	S.I
27 Pesmaco y playas.	S.I	S.I	S.I	S.I	S.I	S.I
28 La Cordialidad.	31,18	Mid High	72,93	Low	49,92	Mid
ZONA CONTINENTAL	32,67	Mid High	55,85	Mid	49,92	Mid
29 La Ciudadela.	46,58	Mid	73,65	Low	49,92	Mid
30 Ecopetrol y Licsa Texas.	S.I	S.I	S.I	S.I	S.I	S.I
31 El Pindo y estaciones de combustible.	30,90	Mid High	57,50	Mid Low	49,92	Mid
32 Los Ángeles, Iberia, Obrero, California y Unión Victoria.	30,12	Mid High	50,24	Mid	49,92	Mid
33 Manglares.	S.I	S.I	S.I	S.I	S.I	S.I
34 La Carbonera.	28,21	High	36,25	Mid High	49,92	Mid

Zona Segura	POPULATION INDICATOR	POPULATION INDICATOR	SOCIOECONOMIC VULNERABILITY INDEX	SOCIOECONOMIC VULNERABILITY INDEX
ISLA EL MORRO	8,18	Very High	37,89	Mid High
18 Pradomar y Liceo Max Seidel.	5,41	Very High	43,77	Mid
19 Batallón de Infantería Marina.	S.I	S.I	S.I	S.I
20 Aeropuerto La Florida.	S.I	S.I	S.I	S.I
21 Neighborhood Brisas del Aeropuerto.	10,72	Very High	33,86	Mid High
22 La Florida, El Morrito y Chapas de Nariño.	6,65	Very High	44,11	Mid
23 Libertadores 1 y 2, Estadio y Escuela de Fútbol.	22,36	High	41,60	Mid High
24 Derivados forestales y zona manglárica.	S.I	S.I	S.I	S.I
25 Playa Arrecha e instalaciones portuarias.	S.I	S.I	S.I	S.I
26 Sector turístico.	S.I	S.I	S.I	S.I
27 Pesmaco y playas.	S.I	S.I	S.I	S.I
28 La Cordialidad.	18,06	High	43,02	Mid
ZONA CONTINENTAL	13,62	Very High	38,02	Mid High
29 La Ciudadela.	11,44	Very High	45,40	Mid
30 Ecopetrol y Licsa Texas.	S.I	S.I	S.I	S.I
31 El Pindo y estaciones de combustible.	13,06	Very High	37,85	Mid High
32 Los Ángeles, Iberia, Obrero, California y Unión Victoria.	13,06	Very High	35,84	Mid High
33 Manglares.	S.I	S.I	S.I	S.I
34 La Carbonera.	0,24	Very High	28,65	High

Attachment 3. Tumaco. Socioeconomic Vulnerability Index Rural Area 2005

Cd.	Nombre del Corregimiento	Services Factor	Services Factor	Housing Factor	Housing Factor	Human Capital Factor	Human Capital Factor	LIFE QUALITY INDICATOR	LIFE QUALITY INDICATOR
140	MILAGROS	29,35	Mid High	33,47	Mid High	0,44	Very High	21,09	High
141	TERAN	19,93	High	32,67	Mid High	0,44	Very High	17,68	High
142	CABO MANGLARES	20,91	High	32,27	Mid High	0,50	Very High	17,89	High
143	CHONTAL	27,41	High	33,66	Mid High	0,43	Very High	20,50	High
144	CONGAL	33,91	Mid High	34,24	Mid High	0,44	Very High	22,87	High
146	BOCANA NUEVA	19,19	High	29,46	Mid High	0,19	Very High	16,28	High
147	CANDELILLA DE LA MAR	32,16	Mid High	42,50	Mid High	0,49	Very High	25,05	High
148	CEDRAL	29,81	Mid High	32,22	Mid High	0,43	Very High	20,82	High
150	BAJO GUABAL	12,00	Very High	35,00	Mid High	0,18	Very High	15,73	High
151	SAGUNBITA	25,50	High	31,86	Mid High	0,16	Very High	19,17	High
152	SANTO DOMINGO	30,55	Mid High	35,52	Mid High	0,38	Very High	22,15	High
153	SAN JACINTO	16,67	High	28,33	High	0,17	Very High	15,06	High
156	DESCOLGADERO	10,00	Very High	25,00	High	0,00	Very High	11,67	Very High
162	PUEBLO NUEVO - KM 41	31,09	Mid High	42,49	Mid High	0,11	Very High	24,56	High
169	SAN JUAN	14,47	Very High	34,23	Mid High	0,14	Very High	16,28	High
173	PIÑAL SALADO	17,55	High	37,21	Mid High	0,14	Very High	18,30	High
179	COLORADO	16,03	High	32,96	Mid High	0,15	Very High	16,38	High
180	BOCAS DE CURAY	17,74	High	34,28	Mid High	0,14	Very High	17,39	High
181	CALETA DE VIENTO LIBRE	18,06	High	34,17	Mid High	0,36	Very High	17,53	High
182	CHORRERA DE CURAY	15,73	High	37,10	Mid High	0,13	Very High	17,65	High
183	LLANAJE	13,05	Very High	34,09	Mid High	0,12	Very High	15,75	High
185	OLIVO	9,87	Very High	33,24	Mid High	0,14	Very High	14,41	Very High
193	NUEVA UNION	23,33	High	41,88	Mid High	0,15	Very High	21,79	High
262	VAQUERIO	28,06	High	31,01	Mid High	0,04	Very High	19,70	High
264	TRUJILLO	5,87	Very High	35,00	Mid High	0,24	Very High	13,70	Very High
291	LIMONES	3,33	Very High	34,00	Mid High	0,00	Very High	12,44	Very High
295	CHAJAL	14,35	Very High	34,31	Mid High	0,08	Very High	16,25	High
296	GUADUAL	8,97	Very High	34,88	Mid High	0,26	Very High	14,70	Very High
302	ALTO BUENOS AIRES	16,67	High	35,00	Mid High	0,04	Very High	17,24	High
327	PLAYON RIO MIRA	15,00	High	33,33	Mid High	0,00	Very High	16,11	High
330	ROMPIDO	3,33	Very High	35,00	Mid High	0,01	Very High	12,78	Very High

Cd.	Nombre del Corregimiento	Natural Catastrophe Risk Indicator	Natural Catastrophe Risk Indicator	PUBLIC INVESTMENT INDICATOR	PUBLIC INVESTMENT INDICATOR	POPULATION INDICATOR	I POPULATION INDICATOR	Socioeconomic Vulnerability Index	Socioeconomic Vulnerability Index
140	MILAGROS	19,44	High	49,92	Mid High	1,09	Very High	22,89	High
141	TERAN	4,00	Very High	49,92	Mid High	1,34	Very High	18,23	High
142	CABO MANGLARES	4,55	Very High	49,92	Mid High	0,30	Very High	18,17	High
143	CHONTAL	16,42	High	49,92	Mid High	2,41	Very High	22,31	High
144	CONGAL	6,98	Very High	49,92	Mid High	2,71	Very High	20,62	High
146	BOCANA NUEVA	2,70	Very High	49,92	Mid High	1,07	Very High	17,49	High
147	CANDELILLA DE LA MAR	45,60	Mid	49,92	Mid High	4,31	Very High	31,22	Mid High
148	CEDRAL	19,44	High	49,92	Mid High	0,54	Very High	22,68	High
150	BAJO GUABAL	6,67	Very High	49,92	Mid High	0,50	Very High	18,20	High
151	SAGUNBITA	18,14	High	49,92	Mid High	1,49	Very High	22,18	High
152	SANTO DOMINGO	21,96	High	49,92	Mid High	3,12	Very High	24,29	High
153	SAN JACINTO	16,67	High	49,92	Mid High	0,13	Very High	20,44	High
156	DESCOLGADERO	0,00	Very High	49,92	Mid High	0,01	Very High	15,40	High
162	PUEBLO NUEVO - KM 41	56,97	Mid	49,92	Mid High	0,00	Very High	32,86	Mid High
169	SAN JUAN	36,34	Mid High	49,92	Mid High		S.I		S.I
173	PIÑAL SALADO	75,42	Low	49,92	Mid High	14,76	Very High	39,60	Mid High
179	COLORADO	1,08	Very High	49,92	Mid High		S.I		S.I
180	BOCAS DE CURAY	3,63	Very High	49,92	Mid High		S.I		S.I
181	CALETA DE VIENTO LIBRE	8,33	Very High	49,92	Mid High		S.I		S.I
182	CHORRERA DE CURAY	47,01	Mid	49,92	Mid High		S.I		S.I
183	LLANAJE	5,81	Very High	49,92	Mid High		S.I		S.I
185	OLIVO	4,51	Very High	49,92	Mid High		S.I		S.I
193	NUEVA UNION	0,00	Very High	49,92	Mid High	0,23	Very High	17,99	High
262	VAQUERIO	93,87	Low	49,92	Mid High	2,72	Very High	41,55	Mid High
264	TRUJILLO	17,14	High	49,92	Mid High		S.I		S.I
291	LIMONES	32,00	Mid High	49,92	Mid High	1,95	Very High	24,08	High
295	CHAJAL	35,79	Mid High	49,92	Mid High	19,27	High	30,31	Mid High
296	GUADUAL	5,95	Very High	49,92	Mid High		S.I		S.I
302	ALTO BUENOS AIRES	0,00	Very High	49,92	Mid High	1,65	Very High	17,20	High
327	PLAYON RIO MIRA	100,00	Low	49,92	Mid High	0,13	Very High	41,54	Mid High
330	ROMPIDO	78,75	Low	49,92	Mid High	0,41	Very High	35,47	Mid High

Attachment 4. Cartagena. Socioeconomic Vulnerability Index 2019

CodSis	NEIGHBORHOOD - CORREGIMIENTO	Services Factor 2019	Services Factor 2019	Housing Factor 2019	Housing Factor 2019	Human Capital Factor 2019	Human Capital Factor 2019
100	MARBELLA	88,45	Low	79,50	Low	66,67	Mid Low
150	DANIEL LEMAITRE	88,45	Low	84,00	Low	66,67	Mid Low
200	SANTA MARIA	88,45	Low	85,10	Low	66,67	Mid Low
250	CANAPOTE	88,45	Low	85,91	Low	66,67	Mid Low
300	SAN PEDRO Y LIBERTAD	88,45	Low	82,01	Low	66,67	Mid Low
350	SIETE DE AGOSTO	88,45	Low	86,17	Low	66,67	Mid Low
400	TORICES	88,45	Low	82,79	Low	66,67	Mid Low
450	SAN FRANCISCO	88,45	Low	81,09	Low	66,67	Mid Low
500	PABLO VI - II	88,45	Low	82,91	Low	66,67	Mid Low
501	REPUBLICA DEL LIBANO	88,45	Low	82,15	Low	66,67	Mid Low
504	OLAYA ST PLAYAS DE ACAPULCO	88,45	Low	80,13	Low	66,67	Mid Low
507	OLAYA SECTOR FOCO ROJO	88,45	Low	79,24	Low	66,67	Mid Low
511	OLAYA SECTOR RAFAEL NUÑEZ	88,45	Low	80,50	Low	66,67	Mid Low
513	OLAYA SECTOR 11 DE NOVIEMBRE	88,45	Low	80,98	Low	66,67	Mid Low
516	OLAYA SECTOR CENTRAL	88,45	Low	80,93	Low	66,67	Mid Low
519	OLAYA SECTOR RICAURTE	88,45	Low	80,18	Low	66,67	Mid Low
521	REPUBLICA DE VENEZUELA	88,45	Low	84,90	Low	67,04	Mid Low
524	TESCA	88,45	Low	85,83	Low	67,10	Mid Low
527	CHIQUINQUIRA	88,45	Low	87,68	Low	67,12	Mid Low
530	CASTILLETE	88,45	Low	91,66	Low	67,14	Mid Low
532	COSTA LINDA	88,45	Low	91,18	Low	67,14	Mid Low
550	PEDRO SALAZAR	88,45	Low	87,64	Low	67,16	Mid Low
600	LOS COMUNEROS	88,45	Low	86,71	Low	67,16	Mid Low
650	EL CABRERO	88,45	Low	79,50	Low	67,16	Mid Low
700	PETARE	88,45	Low	79,77	Low	67,18	Mid Low
750	PALESTINA	88,45	Low	79,76	Low	67,19	Mid Low
800	REPUBLICA DEL CARIBE	88,45	Low	79,73	Low	67,21	Mid Low
850	PARAISO II	88,45	Low	78,17	Low	67,21	Mid Low
900	LA PAZ	88,45	Low	78,37	Low	67,21	Mid Low
950	LOMA FRESCA	88,45	Low	78,81	Low	67,22	Mid Low
1000	PABLO VI - I	88,45	Low	83,27	Low	67,22	Mid Low
1050	SAN DIEGO	88,45	Low	92,00	Low	67,23	Mid Low
1101	PUERTA DE HIERRO	88,45	Low	79,37	Low	67,24	Mid Low
1103	ARROZ BARATO	88,45	Low	80,04	Low	67,24	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	LIFE QUALITY INDICATOR 2019	LIFE QUALITY INDICATOR 2019	Natural Catastrophe Risk Indicator 2019	Natural Catastrophe Risk Indicator 2019	PUBLIC INVESTMENT INDICATOR	PUBLIC INVESTMENT INDICATOR
100	MARBELLA	78,21	Low	100,00	Low	63,00	Mid Low
150	DANIEL LEMAITRE	79,70	Low	98,28	Low	63,00	Mid Low
200	SANTA MARIA	80,07	Low	97,62	Low	63,00	Mid Low
250	CANAPOTE	80,34	Low	98,56	Low	63,00	Mid Low
300	SAN PEDRO Y LIBERTAD	79,04	Low	97,84	Low	63,00	Mid Low
350	SIETE DE AGOSTO	80,43	Low	96,56	Low	63,00	Mid Low
400	TORICES	79,30	Low	98,11	Low	63,00	Mid Low
450	SAN FRANCISCO	78,73	Low	96,97	Low	63,00	Mid Low
500	PABLO VI - II	79,34	Low	98,08	Low	63,00	Mid Low
501	REPUBLICA DEL LIBANO	79,09	Low	94,68	Low	63,00	Mid Low
504	OLAYA ST PLAYAS DE ACAPULCO	78,42	Low	91,96	Low	63,00	Mid Low
507	OLAYA SECTOR FOCO ROJO	78,12	Low	93,73	Low	63,00	Mid Low
511	OLAYA SECTOR RAFAEL NUÑEZ	78,54	Low	90,25	Low	63,00	Mid Low
513	OLAYA SECTOR 11 DE NOVIEMBRE	78,70	Low	90,31	Low	63,00	Mid Low
516	OLAYA SECTOR CENTRAL	78,68	Low	92,42	Low	63,00	Mid Low
519	OLAYA SECTOR RICAURTE	78,43	Low	90,59	Low	63,00	Mid Low
521	REPUBLICA DE VENEZUELA	80,13	Low	97,51	Low	63,00	Mid Low
524	TESCA	80,46	Low	94,29	Low	63,00	Mid Low
527	CHIQUINQUIRA	81,08	Low	98,84	Low	63,00	Mid Low
530	CASTILLETE	82,42	Low	90,27	Low	63,00	Mid Low
532	COSTA LINDA	82,26	Low	97,83	Low	63,00	Mid Low
550	PEDRO SALAZAR	81,08	Low	98,28	Low	63,00	Mid Low
600	LOS COMUNEROS	80,78	Low	97,67	Low	63,00	Mid Low
650	EL CABRERO	78,37	Low	90,00	Low	63,00	Mid Low
700	PETARE	78,47	Low	96,06	Low	63,00	Mid Low
750	PALESTINA	78,46	Low	95,75	Low	63,00	Mid Low
800	REPUBLICA DEL CARIBE	78,46	Low	97,15	Low	63,00	Mid Low
850	PARAISO II	77,94	Low	93,20	Low	63,00	Mid Low
900	LA PAZ	78,01	Low	94,86	Low	63,00	Mid Low
950	LOMA FRESCA	78,16	Low	96,73	Low	63,00	Mid Low
1000	PABLO VI - I	79,64	Low	96,84	Low	63,00	Mid Low
1050	SAN DIEGO	82,56	Low	100,00	Low	63,00	Mid Low
1101	PUERTA DE HIERRO	78,35	Low	99,18	Low	63,00	Mid Low
1103	ARROZ BARATO	78,58	Low	98,39	Low	63,00	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	POPULATION INDICATOR 2019	POPULATION INDICATOR 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019
100	MARBELLA	2,60	Very High	60,95	Mid Low
150	DANIEL LEMAITRE	10,66	Very High	62,91	Mid Low
200	SANTA MARIA	3,76	Very High	61,11	Mid Low
250	CANAPOTE	4,30	Very High	61,55	Mid Low
300	SAN PEDRO Y LIBERTAD	4,81	Very High	61,17	Mid Low
350	SIETE DE AGOSTO	4,51	Very High	61,12	Mid Low
400	TORICES	17,26	High	64,42	Mid Low
450	SAN FRANCISCO	28,89	High	66,90	Mid Low
500	PABLO VI - II	4,63	Very High	61,26	Mid Low
501	REPUBLICA DEL LIBANO	13,67	Very High	62,61	Mid Low
504	OLAYA ST PLAYAS DE ACAPULCO		S.I	58,34	Mid Low*
507	OLAYA SECTOR FOCO ROJO		S.I	58,71	Mid Low*
511	OLAYA SECTOR RAFAEL NUÑEZ	16,69	High	62,12	Mid Low
513	OLAYA SECTOR 11 DE NOVIEMBRE	11,05	Very High	60,76	Mid Low
516	OLAYA SECTOR CENTRAL	15,94	High	62,51	Mid Low
519	OLAYA SECTOR RICAURTE	16,97	High	62,25	Mid Low
521	REPUBLICA DE VENEZUELA	5,37	Very High	61,50	Mid Low
524	TESCA	4,13	Very High	60,47	Mid Low
527	CHIQUINQUIRA	9,66	Very High	63,15	Mid Low
530	CASTILLETE		S.I	58,92	Mid Low*
532	COSTA LINDA		S.I	60,77	Mid Low*
550	PEDRO SALAZAR	3,20	Very High	61,39	Mid Low
600	LOS COMUNEROS	2,40	Very High	60,96	Mid Low
650	EL CABRERO	5,42	Very High	59,20	Mid Low
700	PETARE	3,63	Very High	60,29	Mid Low
750	PALESTINA	4,61	Very High	60,46	Mid Low
800	REPUBLICA DEL CARIBE	4,06	Very High	60,67	Mid Low
850	PARAISO II	5,93	Very High	60,02	Mid Low
900	LA PAZ	6,05	Very High	60,48	Mid Low
950	LOMA FRESCA	2,98	Very High	60,22	Mid Low
1000	PABLO VI - I	1,41	Very High	60,22	Mid Low
1050	SAN DIEGO	4,59	Very High	62,54	Mid Low
1101	PUERTA DE HIERRO	1,42	Very High	60,49	Mid Low
1103	ARROZ BARATO		S.I	61,34	Mid Low*

CodSis	NEIGHBORHOOD - CORREGIMIENTO	Services Factor 2019	Services Factor 2019	Housing Factor 2019	Housing Factor 2019	Human Capital Factor 2019	Human Capital Factor 2019
1105	POLICARPA	88,45	Low	77,53	Low	67,24	Mid Low
1150	SAN BERNARDO	88,45	Low	81,40	Low	67,25	Mid Low
1200	CENTRO	88,45	Low	83,50	Low	67,25	Mid Low
1250	NARIÑO	88,45	Low	80,23	Low	67,25	Mid Low
1300	LA MATUNA	88,45	Low	75,00	Low	67,26	Mid Low
1350	LA MARIA	88,45	Low	83,39	Low	67,57	Mid Low
1400	ESPINAL	88,45	Low	83,08	Low	67,58	Mid Low
1450	GETSEMANI	88,45	Low	83,10	Low	67,58	Mid Low
1500	LO AMADOR	88,45	Low	83,98	Low	67,59	Mid Low
1550	PIE DEL CERRO	88,45	Low	78,38	Low	67,59	Mid Low
1600	EL POZON	88,45	Low	78,39	Low	67,59	Mid Low
1700	MANGA	88,45	Low	78,63	Low	67,59	Mid Low
1800	LA ESPERANZA	88,45	Low	82,86	Low	67,60	Mid Low
1850	LA QUINTA	88,45	Low	83,59	Low	67,60	Mid Low
1900	LA CANDELARIA	88,45	Low	80,14	Low	67,60	Mid Low
1950	OLAYA HERRERA (COM 5)	88,45	Low	80,41	Low	67,61	Mid Low
2000	BOSTON	88,45	Low	80,43	Low	67,61	Mid Low
2050	NEIGHBORHOOD CHINO	88,45	Low	84,19	Low	67,61	Mid Low
2150	ALCIBIA	88,45	Low	84,97	Low	67,61	Mid Low
2200	EL PRADO	88,45	Low	84,62	Low	67,61	Mid Low
2250	MARTINEZ MARTELO	88,45	Low	81,50	Low	67,62	Mid Low
2300	FREDONIA	88,45	Low	80,19	Low	67,63	Mid Low
2350	NUEVO PARAISO	88,45	Low	79,61	Low	67,64	Mid Low
2450	VILLA ESTRELLA	88,45	Low	81,06	Low	67,65	Mid Low
2500	AMBERES	88,45	Low	85,90	Low	67,66	Mid Low
2550	ESPAÑA	88,45	Low	85,66	Low	67,66	Mid Low
2600	ARMENIA	88,45	Low	88,41	Low	67,66	Mid Low
2650	BRUSELAS	88,45	Low	86,04	Low	67,68	Mid Low
2800	ZARAGOCILLA	88,45	Low	83,94	Low	67,68	Mid Low
2850	TRECE DE JUNIO	88,45	Low	85,72	Low	67,68	Mid Low
2900	ESCALLON VILLA	88,45	Low	84,40	Low	67,69	Mid Low
2950	LAS GAVIOTAS	88,45	Low	88,91	Low	67,69	Mid Low
3000	BOSQUE	88,45	Low	84,01	Low	67,69	Mid Low
3050	PIEDRA DE BOLIVAR	88,45	Low	82,87	Low	67,69	Mid Low
3100	SAN JOSE OBRERO	88,45	Low	83,29	Low	67,69	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	LIFE QUALITY INDICATOR 2019		Natural Catastrophe Risk Indicator 2019		PUBLIC INVESTMENT INDICATOR	
1105	POLICARPA	77,74	Low	97,18	Low		
1150	SAN BERNARDO	79,03	Low	95,88	Low	63,00	Mid Low
1200	CENTRO	79,73	Low	90,00	Low	63,00	Mid Low
1250	NARIÑO	78,64	Low	92,54	Low	63,00	Mid Low
1300	LA MATUNA	76,90	Low	80,00	Low	63,00	Mid Low
1350	LA MARIA	79,80	Low	96,03	Low	63,00	Mid Low
1400	ESPINAL	79,70	Low	98,37	Low	63,00	Mid Low
1450	GETSEMANI	79,71	Low	92,68	Low	63,00	Mid Low
1500	LO AMADOR	80,00	Low	97,38	Low	63,00	Mid Low
1550	PIE DEL CERRO	78,14	Low	80,00	Low	63,00	Mid Low
1600	EL POZON	78,14	Low	93,39	Low	63,00	Mid Low
1700	MANGA	78,22	Low	88,13	Low	63,00	Mid Low
1800	LA ESPERANZA	79,64	Low	94,08	Low	63,00	Mid Low
1850	LA QUINTA	79,88	Low	98,76	Low	63,00	Mid Low
1900	LA CANDELARIA	78,73	Low	87,22	Low	63,00	Mid Low
1950	OLAYA HERRERA (COM 5)	78,82	Low	95,00	Low	63,00	Mid Low
2000	BOSTON	78,83	Low	89,93	Low	63,00	Mid Low
2050	NEIGHBORHOOD CHINO	80,08	Low	99,77	Low	63,00	Mid Low
2150	ALCIBIA	80,34	Low	97,36	Low	63,00	Mid Low
2200	EL PRADO	80,23	Low	100,00	Low	63,00	Mid Low
2250	MARTINEZ MARTELO	79,19	Low	100,00	Low	63,00	Mid Low
2300	FREDONIA	78,76	Low	95,98	Low	63,00	Mid Low
2350	NUEVO PARAISO	78,56	Low	95,21	Low	63,00	Mid Low
2450	VILLA ESTRELLA	79,06	Low	98,44	Low	63,00	Mid Low
2500	AMBERES	80,67	Low	99,30	Low	63,00	Mid Low
2550	ESPAÑA	80,59	Low	98,46	Low	63,00	Mid Low
2600	ARMENIA	81,51	Low	98,92	Low	63,00	Mid Low
2650	BRUSELAS	80,72	Low	99,31	Low	63,00	Mid Low
2800	ZARAGOCILLA	80,03	Low	99,09	Low	63,00	Mid Low
2850	TRECE DE JUNIO	80,62	Low	97,93	Low	63,00	Mid Low
2900	ESCALLON VILLA	80,18	Low	99,84	Low	63,00	Mid Low
2950	LAS GAVIOTAS	81,68	Low	99,77	Low	63,00	Mid Low
3000	BOSQUE	80,05	Low	97,42	Low	63,00	Mid Low
3050	PIEDRA DE BOLIVAR	79,67	Low	98,12	Low	63,00	Mid Low
3100	SAN JOSE OBRERO	79,81	Low	98,55	Low	63,00	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	POPULATION INDICATOR 2019	POPULATION INDICATOR 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019
1105	POLICARPA	5,39	Very High	60,57	Mid Low
1150	SAN BERNARDO	4,35	Very High	61,06	Mid Low
1200	CENTRO	6,34	Very High	59,57	Mid Low
1250	NARIÑO	5,55	Very High	58,62	Mid Low
1300	LA MATUNA	0,28	Very High	60,24	Mid Low
1350	LA MARIA	21,05	High	60,82	Mid Low
1400	ESPINAL	4,45	Very High	62,32	Mid Low
1450	GETSEMANI	8,19	Very High	60,08	Mid Low
1500	LO AMADOR	4,95	Very High	60,37	Mid Low
1550	PIE DEL CERRO	1,10	Very High	55,28	Mid*
1600	EL POZON		S.I	61,40	Mid Low
1700	MANGA	11,08	Very High	62,41	Mid Low
1800	LA ESPERANZA	20,31	High	61,97	Mid Low
1850	LA QUINTA	11,18	Very High	63,32	Mid Low
1900	LA CANDELARIA	11,65	Very High	60,75	Mid Low
1950	OLAYA HERRERA (COM 5)	14,05	Very High	62,47	Mid Low
2000	BOSTON	13,04	Very High	58,71	Mid Low
2050	NEIGHBORHOOD CHINO	3,07	Very High	62,31	Mid Low
2150	ALCIBIA	6,39	Very High	61,63	Mid Low
2200	EL PRADO	5,82	Very High	61,66	Mid Low
2250	MARTINEZ MARTELO	3,43	Very High	63,65	Mid Low
2300	FREDONIA	12,42	Very High	64,72	Mid Low
2350	NUEVO PARAISO	21,16	High	60,73	Mid Low
2450	VILLA ESTRELLA	6,17	Very High	61,73	Mid Low
2500	AMBERES	6,42	Very High	62,54	Mid Low
2550	ESPAÑA	7,17	Very High	61,00	Mid Low
2600	ARMENIA	1,96	Very High	62,89	Mid Low
2650	BRUSELAS	8,14	Very High	64,54	Mid Low
2800	ZARAGOCILLA	15,14	High	66,24	Mid Low
2850	TRECE DE JUNIO	22,86	High	63,85	Mid Low
2900	ESCALLON VILLA	13,84	Very High	65,86	Mid Low
2950	LAS GAVIOTAS	20,40	High	67,00	Mid Low
3000	BOSQUE	23,54	High	62,89	Mid Low
3050	PIEDRA DE BOLIVAR	11,10	Very High	61,06	Mid Low
3100	SAN JOSE OBRERO	3,46	Very High	62,32	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	Services Factor 2019	Services Factor 2019	Housing Factor 2019	Housing Factor 2019	Human Capital Factor 2019	Human Capital Factor 2019
3150	PARAGUAY	88,45	Low	84,88	Low	67,70	Mid Low
3200	NUEVO PORVENIR	88,45	Low	82,13	Low	67,70	Mid Low
3250	LAS PALMERAS	88,45	Low	87,10	Low	67,70	Mid Low
3300	JUAN XXIII	88,45	Low	89,29	Low	67,70	Mid Low
3350	JUNIN	88,45	Low	84,43	Low	67,70	Mid Low
3400	LOS ALPES	88,45	Low	86,25	Low	67,71	Mid Low
3450	VIEJO PORVENIR	88,45	Low	84,58	Low	67,72	Mid Low
3500	JOSE ANTONIO GALAN	88,45	Low	80,13	Low	67,72	Mid Low
3550	NUEVE DE ABRIL	88,45	Low	80,79	Low	67,72	Mid Low
3700	SAN ISIDRO	88,45	Low	85,54	Low	67,72	Mid Low
3750	LAS BRISAS	88,45	Low	79,77	Low	67,72	Mid Low
3800	VILLA ROSITA	88,45	Low	85,45	Low	67,73	Mid Low
3850	REPUBLICA DE CHILE	88,45	Low	87,69	Low	67,73	Mid Low
4000	CALAMARES	88,45	Low	87,28	Low	67,74	Mid Low
4250	ANITA	88,45	Low	89,22	Low	67,74	Mid Low
4300	NUEVA GRANADA	88,45	Low	79,50	Low	67,74	Mid Low
4350	SAN ANTONIO	88,45	Low	79,50	Low	67,74	Mid Low
4400	ALTOS DE SAN ISIDRO	88,45	Low	83,86	Low	67,75	Mid Low
4450	MIRADOR NUEVO BOSQUE	88,45	Low	83,36	Low	67,75	Mid Low
4500	LA CAMPIÑA	88,45	Low	83,30	Low	67,76	Mid Low
4600	LOS CERROS	88,45	Low	87,62	Low	68,13	Mid Low
4700	TACARIGUA	88,45	Low	92,00	Low	68,14	Mid Low
4800	VILLA SANDRA	88,45	Low	92,00	Low	68,15	Mid Low
4850	NUEVO BOSQUE	88,45	Low	88,69	Low	68,16	Mid Low
4900	RUBI	88,45	Low	83,67	Low	68,16	Mid Low
4950	LA TRONCAL	88,45	Low	92,00	Low	68,16	Mid Low
5000	BUENOS AIRES	88,45	Low	85,51	Low	68,17	Mid Low
5050	LAS DELICIAS	88,45	Low	79,50	Low	68,17	Mid Low
5100	EL COUNTRY	88,45	Low	92,00	Low	68,17	Mid Low
5150	SAN PEDRO	88,45	Low	92,00	Low	68,18	Mid Low
5250	ALTO BOSQUE	88,45	Low	82,00	Low	68,18	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	LIFE QUALITY INDICATOR 2019	LIFE QUALITY INDICATOR 2019	Natural Catastrophe Risk Indicator 2019	Natural Catastrophe Risk Indicator 2019	PUBLIC INVESTMENT INDICATOR	PUBLIC INVESTMENT INDICATOR
3150	PARAGUAY	80,34	Low	99,00	Low	63,00	Mid Low
3200	NUEVO PORVENIR	79,43	Low	99,00	Low	63,00	Mid Low
3250	LAS PALMERAS	81,08	Low	97,93	Low	63,00	Mid Low
3300	JUAN XXIII	81,81	Low	99,83	Low	63,00	Mid Low
3350	JUNIN	80,19	Low	99,89	Low	63,00	Mid Low
3400	LOS ALPES	80,80	Low	93,36	Low	63,00	Mid Low
3450	VIEJO PORVENIR	80,25	Low	99,05	Low	63,00	Mid Low
3500	JOSE ANTONIO GALAN	78,76	Low	96,92	Low	63,00	Mid Low
3550	NUEVE DE ABRIL	78,98	Low	97,64	Low	63,00	Mid Low
3700	SAN ISIDRO	80,57	Low	99,12	Low	63,00	Mid Low
3750	LAS BRISAS	78,65	Low	99,62	Low	63,00	Mid Low
3800	VILLA ROSITA	80,54	Low	87,98	Low	63,00	Mid Low
3850	REPUBLICA DE CHILE	81,29	Low	99,50	Low	63,00	Mid Low
4000	CALAMARES	81,16	Low	99,84	Low	63,00	Mid Low
4250	ANITA	81,80	Low	100,00	Low	63,00	Mid Low
4300	NUEVA GRANADA	78,56	Low	100,00	Low	63,00	Mid Low
4350	SAN ANTONIO	78,56	Low	100,00	Low	63,00	Mid Low
4400	ALTOS DE SAN ISIDRO	80,02	Low	99,31	Low	63,00	Mid Low
4450	MIRADOR NUEVO BOSQUE	79,86	Low	97,13	Low	63,00	Mid Low
4500	LA CAMPIÑA	79,84	Low	99,85	Low	63,00	Mid Low
4600	LOS CERROS	81,40	Low	99,65	Low	63,00	Mid Low
4700	TACARIGUA	82,86	Low	100,00	Low	63,00	Mid Low
4800	VILLA SANDRA	82,87	Low	100,00	Low	63,00	Mid Low
4850	NUEVO BOSQUE	81,77	Low	99,94	Low	63,00	Mid Low
4900	RUBI	80,09	Low	100,00	Low	63,00	Mid Low
4950	LA TRONCAL	82,87	Low	100,00	Low	63,00	Mid Low
5000	BUENOS AIRES	80,71	Low	100,00	Low	63,00	Mid Low
5050	LAS DELICIAS	78,71	Low	100,00	Low	63,00	Mid Low
5100	EL COUNTRY	82,87	Low	100,00	Low	63,00	Mid Low
5150	SAN PEDRO	82,88	Low	100,00	Low	63,00	Mid Low
5250	ALTO BOSQUE	79,54	Low	100,00	Low	63,00	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	POPULATION INDICATOR 2019	POPULATION INDICATOR 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019
3150	PARAGUAY	7,91	Very High	61,47	Mid Low
3200	NUEVO PORVENIR	3,55	Very High	63,16	Mid Low
3250	LAS PALMERAS	11,23	Very High	61,08	Mid Low
3300	JUAN XXIII	2,29	Very High	61,93	Mid Low
3350	JUNIN	3,09	Very High	63,89	Mid Low
3400	LOS ALPES	12,50	Very High	61,02	Mid Low
3450	VIEJO PORVENIR	6,90	Very High	61,39	Mid Low
3500	JOSE ANTONIO GALAN	3,25	Very High	61,07	Mid Low
3550	NUEVE DE ABRIL	5,60	Very High	62,34	Mid Low
3700	SAN ISIDRO	9,75	Very High	61,54	Mid Low
3750	LAS BRISAS	3,47	Very High	61,43	Mid Low
3800	VILLA ROSITA	4,44	Very High	61,33	Mid Low
3850	REPUBLICA DE CHILE	13,81	Very High	65,98	Mid Low
4000	CALAMARES	20,13	High	61,44	Mid Low
4250	ANITA	1,76	Very High	64,33	Mid Low
4300	NUEVA GRANADA	12,52	Very High	60,63	Mid Low
4350	SAN ANTONIO	0,95	Very High	63,34	Mid Low
4400	ALTOS DE SAN ISIDRO	11,78	Very High	61,52	Mid Low
4450	MIRADOR NUEVO BOSQUE	3,77	Very High	62,20	Mid Low
4500	LA CAMPIÑA	8,82	Very High	62,12	Mid Low
4600	LOS CERROS	5,81	Very High	62,31	Mid Low
4700	TACARIGUA	5,21	Very High	61,76	Mid Low
4800	VILLA SANDRA	1,18	Very High	66,08	Mid Low
4850	NUEVO BOSQUE	18,45	High	61,58	Mid Low
4900	RUBI	1,63	Very High	61,35	Mid Low
4950	LA TRONCAL	2,30	Very High	61,98	Mid Low
5000	BUENOS AIRES	2,05	Very High	62,72	Mid Low
5050	LAS DELICIAS	7,18	Very High	62,13	Mid Low
5100	EL COUNTRY	6,83	Very High	66,21	Mid Low
5150	SAN PEDRO	18,98	High	63,43	Mid Low
5250	ALTO BOSQUE	7,86	Very High	62,23	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	Services Factor 2019	Services Factor 2019	Housing Factor 2019	Housing Factor 2019	Human Capital Factor 2019	Human Capital Factor 2019
5300	BLAS DE LEZO	88,45	Low	87,42	Low	68,18	Mid Low
5350	SAN JOSE DE LOS CAMPANOS	88,45	Low	81,10	Low	68,19	Mid Low
5500	LOS CARACOLES	88,45	Low	90,21	Low	68,19	Mid Low
5550	TERNERA	88,45	Low	84,61	Low	68,20	Mid Low
5600	ALMIRANTE COLON	88,45	Low	92,00	Low	68,20	Mid Low
5800	EL SOCORRO	88,45	Low	90,78	Low	68,21	Mid Low
5850	CEBALLOS	88,45	Low	80,41	Low	68,22	Mid Low
5900	LA CENTRAL	88,45	Low	85,67	Low	68,22	Mid Low
5950	SAN FERNANDO	88,45	Low	84,64	Low	68,23	Mid Low
6000	EL MILAGRO	88,45	Low	82,99	Low	68,24	Mid Low
6050	EL CAMPESTRE	88,45	Low	83,72	Low	68,24	Mid Low
6100	SANTA CLARA	88,45	Low	88,80	Low	68,24	Mid Low
6150	EL CARMELO	88,45	Low	85,81	Low	68,24	Mid Low
6200	VISTA HERMOSA	88,45	Low	84,03	Low	68,26	Mid Low
6250	CIUDADELA 11 DE NOVIEMBRE	88,45	Low	90,89	Low	68,27	Mid Low
6300	URBANIZACION SIMON BOLIVAR	88,45	Low	90,02	Low	68,27	Mid Low
6350	SAN PEDRO MARTIR	88,45	Low	81,34	Low	68,27	Mid Low
6400	LA VICTORIA	88,45	Low	83,17	Low	68,27	Mid Low
6450	LOS JARDINES	88,45	Low	87,64	Low	68,27	Mid Low
6500	LA CONSOLATA	88,45	Low	87,59	Low	68,27	Mid Low
6550	VILLA RUBIA	88,45	Low	87,54	Low	68,28	Mid Low
6600	JORGE ELIECER GAITAN	88,45	Low	83,79	Low	68,28	Mid Low
6650	LA FLORIDA	88,45	Low	83,87	Low	68,28	Mid Low
6700	VEINTE DE JULIO SUR	88,45	Low	81,24	Low	68,29	Mid Low
6750	NELSON MANDELA	88,45	Low	76,88	Low	68,29	Mid Low
6800	CESAR FLOREZ	88,45	Low	82,99	Low	68,30	Mid Low
6850	LUIS CARLOS GALAN	88,45	Low	80,76	Low	68,30	Mid Low
6900	EL REPOSO	88,45	Low	81,35	Low	68,32	Mid Low
6950	EL EDUCADOR	88,45	Low	81,15	Low	68,32	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	LIFE QUALITY INDICATOR 2019	LIFE QUALITY INDICATOR 2019	Natural Catastrophe Risk Indicator 2019	Natural Catastrophe Risk Indicator 2019	INDICADOR INVERSIÓN PÚBLICA	INDICADOR INVERSIÓN PÚBLICA
5300	BLAS DE LEZO	81,35	Low	99,22	Low	63,00	Mid Low
5350	SAN JOSE DE LOS CAMPANOS	79,25	Low	93,97	Low	63,00	Mid Low
5500	LOS CARACOLES	82,28	Low	99,78	Low	63,00	Mid Low
5550	TERNERA	80,42	Low	99,47	Low	63,00	Mid Low
5600	ALMIRANTE COLON	82,88	Low	100,00	Low	63,00	Mid Low
5800	EL SOCORRO	82,48	Low	99,26	Low	63,00	Mid Low
5850	CEBALLOS	79,03	Low	97,74	Low	63,00	Mid Low
5900	LA CENTRAL	80,78	Low	99,53	Low	63,00	Mid Low
5950	SAN FERNANDO	80,44	Low	98,51	Low	63,00	Mid Low
6000	EL MILAGRO	79,89	Low	99,24	Low	63,00	Mid Low
6050	EL CAMPESTRE	80,14	Low	99,24	Low	63,00	Mid Low
6100	SANTA CLARA	81,83	Low	97,89	Low	63,00	Mid Low
6150	EL CARMELO	80,84	Low	99,43	Low	63,00	Mid Low
6200	VISTA HERMOSA	80,25	Low	99,12	Low	63,00	Mid Low
6250	CIUDADELA 11 DE NOVIEMBRE	82,54	Low	100,00	Low	63,00	Mid Low
6300	URBANIZACION SIMON BOLIVAR	82,24	Low	99,85	Low	63,00	Mid Low
6350	SAN PEDRO MARTIR	79,35	Low	99,19	Low	63,00	Mid Low
6400	LA VICTORIA	79,96	Low	99,76	Low	63,00	Mid Low
6450	LOS JARDINES	81,45	Low	99,96	Low	63,00	Mid Low
6500	LA CONSOLATA	81,44	Low	99,39	Low	63,00	Mid Low
6550	VILLA RUBIA	81,42	Low	99,27	Low	63,00	Mid Low
6600	JORGE ELIECER GAITAN	80,17	Low	96,93	Low	63,00	Mid Low
6650	LA FLORIDA	80,20	Low	99,28	Low	63,00	Mid Low
6700	VEINTE DE JULIO SUR	79,33	Low	97,90	Low	63,00	Mid Low
6750	NELSON MANDELA	77,87	Low	95,99	Low	63,00	Mid Low
6800	CESAR FLOREZ	79,91	Low	95,51	Low	63,00	Mid Low
6850	LUIS CARLOS GALAN	79,17	Low	99,84	Low	63,00	Mid Low
6900	EL REPOSO	79,37	Low	98,92	Low	63,00	Mid Low
6950	EL EDUCADOR	79,31	Low	98,77	Low	63,00	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	POPULATION INDICATOR 2019	POPULATION INDICATOR 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019
5300	BLAS DE LEZO	6,36	Very High	65,66	Mid Low
5350	SAN JOSE DE LOS CAMPANOS	19,09	High	64,93	Mid Low
5500	LOS CARACOLES	23,49	High	66,19	Mid Low
5550	TERNERA	19,71	High	64,39	Mid Low
5600	ALMIRANTE COLON	14,68	Very High	64,21	Mid Low
5800	EL SOCORRO	10,96	Very High	65,63	Mid Low
5850	CEBALLOS	17,77	High	61,78	Mid Low
5900	LA CENTRAL	7,36	Very High	65,39	Mid Low
5950	SAN FERNANDO	18,26	High	61,68	Mid Low
6000	EL MILAGRO	4,78	Very High	64,33	Mid Low
6050	EL CAMPESTRE	15,19	High	61,70	Mid Low
6100	SANTA CLARA	4,43	Very High	61,99	Mid Low
6150	EL CARMELO	5,24	Very High	62,94	Mid Low
6200	VISTA HERMOSA	8,51	Very High	61,86	Mid Low
6250	CIUDADELA 11 DE NOVIEMBRE	5,07	Very High	63,15	Mid Low
6300	URBANIZACION SIMON BOLIVAR	7,06	Very High	65,41	Mid Low
6350	SAN PEDRO MARTIR	16,54	High	64,93	Mid Low
6400	LA VICTORIA	18,18	High	63,42	Mid Low
6450	LOS JARDINES	10,97	Very High	64,65	Mid Low
6500	LA CONSOLATA	14,20	Very High	63,98	Mid Low
6550	VILLA RUBIA	12,11	Very High	62,08	Mid Low
6600	JORGE ELIECER GAITAN	4,64	Very High	60,55	Mid Low
6650	LA FLORIDA	2,10	Very High	61,31	Mid Low
6700	VEINTE DE JULIO SUR	2,75	Very High	63,00	Mid Low
6750	NELSON MANDELA	11,77	Very High	59,41	Mid Low
6800	CESAR FLOREZ	0,79	Very High	60,09	Mid Low
6850	LUIS CARLOS GALAN	1,92	Very High	61,17	Mid Low
6900	EL REPOSO	2,65	Very High	61,59	Mid Low
6950	EL EDUCADOR	5,08	Very High	60,37	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	Services Factor 2019	Services Factor 2019	Housing Factor 2019	Housing Factor 2019	Human Capital Factor 2019	Human Capital Factor 2019
7000	ROSSENDAL	88,45	Low	84,15	Low	68,33	Mid Low
7050	MARIA CANO	88,45	Low	84,14	Low	68,33	Mid Low
7100	CAMILO TORRES	88,45	Low	81,39	Low	68,33	Mid Low
7150	NUEVA DELHI	88,45	Low	81,36	Low	68,33	Mid Low
7200	BELLAVISTA	88,45	Low	84,41	Low	68,34	Mid Low
7250	ANTONIO JOSE DE SUCRE	88,45	Low	79,21	Low	68,34	Mid Low
7300	ALBORNOZ	88,45	Low	83,16	Low	68,35	Mid Low
7350	LA ESMERALDA I	88,45	Low	81,02	Low	68,35	Mid Low
7400	LOS SANTANDERES	88,45	Low	81,73	Low	68,36	Mid Low
7450	EL LIBERTADOR	88,45	Low	80,32	Low	68,39	Mid Low
7500	SECTORES UNIDOS	88,45	Low	80,36	Low	68,40	Mid Low
7550	NUEVA JERUSALEN	88,45	Low	80,59	Low	68,85	Mid Low
7600	LA SIERRITA	88,45	Low	79,04	Low	68,86	Mid Low
7650	NAZARENO	88,45	Low	81,46	Low	68,88	Mid Low
7700	MANUELA VERGARA DE CURI	88,45	Low	80,43	Low	68,88	Mid Low
7750	JAIME PARDO LEAL	88,45	Low	79,81	Low	68,88	Mid Low
7800	LA ESMERALDA II	88,45	Low	79,77	Low	68,92	Mid Low
7850	VILLA BARRAZA	88,45	Low	87,62	Low	68,92	Mid Low
7900	VILLA FANNY	88,45	Low	79,25	Low	68,94	Mid Low
7950	ARROZ BARATO	88,45	Low	78,50	Low	69,10	Mid Low
8000	PUERTA DE HIERRO	88,45	Low	79,39	Low	69,74	Mid Low
8050	POLICARPA	88,45	Low	76,51	Low	69,85	Mid Low
8100	PROVIDENCIA	88,45	Low	80,83	Low	74,44	Low
8150	ARROYO GRANDE	88,64	Low	81,20	Low	66,67	Mid Low
8151	ARROYO DE LAS CANOAS	86,42	Low	81,04	Low	66,67	Mid Low
8152	LAS EUROPAS	86,42	Low	77,44	Low	67,59	Mid Low
8153	PALMARITO	86,42	Low	80,00	Low	67,68	Mid Low
8154	BUENOS AIRES	86,42	Low	82,50	Low	67,71	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	LIFE QUALITY INDICATOR 2019	LIFE QUALITY INDICATOR 2019	Natural Catastrophe Risk Indicator 2019	Natural Catastrophe Risk Indicator 2019	INDICADOR INVERSIÓN PÚBLICA	INDICADOR INVERSIÓN PÚBLICA
7000	ROSSENDAL	80,31	Low	100,00	Low	63,00	Mid Low
7050	MARIA CANO	80,31	Low	99,77	Low	63,00	Mid Low
7100	CAMILO TORRES	79,39	Low	98,56	Low	63,00	Mid Low
7150	NUEVA DELHI	79,38	Low	98,98	Low	63,00	Mid Low
7200	BELLAVISTA	80,40	Low	99,71	Low	63,00	Mid Low
7250	ANTONIO JOSE DE SUCRE	78,67	Low	97,48	Low	63,00	Mid Low
7300	ALBORNOZ	79,98	Low	95,86	Low	63,00	Mid Low
7350	LA ESMERALDA I	79,27	Low	99,19	Low	63,00	Mid Low
7400	LOS SANTANDERES	79,51	Low	94,67	Low	63,00	Mid Low
7450	EL LIBERTADOR	79,05	Low	99,41	Low	63,00	Mid Low
7500	SECTORES UNIDOS	79,07	Low	97,49	Low	63,00	Mid Low
7550	NUEVA JERUSALEN	79,30	Low	96,72	Low	63,00	Mid Low
7600	LA SIERRITA	78,78	Low	97,93	Low	63,00	Mid Low
7650	NAZARENO	79,60	Low	99,53	Low	63,00	Mid Low
7700	MANUELA VERGARA DE CURI	79,25	Low	99,71	Low	63,00	Mid Low
7750	JAIME PARDO LEAL	79,05	Low	99,17	Low	63,00	Mid Low
7800	LA ESMERALDA II	79,05	Low	99,83	Low	63,00	Mid Low
7850	VILLA BARRAZA	81,66	Low	100,00	Low	63,00	Mid Low
7900	VILLA FANNY	78,88	Low	97,47	Low	63,00	Mid Low
7950	ARROZ BARATO	78,68	Low	97,78	Low	63,00	Mid Low
8000	PUERTA DE HIERRO	79,19	Low	91,60	Low	63,00	Mid Low
8050	POLICARPA	78,27	Low	81,46	Low	63,00	Mid Low
8100	PROVIDENCIA	81,24	Low	81,67	Low	63,00	Mid Low
8150	ARROYO GRANDE	78,83	Low	99,45	Low	63,00	Mid Low
8151	ARROYO DE LAS CANOAS	78,04	Low	98,15	Low	63,00	Mid Low
8152	LAS EUROPAS	77,15	Low	100,00	Low	63,00	Mid Low
8153	PALMARITO	78,03	Low	100,00	Low	63,00	Mid Low
8154	BUENOS AIRES	78,87	Low	100,00	Low	63,00	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	POPULATION INDICATOR 2019	POPULATION INDICATOR 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019
7000	ROSSENDAL	0,39	Very High	61,18	Mid Low
7050	MARIA CANO	1,40	Very High	61,06	Mid Low
7100	CAMILO TORRES	1,15	Very High	60,40	Mid Low
7150	NUEVA DELHI	0,65	Very High	60,79	Mid Low
7200	BELLAVISTA	1,81	Very High	61,33	Mid Low
7250	ANTONIO JOSE DE SUCRE	2,22	Very High	60,10	Mid Low
7300	ALBORNOZ	1,24	Very High	59,82	Mid Low
7350	LA ESMERALDA I	0,43	Very High	60,49	Mid Low
7400	LOS SANTANDERES	0,49	Very High	60,11	Mid Low
7450	EL LIBERTADOR	3,26	Very High	60,59	Mid Low
7500	SECTORES UNIDOS	0,90	Very High	60,07	Mid Low
7550	NUEVA JERUSALEN	0,71	Very High	60,02	Mid Low
7600	LA SIERRITA	1,08	Very High	60,78	Mid Low
7650	NAZARENO	3,40	Very High	61,28	Mid Low
7700	MANUELA VERGARA DE CURI	2,98	Very High	60,85	Mid Low
7750	JAIME PARDO LEAL	1,44	Very High	60,42	Mid Low
7800	LA ESMERALDA II	0,47	Very High	60,56	Mid Low
7850	VILLA BARRAZA	0,38	Very High	61,52	Mid Low
7900	VILLA FANNY	1,42	Very High	60,99	Mid Low
7950	ARROZ BARATO	4,61	Very High	60,28	Mid Low
8000	PUERTA DE HIERRO	1,67	Very High	60,28	Mid Low
8050	POLICARPA	7,34	Very High	56,41	Mid Low
8100	PROVIDENCIA	2,89	Very High	57,23	Mid Low
8150	ARROYO GRANDE	2,99	Very High	60,48	Mid Low
8151	ARROYO DE LAS CANOAS	0,63	Very High	59,86	Mid Low
8152	LAS EUROPAS	0,24	Very High	60,08	Mid Low
8153	PALMARITO	0,18	Very High	60,26	Mid Low
8154	BUENOS AIRES	0,02	Very High	61,11	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	Services Factor 2019	Services Factor 2019	Housing Factor 2019	Housing Factor 2019	Human Capital Factor 2019	Human Capital Factor 2019
8200	PONTEZUELA	86,42	Low	82,40	Low	67,71	Mid Low
8250	BAYUNCA	86,42	Low	81,36	Low	67,75	Mid Low
8300	PUNTA CANOA	86,42	Low	83,28	Low	68,15	Mid Low
8350	TIERRA BOMBA	86,42	Low	85,29	Low	68,16	Mid Low
8352	PUNTA ARENAS	86,42	Low	84,57	Low	68,16	Mid Low
8400	BOCACHICA	86,42	Low	84,25	Low	68,17	Mid Low
8450	CAÑO DEL ORO	86,42	Low	83,04	Low	68,22	Mid Low
8500	SANTA ANA	86,42	Low	82,31	Low	68,28	Mid Low
8501	ARARCA	86,42	Low	81,21	Low	68,28	Mid Low
8550	PASACABALLOS	86,42	Low	81,08	Low	68,32	Mid Low
8551	LETICIA	86,42	Low	77,93	Low	68,32	Mid Low
8552	EL RECREO	86,42	Low	79,14	Low	68,33	Mid Low
8600	BARÚ	86,42	Low	82,67	Low	68,34	Mid Low
8650	LA BOQUILLA	86,42	Low	81,33	Low	68,85	Mid Low
8651	MANZANILLO DEL MAR	86,42	Low	81,87	Low	68,87	Mid Low
8652	TIERRA LOW	86,42	Low	80,55	Low	68,87	Mid Low
8653	PUERTO REY	86,42	Low	77,54	Low	68,89	Mid Low
8657	ZAPATERO	86,42	Low	76,88	Low	68,93	Mid Low
8658	BOQUILLITA	86,42	Low	77,93	Low	68,94	Mid Low
8659	MAR LINDA	86,42	Low	76,96	Low	68,97	Mid Low
8700	ARROYO DE PIEDRA	86,42	Low	82,00	Low	69,01	Mid Low
8750	ISLAS DEL ROSARIO	86,42	Low	76,47	Low	69,02	Mid Low
8800	ISLA FUERTE	86,42	Low	76,72	Low	69,11	Mid Low
8852	MUCURA	86,42	Low	77,19	Low	69,11	Mid Low
8856	ISLOTE	86,42	Low	80,58	Low	69,71	Mid Low
8900	HENEQUEN	86,42	Low	77,10	Low	69,85	Mid Low
8950	BOSQUECITO	86,42	Low	83,54	Low	69,86	Mid Low
8960	CIUDADELA 2000	86,42	Low	82,50	Low	69,88	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	LIFE QUALITY INDICATOR 2019	LIFE QUALITY INDICATOR 2019	Natural Catastrophe Risk Indicator 2019	Natural Catastrophe Risk Indicator 2019	INDICADOR INVERSIÓN PÚBLICA	INDICADOR INVERSIÓN PÚBLICA
8200	PONTEZUELA	78,84	Low	99,11	Low	63,00	Mid Low
8250	BAYUNCA	78,51	Low	97,87	Low	63,00	Mid Low
8300	PUNTA CANOA	79,28	Low	99,86	Low	63,00	Mid Low
8350	TIERRA BOMBA	79,95	Low	98,60	Low	63,00	Mid Low
8352	PUNTA ARENAS	79,72	Low	99,43	Low	63,00	Mid Low
8400	BOCACHICA	79,61	Low	99,21	Low	63,00	Mid Low
8450	CAÑO DEL ORO	79,22	Low	98,14	Low	63,00	Mid Low
8500	SANTA ANA	79,00	Low	98,16	Low	63,00	Mid Low
8501	ARARCA	78,64	Low	100,00	Low	63,00	Mid Low
8550	PASACABALLOS	78,60	Low	97,96	Low	63,00	Mid Low
8551	LETICIA	77,56	Low	91,01	Low	63,00	Mid Low
8552	EL RECREO	77,96	Low	87,68	Low	63,00	Mid Low
8600	BARÚ	79,14	Low	99,36	Low	63,00	Mid Low
8650	LA BOQUILLA	78,86	Low	95,21	Low	63,00	Mid Low
8651	MANZANILLO DEL MAR	79,05	Low	99,29	Low	63,00	Mid Low
8652	TIERRA LOW	78,61	Low	96,74	Low	63,00	Mid Low
8653	PUERTO REY	77,62	Low	98,54	Low	63,00	Mid Low
8657	ZAPATERO	77,41	Low	97,14	Low	63,00	Mid Low
8658	BOQUILLITA	77,76	Low	90,49	Low	63,00	Mid Low
8659	MAR LINDA	77,45	Low	93,73	Low	63,00	Mid Low
8700	ARROYO DE PIEDRA	79,14	Low	99,86	Low	63,00	Mid Low
8750	ISLAS DEL ROSARIO	77,30	Low	85,59	Low	63,00	Mid Low
8800	ISLA FUERTE	77,42	Low	81,80	Low	63,00	Mid Low
8852	MUCURA	77,57	Low	80,00	Low	63,00	Mid Low
8856	ISLOTE	78,90	Low	80,00	Low	63,00	Mid Low
8900	HENEQUEN	77,79	Low	96,91	Low	63,00	Mid Low
8950	BOSQUECITO	79,94	Low	100,00	Low	63,00	Mid Low
8960	CIUDADELA 2000	79,60	Low	99,81	Low	63,00	Mid Low

CodSis	NEIGHBORHOOD - CORREGIMIENTO	POPULATION INDICATOR 2019	POPULATION INDICATOR 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019	SOCIOECONOMIC VULNERABILITY INDEX 2019
8200	PONTEZUELA	2,55	Very High	64,31	Mid Low
8250	BAYUNCA	16,27	High	60,17	Mid Low
8300	PUNTA CANOA	1,31	Very High	61,31	Mid Low
8350	TIERRA BOMBA	3,10	Very High	60,58	Mid Low
8352	PUNTA ARENAS	0,78	Very High	62,13	Mid Low
8400	BOCACHICA	6,36	Very High	61,16	Mid Low
8450	CAÑO DEL ORO	2,81	Very High	61,43	Mid Low
8500	SANTA ANA	5,33	Very High	60,42	Mid Low
8501	ARARCA	1,53	Very High	64,59	Mid Low
8550	PASACABALLOS	16,73	High	60,03	Mid Low
8551	LETICIA	0,55	Very High	58,04	Mid Low
8552	EL RECREO	0,60	Very High	58,25	Mid Low
8600	BARÚ	4,34	Very High	63,14	Mid Low
8650	LA BOQUILLA	11,06	Very High	59,56	Mid Low
8651	MANZANILLO DEL MAR	1,16	Very High	60,60	Mid Low
8652	TIERRA LOW	1,04	Very High	59,91	Mid Low
8653	PUERTO REY	1,27	Very High	59,85	Mid Low
8657	ZAPATERO	0,24	Very High	59,72	Mid Low
8658	BOQUILLITA	1,32	Very High	58,06	Mid Low
8659	MAR LINDA	0,97	Very High	59,12	Mid Low
8700	ARROYO DE PIEDRA	2,29	Very High	60,84	Mid Low
8750	ISLAS DEL ROSARIO	1,37	Very High	57,33	Mid Low
8800	ISLA FUERTE	3,43	Very High	55,55	Mid*
8852	MUCURA		S.I	55,42	Mid
8856	ISLOTE	1,13	Very High	55,94	Mid
8900	HENEQUEN	1,85	Very High	59,50	Mid Low
8950	BOSQUECITO	0,31	Very High	60,73	Mid Low
8960	CIUDADELA 2000		S.I	44,85	Mid*

Attachment 5. Tumaco. Socioeconomic Vulnerability Index Urban Area 2019

Zona Segura	Services Factor	Services Factor	Housing Factor	Housing Factor	Human Capital Factor	Human Capital Factor
ISLA TUMACO Y LA VICIOSA	95,33	Low	52,08	Mid	35,00	Mid High
1 La Playa, Bischoff y Viento Libre.	95,33	Low	47,47	Mid	35,00	Mid High
2 Neighborhoods Tumac y María Auxiliadora.	95,33	Low	53,65	Mid	35,00	Mid High
3 Urbanización Miramar.	95,33	Low	61,67	Mid Low	35,00	Mid High
4 El Bajito.	95,33	Low	41,56	Mid High	35,00	Mid High
5 Villa Lola.	95,33	Low	64,01	Mid Low	35,00	Mid High
6 Zona aledaña al Hospital San Andrés de Tumaco.	S.I	S.I	S.I	S.I	S.I	S.I
7 Cementerio y neighborhood Luis Avelino Perez.	95,33	Low	73,10	Low	35,00	Mid High
8 Pantano de Vargas.	95,33	Low	60,83	Mid Low	35,00	Mid High
9 Puente Herrera.	95,33	Low	59,34	Mid Low	35,00	Mid High
10 Tres Tablas.	95,33	Low	61,18	Mid Low	35,00	Mid High
11 Puente Medio.	95,33	Low	68,56	Mid Low	35,00	Mid High
12 La Calavera y Potrero.	95,33	Low	57,85	Mid Low	35,00	Mid High
13 Plaza Nariño - Mercado.	95,33	Low	53,32	Mid	35,00	Mid High
14 Zona Comercial - Obelisco.	95,33	Low	72,24	Low	35,00	Mid High
15 Puentes palafíticos.	95,33	Low	45,70	Mid	35,00	Mid High
16 Calle del Comercio - Buenos Aires.	95,33	Low	54,49	Mid	35,00	Mid High
17 Panamá.	95,33	Low	43,30	Mid	35,00	Mid High

Zona Segura	LIFE QUALITY INDICATOR	LIFE QUALITY INDICATOR	Natural Catastrophe Risk Indicator	Natural Catastrophe Risk Indicator	PUBLIC INVESTMENT INDICATOR	PUBLIC INVESTMENT INDICATOR
ISLA TUMACO Y LA VICIOSA	60,81	Mid Low	93,65	Low	73,00	Low
1 La Playa, Bischoff y Viento Libre.	59,27	Mid Low	93,65	Low	73,00	Low
2 Neighborhoods Tumac y María Auxiliadora.	61,33	Mid Low	93,65	Low	73,00	Low
3 Urbanización Miramar.	64,00	Mid Low	93,65	Low	73,00	Low
4 El Bajito.	57,30	Mid Low	93,65	Low	73,00	Low
5 Villa Lola.	64,78	Mid Low	93,65	Low	73,00	Low
6 Zona aledaña al Hospital San Andrés de Tumaco.	S.I	S.I	S.I	S.I	S.I	S.I
7 Cementerio y neighborhood Luis Avelino Perez.	67,81	Mid Low	93,65	Low	73,00	Low
8 Pantano de Vargas.	63,72	Mid Low	93,65	Low	73,00	Low
9 Puente Herrera.	63,23	Mid Low	93,65	Low	73,00	Low
10 Tres Tablas.	63,84	Mid Low	93,65	Low	73,00	Low
11 Puente Medio.	66,30	Mid Low	93,65	Low	73,00	Low
12 La Calavera y Potrero.	62,73	Mid Low	93,65	Low	73,00	Low
13 Plaza Nariño - Mercado.	61,22	Mid Low	93,65	Low	73,00	Low
14 Zona Comercial - Obelisco.	67,52	Mid Low	93,65	Low	73,00	Low
15 Puentes palafíticos.	58,68	Mid Low	93,65	Low	73,00	Low
16 Calle del Comercio - Buenos Aires.	61,61	Mid Low	93,65	Low	73,00	Low
17 Panamá.	57,88	Mid Low	93,65	Low	73,00	Low

Zona Segura	POPULATION INDICATOR	POPULATION INDICATOR	SOCIOECONOMIC VULNERABILITY INDEX	SOCIOECONOMIC VULNERABILITY INDEX
ISLA TUMACO Y LA VICIOSA	13,65	Very High	60,28	Mid Low
1 La Playa, Bischoff y Viento Libre.	18,38	High	61,07	Mid Low
2 Neighborhoods Tumac y María Auxiliadora.	2,74	Very High	57,68	Mid Low
3 Urbanización Miramar.	0,05	Very High	57,67	Mid Low
4 El Bajito.	1,57	Very High	56,38	Mid
5 Villa Lola.	4,10	Very High	58,88	Mid Low
6 Zona aledaña al Hospital San Andrés de Tumaco.	S.I	S.I	S.I	S.I
7 Cementerio y neighborhood Luis Avelino Perez.	1,17	Very High	58,91	Mid Low
8 Pantano de Vargas.	12,81	Very High	60,80	Mid Low
9 Puente Herrera.	2,43	Very High	58,08	Mid Low
10 Tres Tablas.	0,28	Very High	57,69	Mid Low
11 Puente Medio.	1,43	Very High	58,59	Mid Low
12 La Calavera y Potrero.	2,03	Very High	57,85	Mid Low
13 Plaza Nariño - Mercado.	7,30	Very High	58,79	Mid Low
14 Zona Comercial - Obelisco.	2,45	Very High	59,16	Mid Low
15 Puentes palafíticos.	17,00	High	60,58	Mid Low
16 Calle del Comercio - Buenos Aires.	5,46	Very High	58,43	Mid Low
17 Panamá.	8,20	Very High	58,18	Mid Low

Zona Segura	Services Factor	Services Factor	Housing Factor	Housing Factor	Human Capital Factor	Human Capital Factor
ISLA EL MORRO	95,33	Low	46,81	Mid	35,00	Mid High
18 Pradomar y Liceo Max Seidel.	95,33	Low	80,63	Low	35,00	Low
19 Batallón de Infantería Marina.	S.I	S.I	S.I	S.I	S.I	S.I
20 Aeropuerto La Florida.	S.I	S.I	S.I	S.I	S.I	S.I
21 Neighborhood Brisas del Aeropuerto.	95,33	Low	35,87	Mid High	35,00	Mid
22 La Florida, El Morrito y Chapas de Nariño.	95,33	Low	60,15	Mid Low	35,00	Mid High
23 Libertadores 1 y 2, Estadio y Escuela de Fútbol.	95,33	Low	49,43	Mid	35,00	Mid High
24 Derivados forestales y zona manglárica.	S.I	S.I	S.I	S.I	S.I	S.I
25 Playa Arrecha e instalaciones portuarias.	S.I	S.I	S.I	S.I	S.I	S.I
26 Sector turístico.	S.I	S.I	S.I	S.I	S.I	S.I
27 Pesmaco y playas.	S.I	S.I	S.I	S.I	S.I	S.I
28 La Cordialidad.	95,33	Low	46,46	Mid	35,00	Mid High
ZONA CONTINENTAL	95,33	Low	46,11	Mid	35,00	Mid High
29 La Ciudadela.	95,33	Low	70,19	Low	35,00	Mid High
30 Ecopetrol y Licsa Texas.	S.I	Low	S.I	Low	S.I	S.I
31 El Pindo y estaciones de combustible.	95,33	Low	43,33	Mid	35,00	Mid High
32 Los Ángeles, Iberia, Obrero, California y Unión Victoria.	95,33	Low	43,83	Mid	35,00	Mid High
33 Manglares.	S.I	S.I	S.I	S.I	S.I	S.I
34 La Carbonera.	95,33	Low	43,75	Mid	35,00	Mid High

Zona Segura	LIFE QUALITY INDICATOR	LIFE QUALITY INDICATOR	Natural Catastrophe Risk Indicator	Natural Catastrophe Risk Indicator	PUBLIC INVESTMENT INDICATOR	PUBLIC INVESTMENT INDICATOR
ISLA EL MORRO	59,05	Mid Low	93,65	Low	73,00	Low
18 Pradomar y Liceo Max Seidel.	70,32	Low	93,65	Low	73,00	Low
19 Batallón de Infantería Marina.	S.I	S.I	S.I	S.I	S.I	S.I
20 Aeropuerto La Florida.	S.I	S.I	S.I	S.I	S.I	S.I
21 Neighborhood Brisas del Aeropuerto.	55,40	Mid	93,65	Low	73,00	Low
22 La Florida, El Morrito y Chapas de Nariño.	63,49	Mid Low	93,65	Low	73,00	Low
23 Libertadores 1 y 2, Estadio y Escuela de Fútbol.	59,92	Mid Low	93,65	Low	73,00	Low
24 Derivados forestales y zona manglárica.	S.I	S.I	S.I	S.I	S.I	S.I
25 Playa Arrecha e instalaciones portuarias.	S.I	S.I	S.I	S.I	S.I	S.I
26 Sector turístico.	S.I	S.I	S.I	S.I	S.I	S.I
27 Pesmaco y playas.	S.I	S.I	S.I	S.I	S.I	S.I
28 La Cordialidad.	58,93	Mid Low	93,65	Low	73,00	Low
ZONA CONTINENTAL	58,81	Mid Low	93,65	Low	73,00	Low
29 La Ciudadela.	66,84	Mid Low	93,65	Low	73,00	Low
30 Ecopetrol y Licsa Texas.	S.I	S.I	S.I	S.I	73,00	Low
31 El Pindo y estaciones de combustible.	57,89	Mid Low	93,65	Low	73,00	Low
32 Los Ángeles, Iberia, Obrero, California y Unión Victoria.	58,05	Mid Low	93,65	Low	73,00	Low
33 Manglares.	S.I	S.I	S.I	S.I	S.I	S.I
34 La Carbonera.	58,03	Mid Low	93,65	Low	73,00	Low

Zona Segura	POPULATION INDICATOR	POPULATION INDICATOR	SOCIOECONOMIC VULNERABILITY INDEX	SOCIOECONOMIC VULNERABILITY INDEX
ISLA EL MORRO	8,18	Very High	58,47	Mid Low
18 Pradomar y Liceo Max Seidel.	5,41	Very High	60,60	Mid Low
19 Batallón de Infantería Marina.	S.I	S.I	S.I	S.I
20 Aeropuerto La Florida.	S.I	S.I	S.I	S.I
21 Neighborhood Brisas del Aeropuerto.	10,72	Very High	58,19	Mid Low
22 La Florida, El Morrito y Chapas de Nariño.	6,65	Very High	59,20	Mid Low
23 Libertadores 1 y 2, Estadio y Escuela de Fútbol.	22,36	High	62,23	Mid Low
24 Derivados forestales y zona manglárica.	S.I	S.I	S.I	S.I
25 Playa Arrecha e instalaciones portuarias.	S.I	S.I	S.I	S.I
26 Sector turístico.	S.I	S.I	S.I	S.I
27 Pesmaco y playas.	S.I	S.I	S.I	S.I
28 La Cordialidad.	18,06	High	60,91	Mid Low
ZONA CONTINENTAL	13,62	Very High	59,77	Mid Low
29 La Ciudadela.	11,44	Very High	61,23	Mid Low
30 Ecopetrol y Licsa Texas.	S.I	S.I		S.I
31 El Pindo y estaciones de combustible.	13,06	Very High	59,40	Mid Low
32 Los Ángeles, Iberia, Obrero, California y Unión Victoria.	13,06	Very High	59,44	Mid Low
33 Manglares.	S.I	S.I	S.I	S.I
34 La Carbonera.	0,24	Very High	56,23	Mid

Attachment 6. Tumaco. Socioeconomic Vulnerability Index Rural Area 2019

Cd.	Corregimiento	Services Factor	Services Factor	Housing Factor	Housing Factor	Human Capital Factor	Human Capital Factor	LIFE QUALITY INDICATOR	LIFE QUALITY INDICATOR
140	MILAGROS	85,84	Low	38,33	Mid High	35,00	Mid High	53,06	Mid
141	TERAN	85,84	Low	38,27	Mid High	35,00	Mid High	53,03	Mid
142	CABO MANGLARES	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
143	CHONTAL	85,84	Low	38,36	Mid High	35,00	Mid High	53,06	Mid
144	CONGAL	85,84	Low	38,14	Mid High	35,00	Mid High	52,99	Mid
146	BOCANA NUEVA	85,84	Low	38,32	Mid High	35,00	Mid High	53,05	Mid
147	CANDELILLA DE LA MAR	85,84	Low	47,05	Mid	35,00	Mid High	55,96	Mid
148	CEDRAL	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
150	BAJO GUABAL	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
151	SAGUNBITA	85,84	Low	38,86	Mid High	35,00	Mid High	53,23	Mid
152	SANTO DOMINGO	85,84	Low	40,27	Mid High	35,00	Mid High	53,70	Mid
153	SAN JACINTO	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
156	DESCOLGADERO	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
162	PUEBLO NUEVO - KM 41	85,84	Low	47,33	Mid	35,00	Mid High	56,05	Mid
169	SAN JUAN	85,84	Low	38,10	Mid High	35,00	Mid High	52,98	Mid
173	PIÑAL SALADO	85,84	Low	43,85	Mid	35,00	Mid High	54,90	Mid
179	COLORADO	85,84	Low	38,47	Mid High	35,00	Mid High	53,10	Mid
180	BOCAS DE CURAY	85,84	Low	38,36	Mid High	35,00	Mid High	53,06	Mid
181	CALETA DE VIENTO LIBRE	85,84	Low	39,00	Mid High	35,00	Mid High	53,28	Mid
182	CHORRERA DE CURAY	85,84	Low	43,95	Mid	35,00	Mid High	54,93	Mid
183	LLANAJE	85,84	Low	38,90	Mid High	35,00	Mid High	53,25	Mid
185	OLIVO	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
193	NUEVA UNION	85,84	Low	44,13	Mid	35,00	Mid High	54,99	Mid
262	VAQUERIO	85,84	Low	42,80	Mid High	35,00	Mid High	54,55	Mid
264	TRUJILLO	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
291	LIMONES	85,84	Low	40,40	Mid High	35,00	Mid High	53,75	Mid
295	CHAJAL	85,84	Low	38,12	Mid High	35,00	Mid High	52,98	Mid
296	GUADUAL	85,84	Low	38,29	Mid High	35,00	Mid High	53,04	Mid
302	ALTO BUENOS AIRES	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
327	PLAYON RIO MIRA	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid
330	ROMPIDO	85,84	Low	38,00	Mid High	35,00	Mid High	52,95	Mid

Cd.	Corregimiento	Natural Catastrophe Risk Indicator	Natural Catastrophe Risk Indicator	PUBLIC INVESTMENT INDICATOR	PUBLIC INVESTMENT INDICATOR	POPULATION INDICATOR	POPULATION INDICATOR	Indice de Vulnerabilidad Socieconómica	Indice de Vulnerabilidad Socieconómica
140	MILAGROS	96,67	Low	63,00	Mid Low	1,09	Very High	53,45	Mid
141	TERAN	95,73	Low	63,00	Mid Low	1,34	Very High	53,28	Mid
142	CABO MANGLARES	96,00	Low	63,00	Mid Low	0,30	Very High	53,06	Mid
143	CHONTAL	96,54	Low	63,00	Mid Low	2,41	Very High	53,75	Mid
144	CONGAL	96,14	Low	63,00	Mid Low	2,71	Very High	53,71	Mid
146	BOCANA NUEVA	96,00	Low	63,00	Mid Low	1,07	Very High	53,28	Mid
147	CANDELILLA DE LA MAR	97,52	Low	63,00	Mid Low	4,31	Very High	55,20	Mid
148	CEDRAL	96,00	Low	63,00	Mid Low	0,54	Very High	53,12	Mid
150	BAJO GUABAL	96,00	Low	63,00	Mid Low	0,50	Very High	53,11	Mid
151	SAGUNBITA	96,65	Low	63,00	Mid Low	1,49	Very High	53,59	Mid
152	SANTO DOMINGO	96,58	Low	63,00	Mid Low	3,12	Very High	54,10	Mid
153	SAN JACINTO	96,00	Low	63,00	Mid Low	0,13	Very High	53,02	Mid
156	DESCOLGADERO	96,00	Low	63,00	Mid Low	0,01	Very High	52,99	Mid
162	PUEBLO NUEVO - KM 41	97,81	Low	63,00	Mid Low	0,00	Very High	54,21	Mid
169	SAN JUAN	93,40	Low	63,00	Mid Low		S.I	52,34	Mid*
173	PIÑAL SALADO	98,96	Low	63,00	Mid Low	14,76	Very High	57,90	Mid Low
179	COLORADO	95,93	Low	63,00	Mid Low		S.I	53,01	Mid*
180	BOCAS DE CURAY	96,00	Low	63,00	Mid Low		S.I	53,02	Mid*
181	CALETA DE VIENTO LIBRE	96,33	Low	63,00	Mid Low		S.I	53,15	Mid*
182	CHORRERA DE CURAY	97,76	Low	63,00	Mid Low		S.I	53,92	Mid*
183	LLANAJE	96,04	Low	63,00	Mid Low		S.I	53,07	Mid*
185	OLIVO	96,00	Low	63,00	Mid Low		S.I	52,99	Mid*
193	NUEVA UNION	96,00	Low	63,00	Mid Low	0,23	Very High	53,56	Mid
262	VAQUERIO	96,16	Low	63,00	Mid Low	2,72	Very High	54,11	Mid
264	TRUJILLO	94,67	Low	63,00	Mid Low		S.I	52,65	Mid*
291	LIMONES	89,60	Low	63,00	Mid Low	1,95	Very High	52,07	Mid
295	CHAJAL	94,18	Low	63,00	Mid Low	19,27	High	57,36	Mid Low
296	GUADUAL	96,10	Low	63,00	Mid Low		S.I	53,03	Mid*
302	ALTO BUENOS AIRES	96,00	Low	63,00	Mid Low	1,65	Very High	53,40	Mid
327	PLAYON RIO MIRA	100,00	Low	63,00	Mid Low	0,13	Very High	54,02	Mid
330	ROMPIDO	99,00	Low	63,00	Mid Low	0,41	Very High	53,84	Mid