



Proceedings of the Resilient Cities 2013 congress

Session: E2 Enabling local action on adaptation: Planning and policy tools and frameworks

Presentation: Mixing integrated coastal zone management and green growth in Colombia

A recipe for resilient coastal cities?

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Abstract:

Nearly twelve percent of Colombia's population lives in five coastal cities with more than 170000 inhabitants. These coastal cities are vulnerable to the impacts of climate change not only because of the deficiency on their drainage systems, scarcity of coastal protection infrastructure and an out of control urbanization process, but also the lack of coordinated support of coastal zone management at the national level. As Colombian government interest grows to concentrate industry centers close to its coastal zone, implementing effective management and climate adaptation policies becomes more important. Coastal cities today are faced with the challenge of sustainable growth, first for the sake of its people and the national economy, and second for that of the environment. This is where the principles of Integrated Coastal Zone Management must meet the vision of a Green City. This article explores the integration of these concepts and the application for urban planning in Colombian coastal cities with emphasis in the city of Cartagena. After reviewing various sources of information, six aspects were determined as essential in the carving of a green coastal city.

Keywords: Integrated coastal zone management, green city, policy tools, urban planning, climate change adaptation

1 Introduction

Colombia has 43 millions inhabitants according to national census in 2005, but only less than 12% of the population lives close to its two coastal zones (Pacific Ocean and Caribbean Sea). Recent signed free trade agreements have made Colombian national government to grow interest on locating industrial centers near ports on both coastal zones. Therefore, it is important to review the vulnerability issues arise from the climate change and the adaptation strategies that must be applied to the major cities where important port and commerce infrastructure are located.

Colombia has a 1576 km of coast line on the Pacific Ocean with two main coastal cities: Buenaventura with almost 384000 inhabitants and Tumaco with 191000. In contrast, the coastal zone on the Caribbean Sea is 1937 km long with four main cities with a population above 250000 inhabitants. The two most important cities are Cartagena with 979000 inhabitants and Barranquilla with above a million people.

Integrated Coastal Zone Management (ICZM), as defined by Barrangán et al. (2008) is a dynamic, continuous and interactive process that takes into account the marine and terrestrial components of the littoral in order to promote sustainable development in coastal areas with the help of policies, strategies and sectorial plans. Coastal cities are part of the terrestrial components of coastal zones and they can be qualified as the places where the blue of the oceans meet the green of the land. In efforts to achieve sustainability in each of these areas, terms such as “green growth” and “blue economies” have arisen (Trujillo, 2012).

On the other hand, green growth refers to economic practices from both the production and consumption perspectives that use resources in a way that future usage is not jeopardized. It contemplates economic development rather than plain economic growth, as it foresees the long run (Trujillo, 2013). Therefore, the term green city is the application of the green growth concept to the territory where people, along with the social, economic and cultural activities, are gathered without compromising the future use of its natural resources.

Coastal cities are more susceptible to adverse effects included on extreme climate variability than inland cities. They must adjust economic growth to adapt to actual and expected climate change impacts. According to IPCC TAR (2001), various types of adaptation can be distinguished, including anticipatory and reactive adaptation, and autonomous and planned adaptation among others. This paper advocates for an anticipatory and planned adaptation by using sustainable growth concepts found in ICZM and green growth. It also presents the adaptation strategy planned for Cartagena city as an example of this combination.

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2. Cartagena de Indias, a learning step towards a resilient recipe

Cartagena de Indias is located at 10° 25' north, 75° 32' west and faces the Caribbean Sea (Figure 1). It was 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. The port, fortresses and a group of monuments built as a part of its defense system against pirate attacks during the 16th and 17th centuries made of Cartagena a heritage city. Cartagena is today an economic hub because of its large seaport as well as a touristic destination.

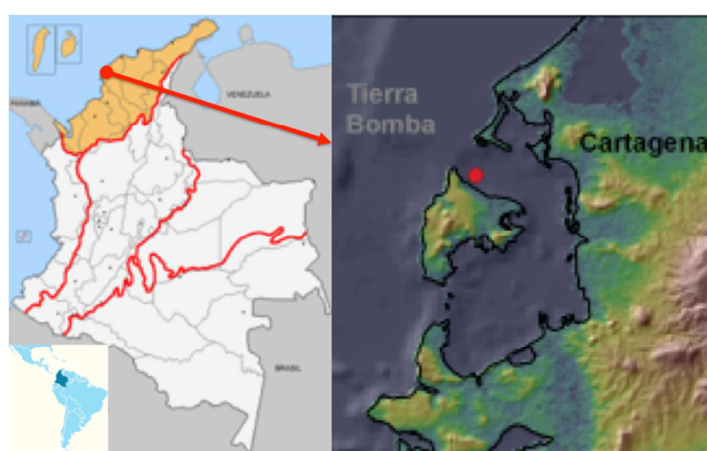


Figure 1 – Localization of Cartagena de Indias Colombian coastal city (Adapted from Vides M.P. 2008)

The Netherlands Climate Assistance Programme (NCAP) studied the coastal zone in Colombia and determined that Cartagena is among the cities that have the largest population and highest capital value at risk due to climate change impacts (INVEMAR et al. 2012). The second phase of the study looked into the effects over key economic sectors of the city with emphasis on the adaptation capabilities of population. It is important to point out that NCAP followed the guidelines of the National ICZM Policy using an integrated approach to generate tools for decision making towards the reduction of the potential effects of sea level rise (Vides M.P, 2008). In this way, NCAP study was able to identify policy options and make suggestions at local, regional and national level to develop a proactive and comprehensive risk management caused by the sea level rise.

Cartagena was selected by the national government to work on its climate change adaptation plan. This plan is carried out by INVEMAR (Marine Research National Institute) and the Climate and Development Knowledge Network (CDKN) with the support of the local government. The Adaptation Plan seeks to incorporate a wide range of ecological, social, cultural, governance and economic considerations by

mixing integrated coastal zone management (ICZM) and green growth strategies. The study also pretends to include city level experiences in preventing or reducing coastal zone vulnerabilities to improves national policies.

3. Know your first main ingredient: ICZM

Colombia was one of the first countries in Latin America to incorporate the ICZM concept to the coastal planning processes during the 1980s. This experience permitted to develop the ICZM National Policy (PNAOCI) that was presented by the Ministry of environment in 2000. PNAOCI defined ICZM as a continuous process that follows a series of steps to develop sectorial plans in space and time which are: Problem identification and evaluation, Characterization and assessment, Plan formulation and adoption, Plan implementation and Evaluation and review (Rojas-Giraldo et al. 2010)

ICZM in Colombia integrates policies and strategies from national to local level. The PNAOCI defines the two main coastal areas (Pacific Coast and Caribbean Sea) in Colombia as Integral Environmental-Land Planning Unit (UIP) and assigned to each one a set of guidelines. Regional strategies are established by dividing each UIP in Coastal Environment Unit (UAC). For instance, the Caribbean Sea UIM is divided on five UACs each of them belongs to a main geographic river basin or delta. A local ICZM plan is developed on Integrated Management Units (UMI), which are part of the UACs as seen on Figure 2.

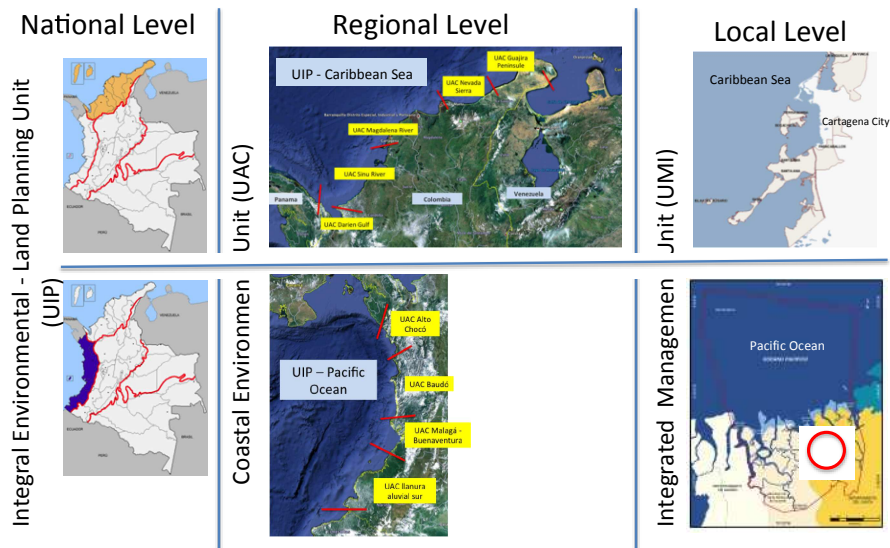


Figure 2 – Integrating ICZM policy from national to local level (Adapted from Alonso et al., 2003)

ICZM is an essential tool on the construction of a coastal resilience city. One of the key aspects of the ICZM process is the stakeholder involvement. In the problem identification step stakeholder identification is emphasized as well as its participation on the problem formulation and scope. During the characterization and assessment the technical team works on the information requirement and the designed scenarios, which will be part of the plan, programs, and strategies for the UIM. One of the most important characteristic of ICZM is that a continuous evaluation is permitted by a plan review and adjustment to the new conditions found during the monitory stage.

The construction of an UIM ICZM plan helps to improve national policy, and results in a better understanding of the capacities of local, regional and national levels. Cartagena Adaptation Plan experience is an information source for decision-makers at the national level to adjust the policy and strategies. It is necessary to ensure local planners participation in national level meetings to allow information to flow without restrictions through the various levels of government.

4. A handful of green growth to spice your resilient recipe

Historically, cities have not been able to respond to the increased urbanization trends, especially cities with limited economic and financial resources. As a result, the quality of life of citizens is affected, while the environment suffered from the impacts due to anthropogenic use. Because this behavior is unsustainable, cities have been working on changing codes of conduct and development strategies in order to achieve sustainability. Trujillo (2012) reviewed various sources of information, and determined six aspects as essential in the carving of a green coastal city. Basically, the author merged the key findings from the Green City Index developed by Siemens and the ones proposed by Nekmat R. (2010) into five aspects and then included the economic factor, underlining its importance in a green city due to the fact that it is regarded as one of the three pillars of sustainability, the source of income for the construction of green infrastructure and the well-being of its people (Trujillo, 2012). These five aspects are represented on Figure 3.

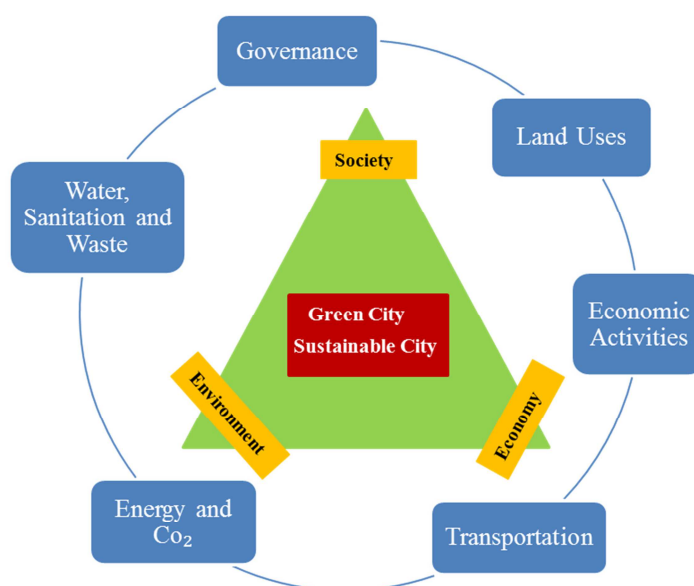


Figure 3 – Key aspects in a Green Coastal City (Trujillo, 2012)

For the land use aspect, the urban design must contemplate the coast as prime real estate because of its aesthetic and functional value. It must provide compatible mixed uses for housing and commerce while a stepwise densification is accomplished to allow economies of scale. Sea level rise in coastal cities will induce short and long term shoreline modification therefore urbanization and construction codes must be modified accordingly to introduce areas to be protected like the urban mangroves in Cartagena.

Water, sanitation and waste management is another key aspect on the building a resilient coastal city. For instance, all stormwater systems in coastal cities must drain to the sea therefore it is affected by sea water level. Because one of the impacts of climate change is sea level rise, an efficient stormwater management system is an essential factor to gain resilience against natural disaster. It is also advisable to build an appropriate urban infrastructure for potable water network and sewage system because of salinity intrusion on rivers, lake and groundwater that are use as a source of water.

A green city also emphasizes on economic growth as a strategy to become resilient. Informal settlements in Colombian cities are located on high-risk areas, occupying the drainage network and filling in water bodies. The main challenge of economic growth is to distribute wealth evenly to the population in order to generate economic development and create human well-being. Cities agglomerate economic activities that must be “green” within a green city. In coastal cities, where “green” meets “blue”, the efficient and

respectful use of both lands and oceans must be taken into account, and therein its importance as strategic territories (Trujillo, 2012).

5. Cartagena's climate change adaptation plan: putting everything together

Cartagena has been built around water bodies. Its bay has an area of 82 km² and an average depth of 16 m and the Virgen coastal lagoon is 22 km² with an average depth of 1.5 m. This main water bodies are interconnected by a series of channels and lakes. This geographic characteristic made Cartagena a city that is particularly vulnerable to climate change. The first task was to determine the impact of climate change on the main economic sectors and to develop an understanding of the barriers and opportunities for building a resilient city. As a second stage, local administration worked along with the national government to establish a set of guidelines for the climate change adaptation plan that combines ICZM with green growth initiatives.

Figure 4 shows the guidelines to climate change adaptation for Cartagena. It also shows how ICZM and green growth form a part of this plan.

- ▲ 1. Rural development and adaptation
 - ▲ 2. Infrastructure and competitiveness
 - 3. Climate and information
 - ▲ 4. Strategic ecosystems
 - ▲ 5. Integrated water resource management
 - 6. Institutional arrangements
 - 7. Knowledge
- ICZM Initiative
▲ Green growth initiative

Figure 4 - Climate change adaptation plan guidelines and relation to ICZM and green growth initiatives (Adapted from INVEMAR et al 2012)

6. Conclusions

- Coastal cities must learn to implement both green growth and integrated coastal zone management (ICZM) strategies, thus environmental, social, economic and governance aspects can be incorporated to a resilient city.
- ICZM together with Green growth require strong community participation from plan conception to implementation. Stakeholders should share their experiences and responsibilities with local and national government.
- The climate change adaptation plan for Cartagena, as a local experience, resulted in a better understanding of the capacities and needs of local level. Its implementation will help to improve regional and national level policy.

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Acknowledgements:

The authors would like to acknowledge INVEMAR, CDKN and the city of Cartagena for their participation during the development of the Climate Change Adaptation Plan. Also to University of Cartagena and Komogu Consulting for the support to present this paper.

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