

NEW REGION URBAN NETWORKS IN THE COLOMBIAN CARIBBEAN

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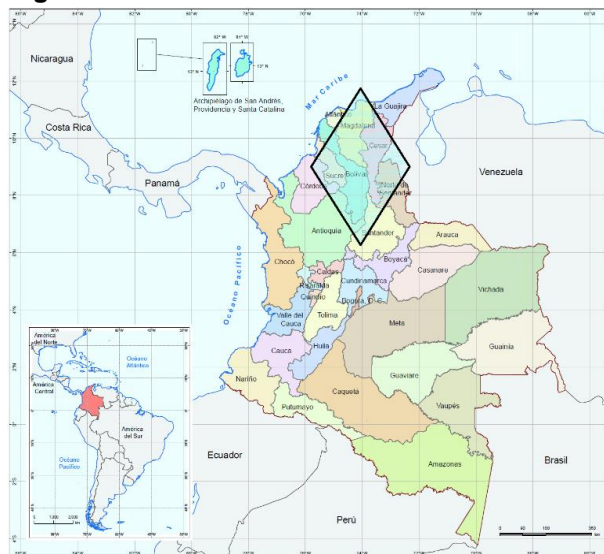
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Abstract

The Caribbean region in Colombia has large land areas and low connectivity between urban centers, the study proposed a methodology of analysis of 10 major cities to validate a regional project called “Diamante Caribe-Santanderes”. The methodology was structured from 4 hubs and 11 indicators of urban analysis that was applied to each of the urban centers. From the mapping results of an image analysis of the various aspects of urban reality was obtained. This study was able to identify trends and potential of the territory and is accomplished propose a new political and administrative structure that integrates large unconnected areas. It also qualifies intervention projects in different scales for each local center, inter between municipal centers, and finally large territorial unions to consolidate a regional identity. The most important of the study is to propose within the categories of analysis systematic search of polyvalent interactions develop joint responses to the needs of communities at the same time elements of conservation measures and restoration of ecosystem dynamics of the environment. Finally, the study shows that under current legislation it is possible to create this new territorial entity, with cultural identity and articulated planning parameters under new regional organization of urban centers.

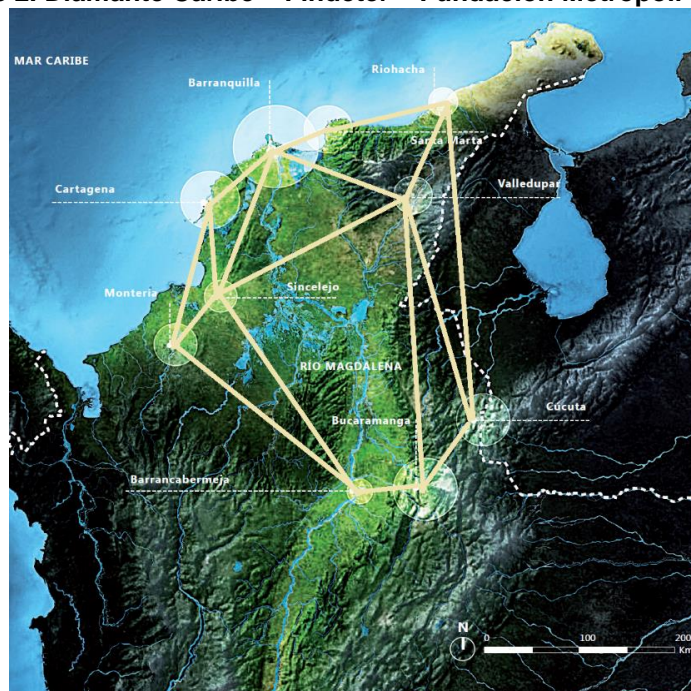
Figure 1. Localization of Colombia – DANE 2012

Introduction

Colombia is located in northern South America. Its total area is 2.070.408 km², comprising 928.660 km² of maritime territories in the Pacific Ocean as well as in the Caribbean Sea; and 1.141.748 km² of land. According to official demographic projections, Colombia has an estimated population of 48.600.000 inhabitants in 2016. Also, considering the whole extension, Colombia shares borders with eleven countries: Costa Rica, Haiti, Jamaica, Dominican Republic, United States, Nicaragua, Panama, Venezuela, Ecuador, Brazil and Peru. (Departamento Administrativo Nacional de Estadística - DANE, 2012) (Graphic 1)

The project named Diamante Caribe – Santanderes is located north of the continental land, including 10 cities, 9 of which are the departmental¹ capitals that constitute the edges of this big polygon; the cities are, from south to north: Bucaramanga (capital) and Barrancabermeja (municipality) in Santander department; Cúcuta, capital of Norte de Santander department; Montería capital of Córdoba department; Sincelejo, capital of Sucre department; Valledupar, capital of Cesar department; Cartagena, capital of Bolívar department; Barranquilla, capital of Atlántico department; Santa Marta, capital of Magdalena department and Riohacha, capital of La Guajira department. (Graphic 2)

¹ Departments are territorial entities of the Colombian state that hold a certain autonomy in administration and spatial planning it was established in the Political Constitution: Article 286: Territorial entities are the departments, districts, municipalities and indigenous territories. The Law might also give such category to the regions and provinces to be constituted according to the Constitution and the Law. Article 287. The territorial entities hold autonomy to manage their interests, within what the Constitution and the Law allow, so the territorial entities will have the following rights: 1. To rule over their selves through their own authorities. 2. To exert their competencies. 3 To manage the resources and establish the tributes required for the accomplishment of their functions. 4. To share the national estate.

Figure 2. Diamante Caribe – Findeter – Fundación Metr poli - 2014

Since the enactment of the Land Use Planning Law - 388 of 1997, a new mechanism came into force, which impels the municipalities to adopt land use plans (POT for its initials in Spanish) with a certain level of autonomy and adjusted to equity parameters. The law aims to protect the environment and the cultural heritage as well as to practice a proper land use according to its suitability and capacities under the sustainable development concept. Thus, the urban planning encompasses the politic, administrative and spatial planning actions focused on multiple social groups to seek the social and economic development in harmony with the environment. (Rep blica de Colombia, 1997) 20 years after the Land Use Planning Law enactment and the start-up of the POT a changing and constructive planning culture has emerged, granting the characterization of the national territory from a multidimensional perspective.

To develop a multidimensional vision of the territory as proposed in the land use plans (POT), it is necessary to identify the production and the offer of services consumed in urban centers. (Fern ndez, 2000). But the permanently growing consumption of natural resources transforms systematically the ecosystems and also causes the extinction of raw materials, which leads to widen the need of energy from neighboring territories and requires more land to meet the demands of the urban center. (Ni o Soto, 2012). The dynamic of the urbanization or urban growth has not been quantified to make visible the level of environmental transformation, which was not regarded at first in the POT methodology. In addition, neither the level of synchronization of these transformations nor the harmony among the different systems created to meet the urban demands were considered, so the quantification or relation of measures to identify balances and equitable dynamics were not either considered. (Camargo Ponce de Le n, 2005) Within this context, the process of urban configuration of the Colombian cities

shows a rapid urbanization and urban growth caused by migration phenomena, which generated an apparent and favorable relation between urban and economic growth, since the human development index has apparently risen, but the process is certainly accompanied with marginality and poverty. In consequence, the cities show nowadays a bad quality of life, bad urban design, unsustainability and pollution. (Jaramillo, y otros, 1993) (Libertun de Duren, 2014)

The Diamante Caribe - Santanderes

The proposal Diamante Caribe – Santanderes comes from a public initiative that aims to improve the capabilities of the territory, after the exploration of new alliances and the development of functional dynamics, by generating other level of interactions based upon a set of networks between the urban centers. This initiative proves to be valid under the constitutional frame, owing to the faculty of creating territorial entities like regions and provinces (Title XI of territorial organization, Chapter I, article 286).

The Diamante Caribe – Santanderes outlines opportunities for agreements with the local communities and for functional mergers along the national territory, as well as international alliances in the case of border municipalities. (Article 289). Therefore, the faculty of creating regions, established in article 306, allows the creation of new administrative and unified-planning regions with legal status, autonomy and its own estate from two or more departments after the popular approval by means of a referendum (Article 307) (República de Colombia, 1991)

Within the previously depicted context of multiple physical, environmental and cultural variables, the special qualities of the Diamante Caribe – Santanderes project were appraised to distinguish a profile of the basic urban features of the urban centers that form this big proposed polygon in Colombia.

Methodology to analyze the basic urban features of the urban spaces

Colombian cities, as other Latin American cities, share similarities rooted in their socio-cultural conditions, that is analogue technologies, access to economic resources, polarization of the occupational structure (González Romero, y otros, 2004), which end up generating rapid urbanization processes without articulation to the urban networks, exacerbating regional disparities and widening the distance between the rural and the urban, all accompanied with the related socio-spatial segregation, which in turn triggers concentration processes in spaces with no capacity for collective uses and weak local administration devices. (Jaramillo, y otros, 1993) These dynamics reflect the big contradiction within the sustainable development: environmental protection amidst high levels of production and consumption as a sign of the environmental plundering. (Sayer, y otros, 2004) (Niño Soto, 2012).

Within this context, indicators and trends are formulated to enrich the urban planning methodologies based upon the analysis of several hubs that group indicators to identify a set of monitoring and orientation mechanisms for planned processes. The indicators, as tools for monitoring and evaluating, help to measure and parametrize models with comparable measures. (Leal Del Castillo, 2004). These indicators when grouped by hubs allow for analyzing the level of adaptation of the urban systems. They are also useful to qualify other spatial dynamics that can be analyzed through the crossing of cartographical approaches with some

significant values, such as those contained in census or inventories or standards with an optimal category for a given place or inside a system. (Camargo Ponce de León, 2005) (Agencia de Ecología Urbana de Barcelona, 2010). Following the Agencia de Ecología Urbana de Barcelona (2010) 4 hubs were defined: Compactness, Complexity, Efficiency and Social Cohesion, each one is developed with indicators that have been adapted to the ambiance, aiming to analyze the current conditions in the urban cases chosen for the study.

Hub 1 Compactness

This hub refers to the land occupation model of the city, as well as to the dynamics that this model produces in the space according to that model and to the urban landscape that it reflects. (Hermida, y otros, 2015). The appraisal encompasses six indicators:

1. Morphology: identification of regular polygons and organic sprawl of the urban form within the expansion processes generated by political, cultural and economic dynamics; (De Solá Morales, 1997) showing the current stage and growth patterns (Azócar García, y otros, 2010).
2. Urban-Fringe-Rural relations: this hub focuses on the urban relations with the territory determining the diffuse, continuous or steep forms depending on the forces among those interactions. These relations build up permeable or steep limits of activities, as well as variable dimensions and specialization or mixture of uses. (Toro Vasco, y otros, 2005) (Serenó, y otros, 2010).
3. Land occupation and density: relation between free and occupied areas that provides the means to identify the degree of saturation or the amount of free space. (Agencia de Ecología Urbana de Barcelona, 2010) (Hermida, y otros, 2015)
4. Equipments: specific elements that shape the support system of the urban activities in relation to the users, setting levels of connectivity, identity and socio-cultural relations. (Agencia de Ecología Urbana de Barcelona, 2010) (Mier y Terán, y otros, 2012)
5. Public space: given urban capacity for the free movement of people, comprising a network for the use and enjoyment of the population and also the capacity for the habitability understood as universal, ergonomic and secure access. (Agencia de Ecología Urbana de Barcelona, 2010) (Ferrer, y otros, 2009).
6. Mobility: efficient connectivity that eases the exchange dynamic and transportation of resources and people through different means and services in order to improve the social conditions of integration. (Agencia de Ecología Urbana de Barcelona, 2010) (Jirón M., y otros, 2010)

Hub 2 Complexity

To identify the diversity and quantity of interactions given by the infrastructure and the uses of the urban land. (Agencia de Ecología Urbana de Barcelona, 2010) (Moroni, 2015) Two indicators serve as basis for analyze this hub:

7. Urban complexity: the city is a multidimensional structure that encompasses the interconnection between dynamic relations with hierarchies alongside multiple levels to shape an interdependent structure ciudad (Salingaros, 2005).
8. Green Areas: places for the conservation of ecosystem dynamic in the territory, granting the preservation of the biodiversity through spatial networks (Agencia de Ecología Urbana de Barcelona, 2010) (Annerstedt Van Den Bosch, et al., 2016)

Hub 3 Efficiency

Referred to the proper management of the systems that support the functioning of the urban centers, this hub analyze the relation between the production process and the resources consumption, the welfare and the production of waste (Kim, y otros, 2014) in terms of substances and energy. (Cohen, y otros, 2010). This process involves the suitable development of interconnection systems in order to grant the good functioning (Agencia de Ecología Urbana de Barcelona, 2010). For this work the following indicator was selected:

9. Urban metabolism: the identification of relations among support systems and general waste in regards to recycling systems. (Agencia de Ecología Urbana de Barcelona, 2010) (Conke, 2015)

Hub 4 Social Cohesion

This hub seeks to identify the quality and quantity of interactions among different social groups in order to moderate the situations that lead to marginalization or urban marginality scenarios. (Agencia de Ecología Urbana de Barcelona, 2010) (Jaramillo, y otros, 1993) This includes the evaluation of elements and isolated structures inside the human settlements (Salingaros, 2005). Two indicators that value the cohesion and housing compose this hub:

10. Cohesion: this indicator identifies social integration processes with special approaches to the socio-economic stratification. (Agencia de Ecología Urbana de Barcelona, 2010) (Cassiers, y otros, 2012)
11. Housing: this indicator identifies the location and articulation of housing complexes within the city, valuating the quality of the interconnections of services and housing typology. (Agencia de Ecología Urbana de Barcelona, 2010) (Garcia Rodriguez, y otros, 2015)

General Results

This work deals with urban and rural areas ruled by the land use plans and fixed limits among the forms of territorial organization. From a functional and geographical perspective, most of the cases show discontinuity of the urban sprawl and how the urban population is predominant in comparison to the rural, although the rural area is larger than the urban (except for Barranquilla, where the rural area is smaller). There is no planning or appropriation binding the environmental spaces to the urban development.

The hub Compactness shows a concentrated landscape with some vacant spaces, in which planned processes of occupation are desired. Hence, there is a need for strategic projects in order to strengthen the public space capabilities and broaden the offer of urban mobility through intermodality. All of the urban centers have regulated homogenous big polygons, among which

we can highlight some neighborhoods that were originated from a planning process with certain morphologies of orthogonal figures.

Coastal cities have a valuable environmental offer barely linked to the urban processes, but this offer is suffering deterioration. There is evidence of a physical and functional conurbation tendency, so the urban sprawl shows processes of physical conurbation and functional and administrative metropolization. The urban fringe has two constant characteristics: a) limits with environmental assets such as rivers, swamps and coastlines; and b) large extensions of land, as agricultural land as forestry reserves, with no planning processes in both cases.

Respect to the urban land occupation, the study found some vacant spaces within the city perimeter, in reference to spaces with certain environmental restrictions. Zones where construction is possible hold mainly medium and small-sized buildings, which means a high-density level of land occupation. The small amount of available equipments in urban centers make possible the projection of a category for interconnection or urban endowments networks.

Regarding to the public space the study identifies some areas of diverse dimensions and residual spaces with no functions articulated to a network of free spaces for the use and free movement of people. In addition, the habitability shows reduced circulation systems for pedestrians and low standards of universal accessibility, little or none ergonomic facilities, sparkling light comfort, high temperatures and high levels of suspended particles, all this leading to low levels of comfort in most of the cases.

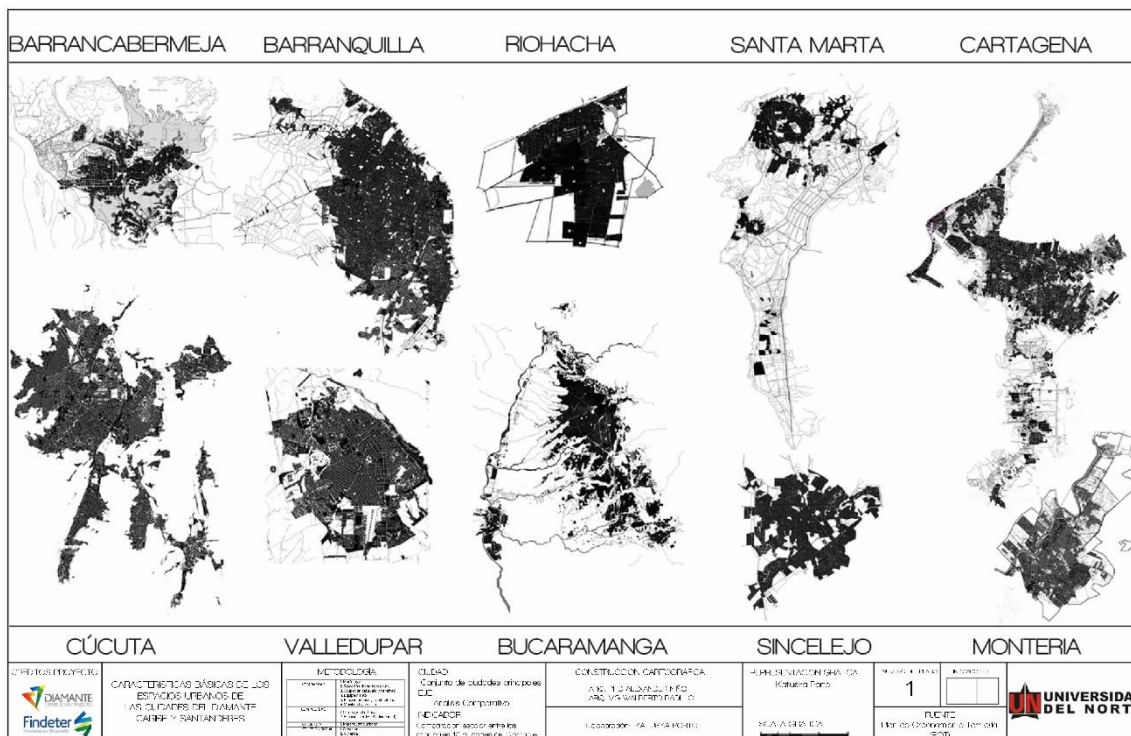
For mobility the urban centers have some infrastructure with low quality and no connections allowing the change of scales in a proper manner. As for services, nearness and availability are observed, but also little specialization and low-density levels are detected, which means that a lot of areas have little or none trade centers or financial, health and education services exchange enclaves.

The size of urban sprawl enables complexity processes because it comprises the possibility to generate a big amount of interactions related to the infrastructure and the uses of urban land. The green areas inside the urban centers are little and do not contribute to the conservation of the ecosystem dynamics of the territory. It is necessary to improve the quantity and the quality of the green areas in order to consolidate urban networks that favor the transit and permanence of biodiversity through an environmental network that harmonizes the complexity of the coastal ecosystems. The urban centers show traditional characteristics of energy and water supply and waste management, evident in landfills or transitional cells at open space. There is not any massive model of energy alternative systems aiming to improve the efficiency, the ecological footprint and the urban metabolism, for example with solar energy, recycling waste or urban agriculture programs.

The study identifies a good quality and quantity of interactions among the different social groups, what might reduce marginalization processes and improve the social cohesion. Social integration processes and some levels of socio-spatial segregation and compactness of urban communities are also observed. The indicators show homogeneous polygons of social stratification and little scenarios that constraint the marginal or peripheral areas, all this making the integration by spatial proximity possible. The analysis of housing areas with assorted quality and typology highlights a good level of social cohesion within the urban center. Thus, the

articulation of housing areas to the rest of the city is well located due to little endowments for operative support.

Figure 3. Urban Sprawl



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