

Original Article

Between Development and Loss: Residential Expansion and Transformation of Rural Habitat in Vía a la Costa and Posorja, Urban Edges of Guayaquil

Juan Carlos Briones Macias¹, Agustin Gamarra Sampén², Maria Isabel Romero Jara³

^{1,3}Universidad de Guayaquil, Guayaquil, Ecuador, Universidad César Vallejo, Trujillo, Perú.

²Universidad de Guayaquil, Guayaquil, Ecuador.

¹Corresponding Author : juan.brionesmac@ug.edu.ec

Received: 21 November 2025

Revised: 31 December 2025

Accepted: 11 September 2026

Published: 29 September 2026

Abstract - The urban growth of Guayaquil has reconfigured the boundaries between the city and the countryside, giving rise to new urban edges where residential expansion advances on previously rural territories. Vía a la Costa and Posorja sectors have become contrasting but complementary scenarios of the same phenomenon: the progressive loss of rural habitat in the face of the dynamics of accelerated urbanization. Urban growth in Latin America has historically followed a model of dispersed and disjointed expansion, driven by real estate interests and weak territorial control. This pattern of development has generated a recurring phenomenon: the blurred border between urban and rural, known as the "urban edge". In these spaces, the coexistence of agricultural, residential and industrial uses is manifested, reconfiguring the landscape and altering socio-territorial dynamics. To generate a comparative analysis of urban edges based on their environmental, social and real estate impact caused by residential expansion in the Vía a la Costa and Posorja sectors of Guayaquil, to identify the transformations of the rural habitat and the challenges they pose for the sustainable planning of the territory. As conclusion Urban expansion in Vía a la Costa and Posorja reflects growing metropolitan influence, infrastructure development, and increasing peri-urban transformation.

Keywords - Urban edge, Urban growth, Local development, Rural habitat.

1. Introduction

Over the past two decades, Guayaquil's urban growth has exceeded foreseeable urban limits, expanding into areas unsuitable for urban development. This has intensified the risk posed by emerging populations in natural spaces, vulnerable areas, and sometimes areas with an overabundance of services. Its traditional boundaries have been encroaching on its rural margins, rapidly transforming territories that previously maintained an agricultural or natural character into satellite urban developments.

Among the most representative examples of this sprawl are two sectors that have undergone significant changes over the years: Vía a la Costa and Posorja. In these areas, residential expansion has generated new forms of land use and profound alterations to the rural landscape [1].

In Vía a la Costa, according to data from Velastegui-Montoya, until 2023 the proliferation of gated communities, shopping centers and highways has generated a reduction of at least 15% of the agricultural and livestock strip in the city of Guayaquil [2], which has caused a mixture between the

urban and rural strip without having a precise limit, which has reduced the environmental quality and the surface of protected areas.

For its part, Posorja, historically linked to fishing and agricultural production since before the 16th century, has experienced constant changes in land use driven by tourism pressure, port development, and new housing projects. These changes, up to 2024, have given rise to a dynamic of local real estate development and have jeopardized its rural identity and environmental quality [3].

These processes, driven primarily by land speculation and the search for new centers of activity, reveal an urban expansion model that prioritizes profitability over sustainability. This profitability is driven by urban expansion processes that have transformed this territory into satellite parishes, generating a broad spectrum of land use within two main development frameworks: mobility and tourism. The loss of productive land, ecological fragmentation, and territorial inequality are symptoms of a transformation that is progressing faster than planning.



Based on this initial analysis, cases of accelerated and disorganized urban expansion, known as sprawls, have been identified. These sprawls have shaped a spectrum of green space consumption, hindering territorial recovery. The case of Jaipur, India, is identified as an iterative model of unchecked urban growth, bearing similarities to the Guayaquil territorial context. This is achieved by quantifying green spaces and urban area, and by identifying a consumption factor that is dependent on population growth and urban mobility connectivity. This is done using a multi-criteria technique that analyzes spectra of increased soil surface temperature (LST) for measurement [4].

Among the spatial metrics considered as urban sprawl, it was revealed that increased urban compactness, combined with rapid urban growth (43%), significantly affected the availability of land for the development of green spaces. The land suitability analysis reflects that there is limited space available in the medium (670.82 ha) and high (615.85 ha) suitability categories for the future development of green spaces. Furthermore, less than 2% of the undeveloped land is available for the development of green spaces in the peripheral and semi-central areas of the city [4].

Much of the territory in Ecuador exhibits similar trends, consuming natural spaces and causing territorial vulnerability due to a lack of planning in the face of accelerated and

uncontrolled urban development (sprawl). In this context, this study seeks to comparatively analyze the spatial, social, and ecological impacts of residential expansion through a preliminary case study where territorial quantification can provide insight into how the territory is growing in a compact urban and rural trend, reflecting on the challenges that this phenomenon poses for the sustainable and equitable planning of the territory [4].

2. Materials and Methods

2.1. Comparative Evaluation of Urban–Rural Transitions

Scientific literature agrees that urban–rural transitions mainly occur in peri-urban areas, which are characterized by a mixture of urban and rural functions, dispersed urban growth, and rapid socioeconomic transformations.

The main characteristics of the rural to urban migration correspond to interactions between urban and rural systems (economic, social, and ecological); accelerated land-use changes, particularly the conversion of agricultural land into urban areas; territorial fragmentation and increasing pressure on natural resources [5].

In the Global South, these transitions tend to be more complex due to rapid urbanization, informality, and limited territorial planning capacity.

Table 1. International comparison of urban–rural transition cases

Region / City	Characteristics of the Transition	Main Drivers	Territorial Impacts
China (Kunming)	Progressive integration of rural villages into the urban fabric	Real estate development and transformation of land tenure systems	Reconfiguration of the urban landscape and shift from rural to urban status
Europe (various countries)	Low-density urban expansion and mixed rural-urban land uses	Suburbanization, metropolitan mobility, and regional planning	Territorial fragmentation and discontinuous peri-urban growth
Mexico (Mexico City)	Metropolitan expansion into rural peripheral areas	Road infrastructure, population growth, and accessibility	Loss of vegetation cover and increase in urbanized land
India (Chennai)	Rapid transformation of rural villages into hybrid urban-rural environments	Industrialization, migration, and metropolitan expansion	Complex interactions among social, economic, and political actors
Malaysia (George Town)	Urban growth in surrounding rural areas	Accelerated urbanization and metropolitan expansion	Land-cover change and the need for urban growth boundaries

Urban–rural transitions in Latin America present characteristics associated with rapid urbanization, socio-spatial inequality, and informal growth processes. Across the

region, peri-urban areas often become spaces where agriculture, informal settlements, and new metropolitan infrastructures coexist [6].

Table 2. Urban–rural transitions in Latin American models

Region	Main Characteristics	Dominant Processes
Mexico	Expansion of megacities into peripheries settlements	Accelerated urban growth and accelerate mobility
Brazil	Metropolitan peripheries with strong levels of informality	Growth of the "gray sprawl" from disorganized settlements
Colombia	Peri-urbanization linked to logistics corridors	Excessive industrial development
Ecuador	Urban–rural transitions associated with local development criteria	Peripheral real estate development towards coastal growth hubs

A comparative analysis of various cases within international and regional contexts—drawing on studies from the last decade—demonstrates that urban-rural transitions are driven by dynamics of conflict and fragmented development. These dynamics stem from urban expansion that consumes and appropriates rural territories, changes in land use, and socioeconomic restructuring that alters the conditions for economic prosperity in rural areas [7]. These trends, manifested through conflict dynamics, have resulted in a rate of growth that directly impacts territorial planning; such conflicts are particularly acute in the Southern Cone (Latin America), where the appropriation of space and consumption of resources exacerbate territorial informality and vulnerability in urban peripheries and urban-rural transition zones.

2.2. Growth in Urban-Rural Transitions

Urban-rural transition zones, as sites of conflict, have become common case studies in geospatial analysis, leading to the development of techniques to measure and control their expansion. Tools based on geo-analysis and geoprocessing allow for the identification of their original boundaries and how these have shifted or become integrated into the urban fabric; satellite monitoring systems such as ALOS-PALSAR or LANDSAT have been used to measure the growth of the urban fringes in Posorja and Vía a la Costa [8].



Fig. 1 Growth dynamics of Posorja and Vía a la Costa using geospatial measurement techniques

Urban growth in Guayas province has driven a significant transformation of coastal areas through the expansion of

productive and real estate sectors, reflecting substantial rural-to-urban migration. Urban fringes—formerly defined by agricultural or livestock-rearing activities—have increasingly encroached upon rural land with real estate developments that foster semi-urban settings, such as small, gated communities. This has most severely impacted the territory's natural conditions, resulting in the progressive loss of rural habitats driven by the dynamics of rapid urbanization. In the specific case of Vía a la Costa, the real estate boom has led to fragmented territorial development characterized by gated communities; however, the area has also been compromised by the expansion of extractive zones—specifically livestock farming, acting as a major consumer of land—which has weakened natural corridors in southwestern Guayaquil [9-11].

Posorja exhibits a trend similar to that of Vía a la Costa, yet it possesses unique characteristics as a coastal area experiencing a surge in tourism and hotel development that extends right to the shoreline. This shift toward urban development has seen socioeconomic growth dynamics completely displace rural production, creating tensions within the urban-rural transition zones.

Faced with these two models of territorial development—geared toward real estate, productive, and extractive urban appropriation—the fragility of land tenure and land-use control policies has resulted in a high degree of territorial vulnerability to environmental, social, and socioeconomic impacts. Understanding these conflicts has led to a distinct transformation—driven by development corridors (main access routes) and urban fringes—that shapes a unique perception of the rural landscape and highlights how the urban edge consumes rural space and alters the territory [12].



Fig. 2 Urban boundary of Vía a la Costa and Posorja

2.3. Theoretical Framework

Historically, urban growth models in Latin America have been based on the arbitrary appropriation of land, establishing

informal settlements as a characteristic feature of Latin American urban development [13]. This pattern has blurred the boundaries between urban and rural areas, driving an unstable, consumption-oriented urban expansion.

While rural zones centered on agriculture persist, the landscape has become fragmented; focusing on the study area of Guayas Province, the expansions along Vía a la Costa and in Posorja exemplify this Latin American pattern, transforming the territory into the next urban cluster. According to Hidalgo Silva, pressure from real estate and tourism markets has led to urban fragmentation and increasing exclusion, driven by the spatial segregation resulting from the spread of the "urban gray sprawl"[10].

contexts, rurality sees agricultural economies being replaced by service and tourism activities, while cultural and landscape values are eroded by the pressure of urban development. Specifically, regarding the Vía a la Costa and Posorja areas, the fragmentation of tropical dry forests has reduced environmental connectivity, thereby impacting biodiversity and ecosystem services—a trend that poses a threat to both natural systems and the local economy [17, 18].

Against the backdrop of unchecked urban fringe growth, this study sheds light on the tensions arising from real estate-driven economic expansion and their impact on territorial sustainability; as Liang argues, the challenge for peripheral communities lies in forging a vision of an integrated city that harmonizes urban planning with the management of the rural landscape.

Ultimately, the urban fringes of Guayas Province are currently characterized by intense real estate pressure and the progressive loss of rural habitats, necessitating public policies that foster ecological balance and territorial justice [19].

3. Methodology

This research adopts a mixed approach, combining qualitative and quantitative methods that allow analyzing residential expansion both from the territorial perspective and from social and ecological dynamics. It is a descriptive, comparative and analytical study, aimed at understanding the spatial transformations that occur in the urban edges of Vía a la Costa and Posorja.

A non-experimental and cross-sectional design is used, since variables are not manipulated, but phenomena are observed as they occur in the current context. The study is based on the collection and analysis of documentary, cartographic and empirical information corresponding to the period 2015–2025, to establish temporal and spatial comparisons of expansion processes.

The units of analysis are the rural-urban territories of the Vía a la Costa and Posorja sectors of the Guayaquil canton. The indirect population is made up of the inhabitants of the affected areas, institutional actors, urban planners and community representatives.

To quantify urban sprawl, LANDSAT satellite data were acquired from 2000 to 2025. Satellite imagery was obtained from the USGS website. In addition, various secondary data, such as city and zone boundaries, were collected. Thematic databases, including zonal maps of Vía a la Costa and Posorja, urban sprawl maps, and land use and land cover data, were generated using ERDAS Imagine and ArcGIS software. Comparative mapping: overlaying historical and current (2015–2025) maps using GIS tools (QGIS, ArcGIS) and sources such as Google Earth and municipal cadastre.



Fig. 3 Housing occupation area in Guayas. (a) Vía a la Costa, (b) Vía a Daule, (c) Durán, (d) Palestina, (e) Posorja, (f) La Aurora.

Ortiz and Moreno note that the expansion of the urban fringe has encroached upon the territory, creating an environment vulnerable to phenomena such as flooding, high rates of traffic accidents, and the loss of natural areas; this expansion reflects a lack of sustainability criteria, driven by the ease with which development hubs appropriate the land [14, 15]. Authors such as Pindado (2016) point out that the concept of "hybrid territories" involves layering urban development over rural space as a survival strategy for the countryside—since, without these layers, the area might otherwise succumb to economic underdevelopment—yet the failure to properly leverage the rural landscape has rendered this layering process essentially consumptive [16]. In such

The information will be synthesized into data and subjected to an evaluation of urban attributes of each of the urban edges analyzed, generating a comparison for the treatment of peripheries in areas of environmental, social and economic development.

4. Results and Discussion

4.1. SIG Mapping Analysis

Territorial analysis focuses on explaining urban growth patterns and the specific characteristics arising from spatial adaptation processes; specifically, regarding the Vía a la Costa and Posorja areas, Geographic Information System (GIS) tools were used to visualize the territorial features that make this region a unique case study. Key spatial analysis criteria include identifying increased traffic congestion on main access roads—which has slowed transitions between territories—and noting the scarcity of available land for new activities, alongside exogenous factors such as rising real estate values driven by their status as peri-urban development hubs.

Consequently, these regions have begun to experience rapid residential growth, the emergence of new commercial ventures, and the conversion of former agricultural land into urban or semi-urban areas. In particular, expanded transport infrastructure and improved regional connectivity have been essential in facilitating daily commuting between the metropolitan center and these peripheral zones. The development of road networks connecting Guayaquil to coastal and port areas has enhanced the appeal of these locations for new housing developments and tourism-related projects. Thus, the urban periphery's landscape has gradually transformed into a hybrid configuration where rural practices coexist with emerging urban functions [3].

The evaluation is based on this analysis of the last decade regarding the transition (migration) from the countryside to the city, expanding the urban edge of Posorja and Vía a la Costa, as determined in the following scatter plot obtained from GIS mapping analysis.

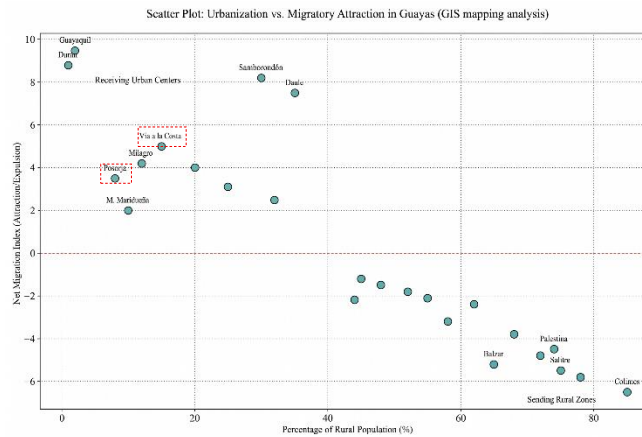


Fig. 1 Urban fringe growth in a scatter plot using GIS mapping analysis

Visualizing urban growth data-derived from simplified GIS geoprocessing-reveals significant, established migration flows toward both the peripheral and central zones of cities such as Guayaquil, Durán, Daule, and Samborombón in Guayas Province.

Data indicate that approximately 27% of urban residents originate from rural areas; specifically in zones like Vía a la Costa and Posorja, many inhabitants have relocated from the rural sectors of these same cities, driving internal migration. This pattern reflects the concentration of economic activities, job opportunities, higher education institutions, and urban services that continue to draw populations from surrounding territories. Although both analyzed territories retain their intrinsic rural character, their urban areas have progressively absorbed the population growth of their natural hinterlands. Consequently, the urban fringes analyzed here—functioning as cantons within the broader study—have emerged as major residential hubs over the past decade, accommodating large

numbers of people who commute daily for work and maintain economic and social ties to the metropolitan core while residing in newly developed suburban environments. Furthermore, the consolidation of logistics and port activities in Vía a la Costa and Posorja has created new employment opportunities, attracting people from both urban and rural backgrounds. Overall, the last ten years reveal a clear pattern of territorial transition in which peri-urban spaces along Vía a la Costa and Posorja are evolving into strategic zones of expansion for the metropolitan region.

4.2. SIG synthesis

It is expected to show differentiated expansion patterns between both sectors, showing how urbanization processes affect the ecological and social structures of the urban edge. The results will allow proposing guidelines for the sustainable planning of the territory, aimed at strengthening environmental management and territorial equity in Guayaquil.

Table 3. Comparative analysis of the urban edge of Posorja

Analysis category	Posorja historical cartography	Posorja current cartography	Involvement for territorial understanding
1. Predominant land use	Dominance of agricultural areas, pastures, mangroves and natural soils without significant urban intervention.	Increase in residential, industrial, tourist and service use, with a sharp reduction in rural land.	It marks the passage from a productive territory to an urbanized one, evidencing the loss of rural habitat and the displacement of traditional activities.
2. Ecological continuity	Continuous ecosystems, especially mangroves, estuaries and coastal grasslands.	Ecosystems are fragmented by port infrastructures, settlements and roads.	The breakdown of ecological connectivity affects biodiversity, ecosystem services and environmental functions of the coastline.
3. Infrastructure and mobility	Minimum road network, organic routes and dirt roads associated with fishing and agricultural activities.	New roads, access to the port, rectified routes, road hierarchy.	Infrastructure boosts economic development but accelerates the occupation of rural territory.
4. Socio-economic activities	Predominance of artisanal fishing, traditional agriculture and small livestock.	Growing predominance of port activities, commerce, tourism and housing.	Replacement of the local socio-productive system by larger-scale external economies.
5. Landscape and morphology	Open, homogeneous landscape, with a strong presence of the natural environment.	Heterogeneous and hybridized landscape, a mixture of residual rurality, urbanizations, port infrastructure.	The original coastal landscape identity is lost.
6. Anthropic pressure	Low urban pressure: slow growth linked to productive cycles.	High urban pressure; accelerated expansion and led by private and public investment.	Territory goes from being a "productive support" to "urban support", generating tension.
7. Environmental vulnerability	Functional ecosystems: continuous mangrove, water regulation and natural buffering.	Zoning with occupied risk areas, expansion over sensitive areas and altered natural drainage.	Increased vulnerability due to occupation of risk areas and loss of natural protection.

According to the cartographic analysis, it was also possible to determine the conditions of the urban edge of Vía a la Costa as a booming development cluster.

Table 4. Comparative analysis of the urban edge of Vía a la Costa

Analysis category	Vía a la Costa historical cartography	Vía a la Costa current cartography	Involvement for territorial understanding
1. Predominant land use	Dominance of real estate zones, natural areas, mangroves and natural edges significant urban intervention.	Increase in residential and service use, with a sharp reduction in rural land.	It marks the passage from a productive territory to an urbanized one, evidence of the loss of rural habitat.
2. Ecological continuity	Continuous ecosystems, especially mangroves, estuaries and coastal grasslands.	Ecosystems are fragmented by residential and industrial uses.	The breakdown of ecological connectivity affects biodiversity, ecosystem services and environmental functions of the coastline.

3. Infrastructure and mobility	Maximum road network and dirt roads are associated with residential and industrial activities.	New roads, access to the urbanizations.	Infrastructure boosts economic development but accelerates the occupation of rural territory.
4. Socio-economic activities	Predominance of real estate and shrimp farming activities	Growing predominance of real estate and services activities	Replacement of the local socio-productive system by larger-scale external economies.
5. Landscape and morphology	Open, homogeneous landscape, with a strong presence of the natural environment.	Heterogeneous and hybridized landscape, a mixture of residual rurality and urbanizations	The original coastal landscape identity is lost.
6. Anthropic pressure	Low urban pressure: slow growth linked to productive cycles.	High urban pressure; accelerated expansion and led by private and public investment.	Territory goes from being a "productive and auxiliar rural support" to "extensive urban edge", generating tension.
7. Environmental vulnerability	Functional ecosystems: continuous mangrove, water regulation and natural buffering.	Zoning with occupied risk areas, expansion over sensitive areas and altered natural drainage.	Increased vulnerability due to occupation of risk areas and loss of natural protection.

The comparison of the lands is very similar, which generates conclusions that both lands, being in a line of urbanizations at the foot of the coastal urban edge, develop independently, but nevertheless fulfill a common growth and development around their time of urban consolidation, starting from ruralism to an extensive or productive urban edge.

4.3. Critical Analysis

The contrast between historical cartography and Posorja's current cartography evidences a dual process that structures the central argument of the article: the simultaneous coexistence between urban development and the loss of rural habitat. A profound and rapid transformation is currently underway on the outskirts of Posorja and along the Vía a la Costa.

The expansion of the Guayaquil metropolitan area is setting the pace, driven by new infrastructure projects and business ventures. In recent years, the development of logistics infrastructure, increased port activity, road improvements, and a boom in residential developments have successfully connected these once-remote areas to the global economy.

This surge of activity has improved access to the region and attracted investment in commerce, tourism, transportation, and services. Naturally, the increased activity has triggered a spike in the demand for land for housing—primarily to accommodate the workforce arriving for these new projects. From an economic perspective, this presents an excellent opportunity for the region to establish a strong international position in the maritime sector. However, a look at land-use patterns reveals a troubling reality: the rural landscapes and sensitive environments that once defined the area's identity are being erased.

Concrete structures and housing developments are gradually displacing agricultural zones, traditional fishing grounds, and natural habitats, thereby disrupting the environmental balance. Encroachment upon the coastal strip and mangrove areas has destroyed the natural corridors that sustain local flora and fauna. Most critically, this damage leaves the territory far more vulnerable to sudden climate shifts and severe storms, particularly in low-lying areas where nature itself once served as a protective shield.

But the impact isn't just environmental; this transformation on the outskirts is also shaking up the economy and the customs of long-time residents. Traditional livelihoods-like artisanal fishing or small-scale farming that once fed many local families—are losing ground. Now, the driving forces are logistics, port services, tourism, and real estate speculation.

This shift in focus not only alters the area's economic base but also sends land prices soaring, making it incredibly difficult for original inhabitants to remain in their own neighborhoods. Essentially, as the area adopts a more urban pace, the historic bond between communities and the land they once worked is severe.

At the same time, the face and essence of these places are undergoing a radical transformation. New housing developments springing up along the expansion route feature designs, construction methods, and layouts that bear no resemblance to the traditional coastal villages of the past.

This creates a monotonous, mass-produced aesthetic that almost entirely obscures the beauty of the natural landscape. What was once pure countryside and coastline is now turning into the typical fringe of a major metropolis, dominated by gated communities, massive highways, and warehouses.

Viewed this way, this strip has become a battleground between two worlds. On one side, the city advances aggressively, driven by highways, real estate ventures, and market forces. On the other hand, rural life is in retreat, losing both its natural character and its traditions. The result is a hybrid landscape, a somewhat strange mix where urban life operates atop the surviving remnants of the countryside.

Ultimately, it is the classic dilemma of economic progress versus the loss of identity, in this case more investment, more activity, and better infrastructure, but the ecology and culture that once sustained these places are simultaneously being wiped off the map.

Everything happening in Posorja and along the Vía a la Costa is a true reflection of how Guayaquil and its surrounding areas are expanding. The city continues to grow outward, sprawling across the landscape. This is largely due to a lack of formal housing options and the fact that people still prefer the traditional model of owning a standalone house with its own plot of land, rather than opting for vertical construction [20].

This expansive pattern has yet to be redirected by a comprehensive territorial strategy capable of promoting more compact or sustainable urban forms. For this reason, the present study proposes estimating the amount of land required to accommodate future residential growth over a twenty-year projection period, considering both demographic growth rates and the extent of land occupied by urban development as of 2020.

Such an approach aims to provide a clearer understanding of the spatial implications of continued metropolitan expansion and the potential pressures it may exert on the remaining rural and ecological landscapes located along these urban edges.

The natural limits of the city of Guayaquil, its urban sprawl and the limitations of protected areas, have left as the only option the future expansion to the east, around the connection of the E-40 highway with the coastal maritime zone and bringing the urban area of Guayaquil closer to Chongón, the head of this rural parish.

Under the panorama of the current situation of the Guayaquil conurbation, the actions of proposals for change have been focused on three aspects: change in the quality of life of irregular settlements, care of protected land or of high agricultural value and control of the limit of future expansion in accordance with projected years.

The first refers to the incorporation of the Monte Sinai area within the urban limits of Guayaquil, identified as a population with a high level of poverty and that has been in an irregular situation for more than 20 years, with zero coverage of basic services and urbanization. At this point, it is worth

mentioning that a change in local and national policies is required to: promote the polynuclear development of rural parishes, reducing their migratory movement; and to expand the supply of social housing aimed essentially at people with limited economic resources who do not have access to a loan from banks or private organizations.

4.4. Treatment of the Urban Edge and its Implications in Vía a la Costa and Posorja

The development of the urban edges of Vía a la Costa and Posorja shares consolidated urban dynamics such as an accelerated growth of the real estate industry that has caused extensive territorial consumption that affects a large part of the natural components of the landscape; which has mainly affected the capacity for urban resilience in the face of this housing demand that cannot be controlled by emerging or unconventional means.

The planning of the territory is accompanied by a superfluous treatment of each component of the territory apart from its analysis in scales, from this scoop it has been possible to incorporate the following criteria for the analysis of the territory based on the attributes of an urban edge and how it should be developed [21].

Based on the configuration of attributes, an urban edge proposes a set of relational elements that determine the vocation of these attributes and certain properties like the urban-regional analysis and diagnosis is framed in the identification and development of two types of relationships, which determine territorial functioning:

4.4.1. Static Relationships

Relative position of each city, municipality or population center with respect to the others in the system, which determines its form and guarantees the identification of specific attributes and characteristics that are specific to the territory, which can be shared with one or more of the nearby municipalities (proximity relations).

4.4.2. Dynamic Relationships

Quantity and intensity of flows between cities, municipalities or population centers with others, especially population and economic (exchange of products), given in part by specific attributes and characteristics (static relationships), as well as by conditions of service and coverage. Their identification is given by levels of hierarchy: 1) primary (high flow), 2) secondary (medium flow) and 3) tertiary (low flow). This determines the functioning of the territory and allows for the formulation of improvement and potentiation actions.

Both the A and B relationships are established as a basis for the construction of plans and graphic schemes for the development of the urban edge, in which the inherent characteristics and the functioning of the territory are identified according to attributes. Likewise, with this

classification, it is possible to understand dynamics and relationships in different territorial contexts (major or minor) that are the guideline for the formulation of planning and ordering processes that generate regional and urban synergies [12].

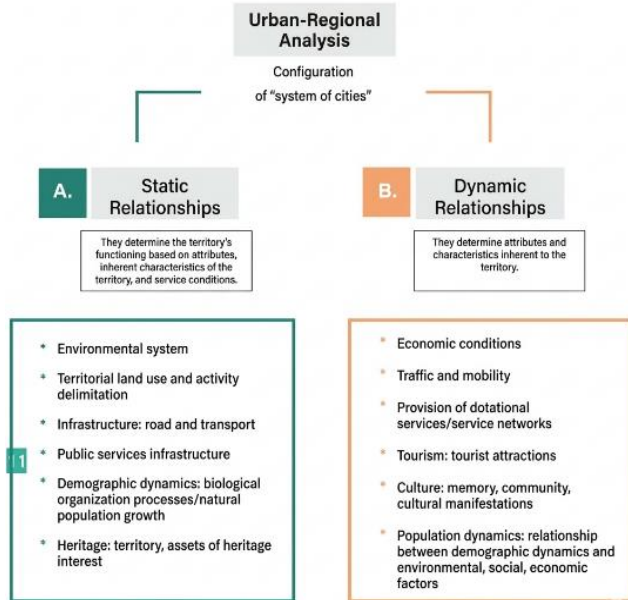


Fig. 5 Analysis of Urban Edge Attributes

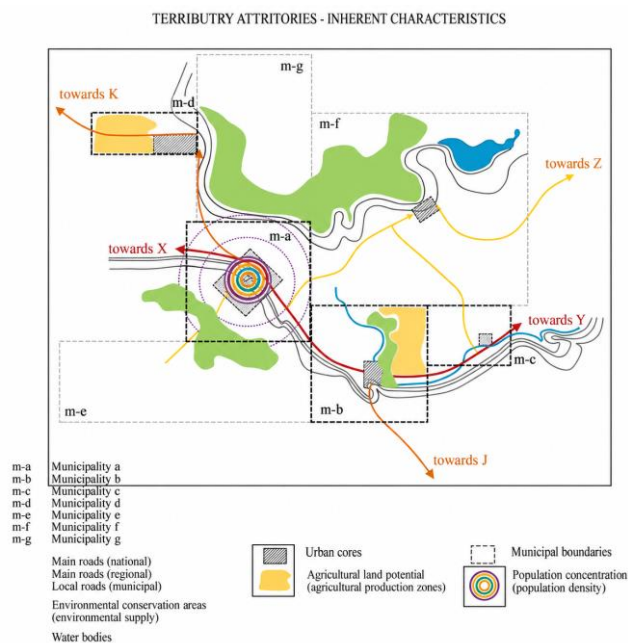


Fig. 6 Attributes of the territory - inherent characteristics

The treatment of urban edges serves to improve urban resilience, social integration and ecological balance, through this comprehensive analysis it is intended to improve the management of the particular transition areas of Vía a la Costa and Posorja, in order to mitigate environmental and social

risks preserving the natural components of the territory giving way to the creation of spaces with quality of life, safer and more livable for citizens [22].

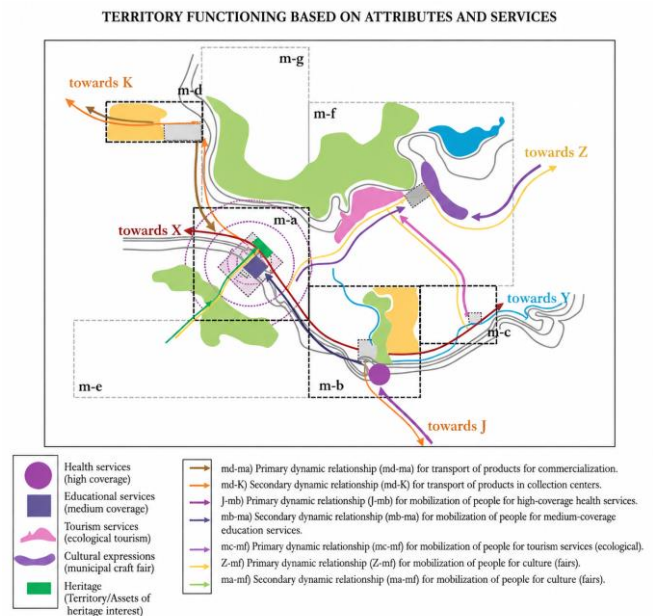


Fig. 7 Functioning of the territory based on attributes and services

5. Conclusion

The treatment of the urban edge of the Vía a la Costa in Guayaquil focuses on improving road safety, mobility and urban integration through infrastructure and planning works. This includes the construction of returns, road accesses, and elevated pedestrian crossings, in addition to infrastructure projects such as a wastewater treatment plant and the improvement of the road network, all with the aim of supporting the growth of the area.

Based on this spatial analysis, the treatment of the urban edges of Vía a la Costa and Posorja has focused on regeneration and infrastructure improvements-particularly in urban-rural transition zones-through interventions in local access flows, the creation of public spaces, and the diversification of activities that incorporate rural elements to foster balanced growth in the peripheral areas; these actions aim to boost residents' quality of life and attract investment and tourism [23].

In conclusion, the radical transformation of the areas along the Vía a la Costa and in Posorja clearly demonstrates how Guayaquil's influence continues to drive urban growth. In recent years, road improvements, the logistics boom, and port activity have effectively connected these outlying areas to a much larger market.

With improved connectivity, it was only natural to see an influx of investment in commerce, tourism, and above all real

estate developments. Today, there is a tremendous need for housing and residential communities to accommodate the people drawn by the new jobs this corridor offers. It is a process in which what was once open countryside is transformed into a transitional zone, blending businesses, homes, and new infrastructure.

Ultimately, this spread of urban development toward the sea highlights just how vital this strip of land is to the future of the greater metropolis. If this growth is managed and planned intelligently, the expansion will not only better integrate the region but also hold the potential to establish this coastal area as a highly competitive logistics and port hub [24].

Conflicts of Interest

This section is compulsory. A competing interest exists when professional judgment concerning the validity of

research is influenced by a secondary interest, such as financial gain.

We require that our authors reveal any possible conflict of interest in their submitted manuscripts. If there is no conflict of interest, authors should state that “The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper”.

Funding Statement

The research was funded by the authors and Universidad Cesar Vallejo which contributed their facilities.

Acknowledgments

We thank Universidad Cesar Vallejo and Universidad de Guayaquil for their contribution to the descriptive analysis of information and research.

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