



## SOCIAL SCIENCES

# Coordination mechanisms of rural land use planning. Combeima Canyon, Ibagué, Colombia

CERGIO ANDRÉS REYES-BONILLA & ANDRÉS ERNESTO FRANCEL-DELGADO

**Abstract:** In Colombia, the planning of the territories has been determined through the Territorial Ordering Plans (POT). A part of the component of these POTs corresponds to decision-making regarding the rural land of the municipalities. In Ibagué, Colombia, is the Combeima Canyon, a rural area of great importance for the region due to its high environmental and tourist potential. The articulation between the reality of the sector with the POT of Ibagué was analyzed, its strengths and weaknesses were identified, compared to the dynamics of the territory and the perceptions of a population group. The results show a disinterested land use planning with rural land, disjointed planning trends and inconsistent with the minimum requirements and concepts of the national legal framework. Recommendations are proposed for the application of territorial ordering instruments that allow solving the problems and preserving the strengths of the Combeima Canyon.

**Key words:** Combeima river, land use, rural development, territorial planning.

## INTRODUCTION

In Colombia, from the 20th century, the ordering of the territory has been approached through instruments called plans. These constitute one of the main planning exercises to build cities under a project defined in the long term. According to Alba-Castro (2013) and Francel (2017), there are records in the country since 1917 in Medellín of an instrument called Future Plan. Subsequently, according to Massiris-Cabeza (1999), in 1947 Law 188 was enacted, forcing municipalities with a budget of not less than \$200,000 to draw up a Regulatory Plan for urban development.

Currently, in our country, the future is determined in urban terms for the municipalities in a period of twelve years through a tool called Territorial Ordering Plan (POT), whose normative foundation is Law 388 of Congreso de Colombia (1997). This tool is so prevalent that all construction in the jurisdiction of each

municipality is conditioned to what is established by the POT, because it determines the protection of significant areas, as well as the actions to be generated for an adequate development of the territory. Part of the component of these POTs corresponds to decision-making regarding rural land.

In the country, 99% of the national territory is rural and is comprised of 58.6% with forestry vocation and 37.5% of agricultural land (Instituto Geográfico Agustín Codazzi 2022). These percentages are maintained in the various municipalities and cities. Such is the case of Ibagué, the capital of the department of Tolima, located in the center-west of the country, with 541,101 inhabitants (DANE 2018) who reside mainly in the urban area (94.6%) and a minority in the rural sector (5.4%) (Alcaldía de Ibagué 2019a, b, c). In the urban area there are 402 neighborhoods and in the rural area there are 17 townships and 144 villages (Concejo municipal

de Ibagué 1990, Concejo municipal de Ibagué 1992), where 97% of the land is rural, comprised of 45% of land use. agricultural and 45% forestry (Alcaldía de Ibagué 2014) [Figure 1].

To the northwest of Ibagué is the Combeima river basin, with an area of 27,421.13 hectares, which represents 20.14% of the municipal rural land. The elevation of the Combeima Canyon is between 1,300 meters above sea level in the Cay corregimiento, up to 5,200 meters above sea level on the paramo area. It presents 20,981 hectares of environmental protection soils (88.5%), 2,130 hectares of production soils (9.1%), 585 hectares in threat and high risk (2.5%), 143 hectares of restricted development zones (0.6%) and 34 hectares of urban land (0.1%). The corregimiento with the largest population in the Combeima Canyon is Villa Restrepo with

3,480 people (54%), followed by Cay with 2,722 people (42%) and Juntas with 212 people (4%). The paramo zone does not register population (Corporación Autónoma Regional del Tolima – CORTOLIMA 2019).

The Combeima canyon is an emblematic place for the inhabitants of the municipality of Ibagué, due to its climatic, landscape, biodiversity and cultural characteristics, in recent years CORTOLIMA, together with the Los Nevados National Natural Park, have demonstrated, in front of the increase of tourism within its protected natural areas, in an unrestrained manner, without any type of limitation and regulation, determined by the management objectives of these (Corporación Autónoma Regional del Tolima - CORTOLIMA 2017).



**Figure 1. Combeima Canyon. Own elaboration based on data from the Alcaldía de Ibagué (2014).**

According to the Ibagué Aqueduct Master Plan, this basin supplies 87% of the aqueduct service for the urban population (Empresa Ibagüereña de Acueducto y Alcantarillado 2021). It contains areas of environmental relevance such as the Alto Combeima Protective Regional Forest Reserve and the Los Nevados National Natural Park. In addition, from the National order it is prioritized for its high-risk conditions, through Decree 1480 (Ministerio de ambiente, vivienda y desarrollo territorial 2007).

Despite its importance and extension, the dynamics of the sector present a constant deterioration in the environmental and housing aspects, for which the present investigation studies the incidence and coherence between the Territorial Ordering Plan and the Combeima Canyon. The historical abandonment of planning instruments on rural land is verified, as well as the lack of guarantees for adequate development in accordance with current trends in urban planning. The bases are generated to determine strategies and actions that mitigate the problems found in the planning instruments, focused on the restrictions to development and the deterioration of the ecosystem.

### **State of the art**

Territorial ordering, or territorial planning, is a concept that has been extensively addressed by different authors in Latin America. It is defined as “a process of a technical-political-administrative nature, with which it is intended to configure, in the long term, an organization of the use and occupation of the territory, in accordance with its potential, with the expectations and aspirations of the population and with development objectives” (Massiris-Cabeza 2002).

During the first decades of the 20th century, conceptions of holistic rational planning emerged, which expressed that some urban

planners had full capacity to manage social processes at will and build a different society, following a design established in advance (De Mattos 2005).

Along the same lines, Pradilla-Cobos (2005) stated that these urban planners, usually architects or urban planners, followed the logic of the designers, the bureaucracy and the government's policy. The elaboration of the plans excluded the citizens, with the exception of the groups of economic power with interests in the urban area, which have a privileged relationship with the administration.

In the current scenario, there is no place for the old conceptions of holistic rational planning. It is important to recognize that in order to achieve the transformations we seek, we must start from a realistic analysis of the situation and of the prevailing conditions in existing societies and not of those that we would like to exist. This must be the result of careful democratic communication efforts seeking the collective participation of all the actors around us (De Mattos 2005).

Planning must be constructed in a different way, so that the limitations and contradictions detected in the forms of the past are resolved. It must go into economic, cultural, social and environmental fields. Participation must go beyond the formal nature that it has today, it must include the different groups and social strata, and have a consultative and decision-making nature (Pradilla-Cobos 2005).

The use of Geographic Information Systems (GIS), according to Baxendale & Buzai (2013), has an important impact on the practice of territorial planning, as support in carrying out diagnoses and planning proposals and contributions in management. The primary purpose is to act specifically on the spatial dimension and, thereby, improve the quality of life of people in the achievement of fairer societies.

The valuation of the landscape constitutes a fundamental part of the territorial ordering in places with high environmental qualities, since “this characterization carried out, in addition to providing knowledge and serving as a basis for possible initiatives of education and dissemination, constitutes the foundation of a proposal for urban protection. of the quality of the landscape and the consequent establishment of landscape management criteria” (Mata et al. 2009).

According to Cabrera (2008), based on the principles established in Law 388 of 1997, which defines land use planning in Colombia, it is possible to configure tools for the effective management of cities without the need for new laws. Among these tools is the allocation of capital gains participation resources for the improvement of informal urban settlements, the execution of road works and public services in exchange for the granting of additional building space or the obligation to give free land for housing development. of priority interest.

An example of the ability to generate valuable rural planning tools in Colombia as a result of the possibilities allowed by law, is the analysis carried out by Vélez-Olivera (2019) for Medellín, who highlights how this city has transformed its conception of rurality from the planning of the territory, thus achieving improvements in aspects such as environmental conservation, urban-rural relations, economy and quality of rural life, allowing an advance in the planning exercise in just 21 years of evolution of the POT instrument.

Another notable reference in our country in relation to effective management capacity is the analysis carried out by Bernal et al. (2010) for Bogotá, in which they mention how the management instruments allowed the obtaining and preservation of protective land, acquisition

of land for facilities, public space and road system.

Additionally, one aspect to consider is the bottom-up approach mentioned by Sánchez (2011), who analyzed some examples in Colombia in which fundamental elements were identified, such as the organization for the appropriation of the territory, the identity claim, the demand for rights and resistance. in the place. This reflected the complexity of the territories as one of the challenges for their planning and bases the need for the joint elaboration of public policies of territorial ordering as a way that is gaining more and more strength, thanks to the organized work of the community.

Despite few exceptions, there has been a difference in the importance or attention given to part of the cities, concentrating on solving urban land problems and neglecting the rural area. This situation has been recognized in the document *Misión Sistema de Ciudades* (Departamento Nacional de Planeación 2014), when mentioning that the guidelines for planning rural areas that municipal POTs must follow are very general. Consequently, there is a lack of guidance for the development of these areas, so that the planning instruments are sensitive to urban growth, while promoting agricultural use in adequate spaces, avoiding the problems generated by the conflictive relationship between the countryside and the city.

## MATERIALS AND METHODS

The analytical-synthetic method was implemented, which “consists of separately reviewing all the collection of material necessary for the investigation” (Maya 2014), referring to scientific and normative documents that are of great importance in the construction of knowledge around the field. of study covered.

The theoretical, legal, spatial and statistical parts of the territorial planning applied in the Combeima Canyon were distinguished, to address the investigation. Therefore, five phases were developed, which are described below.

### **Phase 1**

It consists of gathering information to determine the scope, limitations and parameters of the analysis of land use planning in the Combeima Canyon. In the first place, document Decree 1000-0823 of 2014 was reviewed, by which the revision and adjustment of the Land Management Plan of the municipality of Ibagué is adopted and other provisions are issued (Alcaldía de Ibagué 2014), the article "Transitions of the land cover and use in the period 1991-2005 in the Combeima river basin, Colombia" by Pérez Gómez & Bosque Sendra (2008) and Conpes 3570 of the Departamento Nacional de Planeación (2009), which allowed verifying the geographical limits, land classification and political-administrative of the Combeima river basin. The area under study 'Combeima Canyon' was determined as the part of the Combeima river basin composed of the villages of Villa Restrepo, Cay, Juntas and the Páramo Zone.

Secondly, the documents that have an impact on the territorial ordering of the area under study were reviewed. In the context of territorial planning instruments, it was verified that the only applied and existing one is the Territorial Planning Plan of the municipality of Ibagué (Alcaldía de Ibagué 2014) in which its technical support components, content of the decree, cartography, execution program and socialization minutes. In the national context, the regulations to be analyzed are those in force at the time the POT is issued, this being Law 388 of 1997, Decree 879 of 1998 and Decree 3600 of 2007, these determine the procedural and legal framework.

### **Phase 2**

The strengths and weaknesses of the POT against the administrative and legal procedure and the perceptions of a population group were identified through a survey. A procedural component was determined to verify compliance with Law 388 of 1997 to prepare the POT in each of the processes that define land use planning (technical, political and administrative). In the administrative process, compliance with the provisions of Decree 879 of 1998 was reviewed, determining as minimum aspects citizen participation, the concretion of an occupation model, diagnosis and formulation.

In the technical process, compliance with the provisions of Decree 3600 of 2007 was reviewed, to identify compliance with the categories of rural land, the allocation of urban regulations and their consistency. In the political process, the economic, social, environmental and institutional dimensions were reviewed to determine the political position of the POT in relation to the area under study.

A third perceptual component was defined, to find out through a survey the activities carried out in the area under study, their frequency, main destinations, opinions, needs and proportion of public and private investment. The headline of the survey had the ethical approval and informed consent was obtained from all participants. the survey questions can be consulted at the following link: [https://docs.google.com/forms/d/1milQjU4-zZGqNYuKnV8PDL-MxiFsa4Sf3z3pdnruDuY/edit?usp=drivesdk\\_](https://docs.google.com/forms/d/1milQjU4-zZGqNYuKnV8PDL-MxiFsa4Sf3z3pdnruDuY/edit?usp=drivesdk_)

### **Phase 3**

It consisted of the cartographic construction of information on the non-residential infrastructure located in the Combeima Canyon, with the purpose of complementing the deficiencies of the data from the initial phase. Establishments

with customer service were identified through the use of Google tools (Maps and Satellite) to preliminarily establish the geographic location, type, activity, name and the data was corroborated with field visits. Also, information was consolidated on the population and POT land uses of the area under study, obtained from the Township Development Plans.

#### **Phase 4**

It is part of a geographic analysis exercise applying GIS tools, which allow obtaining significant information about the reality of the territory and its connection with the territorial ordering instrument. For this, a spatial component was determined, which consists of the elaboration of five relationship maps between the constructed information and that established in the POT, using the QGIS and Google Earth Engine tools. Map 1 contains the allocation of land uses for the entire study area and the location of establishments discriminated between public and private. Map 2 contains the population density for each corregimiento and the location of each establishment indicating the corresponding land use according to POT. Map 3 contains a topographic map with the elevation above sea level of the area under study and the location of the establishments indicating the activity carried out by each of them. Map 4 presents the concentration of establishments in each corregimiento. Map 5 presents the buildings and forest cover in the area under study and related sector.

#### **Phase 5**

As a synthesis of the four previous phases, discussions are raised regarding the urban, conceptual and institutional aspects. Both general recommendations are determined in the application of current trends in land use planning, as well as specific ones about what

is suggested against the land use planning instrument and the factors that allow the proper implementation of land use planning in rural areas, with specific application in the Combeima Canyon.

## **RESULTS**

### **Procedural component**

As a result of the analysis of the administrative process, it was found that the POT was not socialized with the Combeima Canyon community, nor was there evidence of a diagnostic document that would account for the current state of the territory. Additionally, there is a formulation with decisions without any support or relationship with the occupation model, in addition to finding issues without decision-making such as population centers, country housing and facilities. Similarly, there are no programs, projects, management and financing instruments, or execution program.

Regarding the technical process, continuity of the absences and shortcomings of the administrative process was found: the cartography does not contain the identification of the areas for facilities and rural housing, there are no regulations assigned for populated centers, facilities, or construction indexes for different uses. housing on protected land, in addition, there is the possibility of applying a 30% occupancy rate on protected land [Table I].

Second, the dimensions that have an impact on the political process in the POT are determined. In this sense, it is observed that the predominant economic associations of industry, agriculture and tourism are guaranteed a permitted use of their activity and the economic associations of retail trade have restricted the development of their activity. Likewise, there is no analysis of the socioeconomic aspects of the population of the Combeima Canyon and there

**Table I. Administrative and technical process. Own elaboration.**

<b>Administrative process</b>			
<b>Item</b>	<b>Document</b>	<b>Result</b>	<b>Fundament</b>
Citizen participation	Minutes of meeting attendance	Not socialized with the community.	Law 388 of 1997 and National Decree 879 of 1998
Occupation model	Technical Support Document and Decree	It recognizes values and the need for environmental and water protection, tourist importance and studies of threats and risks. It will regulate the basin, restricting uses and urban development. It proposes a special centrality of link between the urban and the rural.	Law 388 of 1997 and National Decree 879 of 1998
Diagnosis	Documents that make up the POT	Although it is mentioned, there is no evidence of a diagnostic document.	Law 388 of 1997 and National Decree 879 of 1998
Formulation	Documents that make up the POT	There is an occupation model that recognizes the particularities of the place. Decisions are indicated, although without support or relationship with the occupation model. Themes without decisions: populated centers, rural housing and facilities. There are no programs, projects, management and financing instruments, or execution program. Cartography without detailed risk management studies carried out since 2012.	Law 388 of 1997 and National Decree 879 of 1998
<b>Technical process</b>			
<b>Item</b>	<b>Document</b>	<b>Result</b>	<b>Fundament</b>
Rural land categories	Decree and cartography of the POT	The cartography does not contain the identification of the areas for facilities and rural housing.	Law 388 of 1997 and National Decree 3600 of 2007
Allocation of urban regulations	Decree of POT	Without regulations assigned for populated centers, facilities, assignments, project approval and compensation. Absence of a construction index for permitted uses other than housing on protected land.	Law 388 of 1997 and National Decree 3600 of 2007
Inconsistencies with national regulations	Decree of POT	In protected land, the following are allowed: Rural housing, 30% occupancy for tourism and commerce, and subdivisions.	Law 388 of 1997 and National Decree 3600 of 2007

is evidence of a weak institutional framework regarding the implementation of the POT [Table II].

**Spatial component**

According to the collection and synthesis of information, the determination of data that

the municipal administration lacks and that, therefore, are not incorporated as essential in its planning instruments, was achieved. A total of 161 establishments were identified, of which 143 (89%) are private and 18 (11%) are public. There are 73 establishments (45%) located in restricted development zones, 40 establishments (25%)

**Table II. Political process. Own elaboration.**

Political process		
Dimension	Document	Result
Economical	Decree (article 411) and Plan R2 land use of the Ibagué Land Use Plan	Predominant economic associations of industry, agriculture and tourism are guaranteed a permitted use of their activity. Economic unions of retail trade are not allowed to operate.
Citizenship (social)	Documents that make up the Territorial Ordering Plan of Ibagué	The decisions reflect an articulation only with the predominant economic associations such as industry, agriculture and tourism. Socioeconomic aspects of the population of the Combeima Canyon are not determined (poverty situation is not known)
Environmental	Documents that make up the Territorial Ordering Plan of Ibagué	The contribution of the POT is the determination of land uses based on the POMCA COELLO in force at the time.
Institutional	Documents that make up the Territorial Ordering Plan of Ibagué	The municipality has high intervention in the elaboration, but low intervention in the implementation.

in threat and risk areas, 23 establishments (14%) on production land, 17 establishments (11%) in environmental conservation and 8 establishments in urban areas (5%) [Figure 2].

The establishments are concentrated in the districts of Cay and Villa Restrepo, especially on the edge of the main road, parallel to the Combeima River. 116 establishments classified as commerce and services (72%), 24 entertainment and recreation establishments (15%), 19 institutional establishments (12%) and 2 industries (1%) [Figure 3]. A map was made with the Google Earth Engine tool, which confirms the concentration of establishments, next to the forest cover of the area under study. It is available for unrestricted access and provides a tool for administrative entities to recognize the area in greater depth [Figure 4].

**Perceptual component**

The survey provided the following data. 80% of those surveyed consider that public investment in the Combeima Canyon is regular or insufficient. 50.6% of those surveyed consider the relocation of constructions in risk areas a priority, 49.4% indicated that investment in

tourism is important and 54.41% mentioned that the protection of natural resources is fundamental. The most visited place in the Combeima Canyon is the Villa Restrepo Park, in 69% of the cases. The most carried out activity in the Combeima Canyon in 65% of the cases is the visit of natural landscapes and entering commercial establishments such as restaurants [Figure 5].

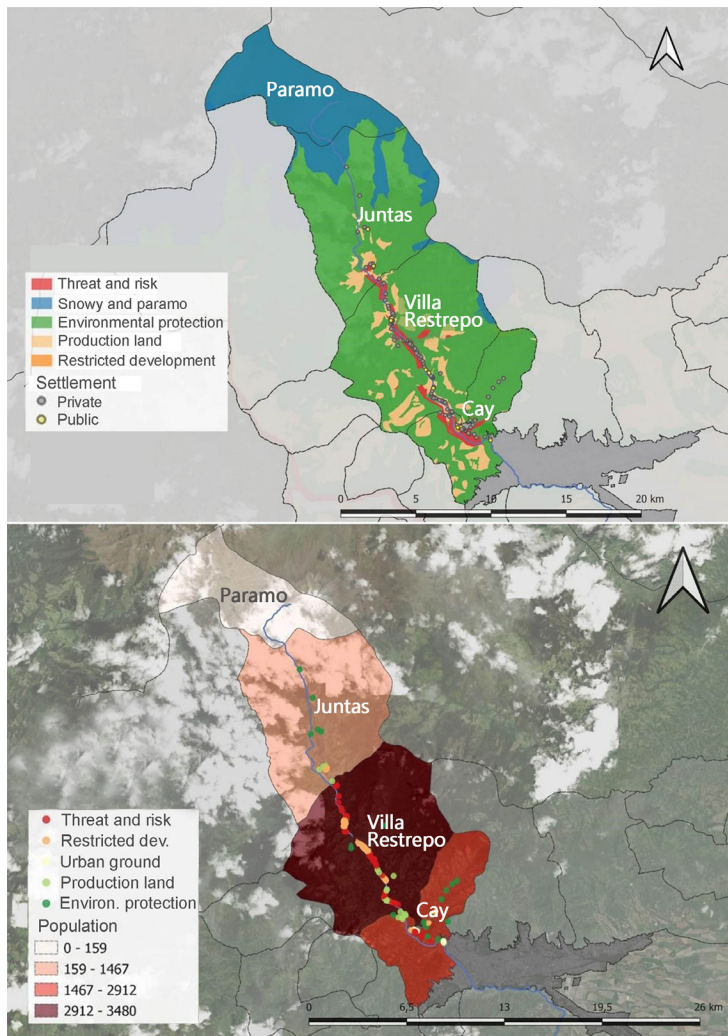
**DISCUSSION**

**Conceptual analysis**

The Territorial Planning Plan of Ibagué, despite being adjusted in 2014, presents the characteristics of the urban planning plans that predominated during the 20th century in Latin America, as exposed by De Mattos and Pradilla-Cobos. Among them, the exclusion of citizens in the preparation of the normative application document, with the exception of groups of economic power, whose interests are organically incorporated into the instruments.

The regulatory product is reduced to a document that must be applied by individuals, according to the criteria of the responsible local





**Figure 2.** Above: Land uses and type of establishments. Own elaboration based on data from the Alcaldía de Ibagué (2014). Bottom: Population and land use of establishments. Own elaboration based on data from the Alcaldía de Ibagué (2014, 2019b, d).

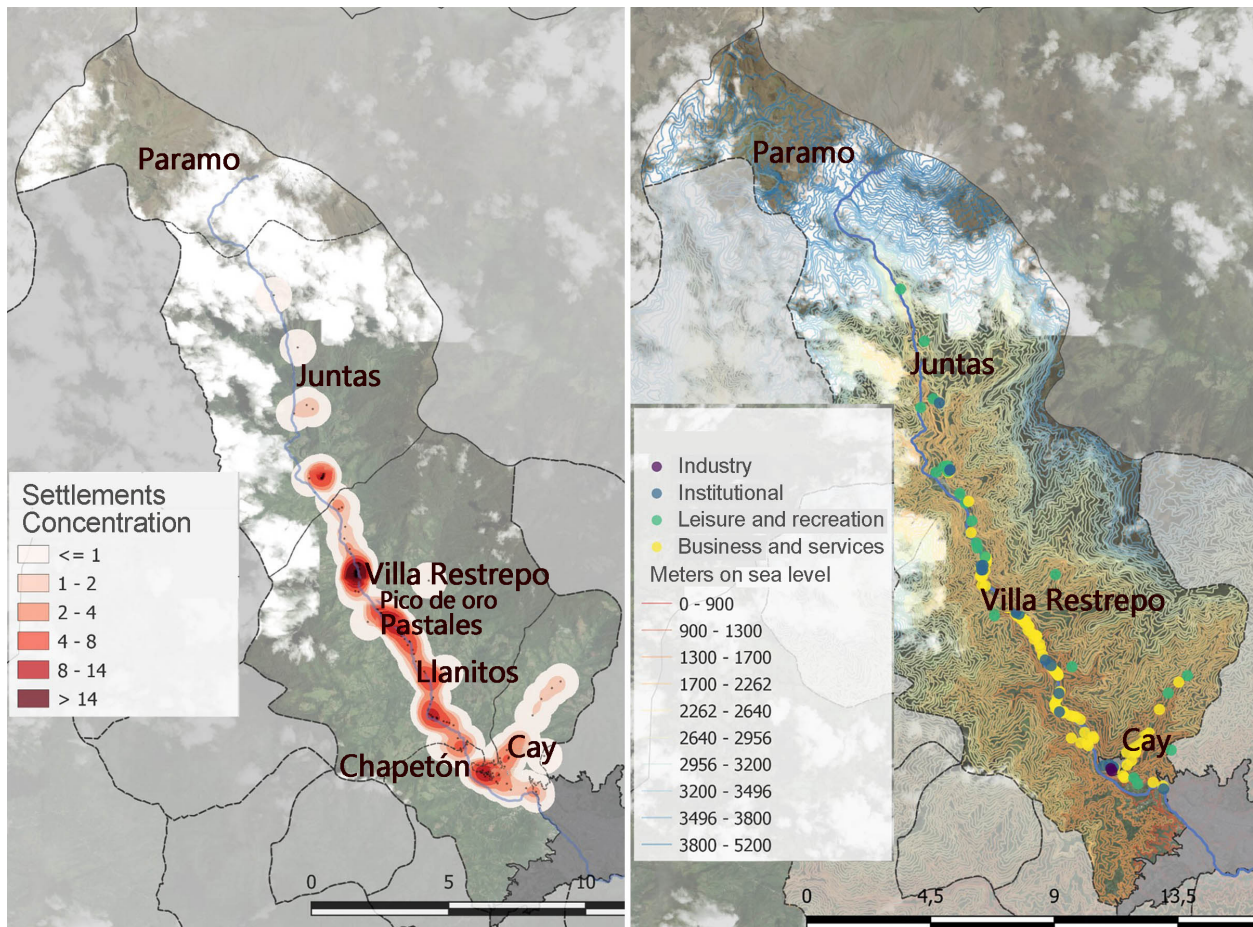
office, without any follow-up of the consistency between reality and the plan. Consequently, it responds to the political logic of administrators and not to citizenship. Therefore, it is possible to determine a low application of current territorial planning approaches, which are characterized by the existence of citizen participation, realistic analysis of the situation, recognition of local actors and strengthening of appropriation exercises.

**Institutionality**

A disinterested territorial ordering is observed, reflected in the absence of minimum contents conceived in the Colombian legal framework, such as diagnosis, technical support for

decision-making and the absence of norms and provisions that allow verifying if there is adequate use of rural land. and compliance with the proposed occupation model. It should also be mentioned that the minimum normative foundations of the Colombian territorial ordering were not complied with, which contributes to the development of interventions that go against the adequate development of rural land according to the national legal framework.

Faced with the perceptions of the citizenry, which should be a central element of the institutional framework, there is coherence between what is expressed by the population group surveyed and the occupation model of the POT. These convergences are found in what



**Figure 3. Left: Concentration of establishments. Own elaboration based on data from the Alcaldía de Ibagué (2012). Right: Elevation and types of establishments. Own elaboration based on data from the Alcaldía de Ibagué (2014).**

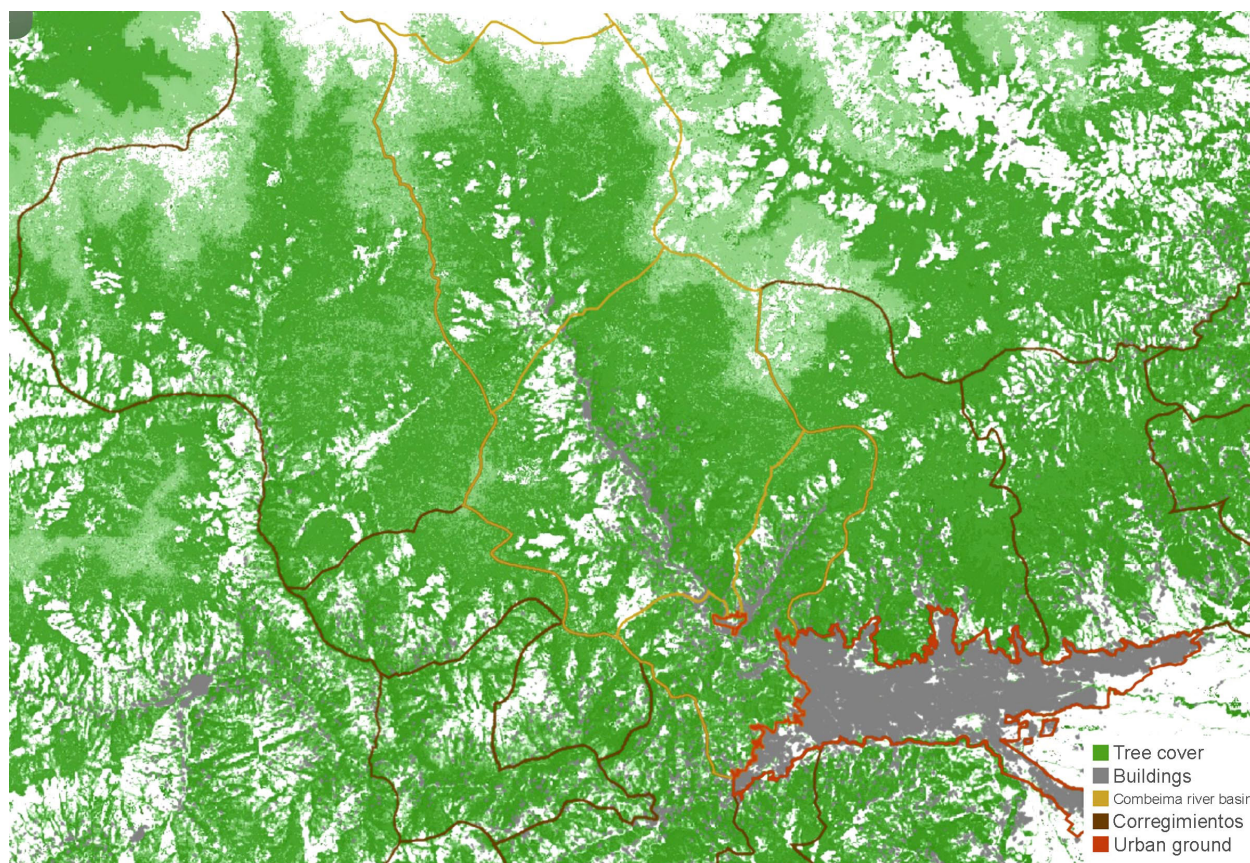
is considered important in the Combeima Canyon, such as risk management, investment in tourism and the protection of natural resources. However, the weakness of the implementation of the POT generates effects of indeterminacy of relevance in the infrastructural actions, due to procedural, legal, conceptual and institutional shortcomings.

**Urban analysis**

An incoherent territorial planning with the reality of the territory is conceived, since particular characteristics were identified that the morphology of the Combeima Canyon has that are not considered in the POT, because when carrying out the analysis of the characteristics

of the identified establishments, in terms of location, activity, land use, threat and risk, demonstrate some particular situations that the Combeima Canyon has and are not considered in the POT.

There is a concentration of infrastructure along the main highway parallel to the Combeima River on the townships of Villa Restrepo and Cay. These establishments mostly correspond to commerce and services such as restaurants, lodgings, dessert shops and cafeterias that are part of the tourist offer of the Combeima Canyon. 70% of the establishments identified present uncertainty regarding the risk management component.



**Figure 4. Buildings and tree cover.** Own elaboration based on data from the Alcaldía de Ibagué (2014). Link: <https://careyesbo.users.earthengine.app/view/cobertura-boscosa-y-edificaciones-combeima-ibague>

In the analysis of the territorial characteristics, in terms of land use, population and topography, there are situations contemplated in the POT, such as the predominance of the Combeima Canyon as an area of environmental importance in almost 90% of its total area. However, the population characteristics are not identified, which account for a population concentration in the villages of Villa Restrepo and Cay. Nor are the obvious geomorphological characteristics of the topography of the Combeima Canyon determined, with unique specifications in height differences above sea level that ascend from the Combeima River Basin to the adjoining mountains that reach their highest point in the Nevado del Tolima.

## CONCLUSIONS

The Combeima Canyon requires a different form of land use planning, like other rural soils in the region and the country. This new paradigm needs the political will to resolve the evident institutional disinterest and citizen power to demand attention to the needs of the 6,000 people who inhabit the place, in addition to the articulation with the dynamics of the thousands of tourists.

Faced with current trends, at the local level, land use planning must be understood as a planning-process, which is not limited to setting the development of the POT as a framework for action, but rather a set of actions over time to achieve an objective. wanted. This territorial

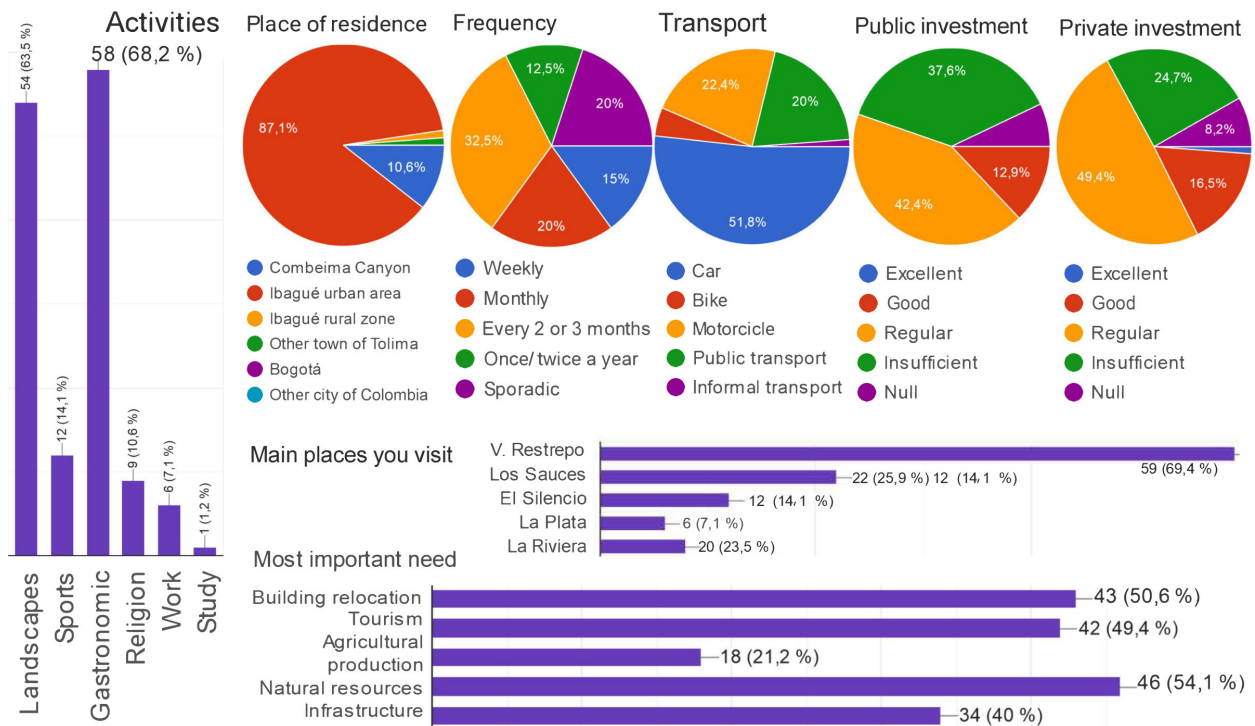


Figure 5. Survey graphs. Own elaboration.

planning must take seriously the principles of Law 388 of 1997, to be inclusive, equal and fair.

It must be integrated with the use of geographic information systems to generate inputs consistent with the reality of the territory, an environmental characterization exercise must also be carried out, focused on knowing the landscape value of the Combeima Canyon that allows reflecting its predominance over economic interests.

Given the scope of actions that can be carried out within the procedural and legal framework, it is recommended that an intermediate regulatory planning instrument be prepared for the POT, such as the Rural Planning Unit, which includes within its provisions the areas identified as priority. According to the data collected, the corregimientos of Villa Restrepo and Cay are urgent.

This instrument should focus on the specification of the occupation model proposed by the POT, having as a priority the risk

management component and a comprehensive urban planning standard to incorporate the results of the existing detailed studies as urban planning decisions, to be carried out in the shortest possible time. the detailed studies of the high threat areas that do not yet have them and issue the missing standard in the populated centers.

In short, the local rural land use planning for the Combeima Canyon must make up for lost time. It is necessary to formulate a planning instrument with a diagnosis, comprehensive urban regulations, programs, projects, management and financing instruments and other elements that will allow in the future, to carry out analyzes of them and recommendations for an adequate development of the territory.

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**CERGIO ANDRÉS REYES-BONILLA<sup>1</sup>**

<https://orcid.org/0000-0002-8700-5802>

**ANDRÉS ERNESTO FRANCEL-DELGADO<sup>2</sup>**

<https://orcid.org/0000-0002-3249-3191>

<sup>1</sup>Maestría en Urbanismo, Universidad del Tolima, Facultad de Ciencias del Hábitat, Diseño e Infraestructura, grupo de investigación Historia, Arquitectura, Urbanismo y Diseño, Campus de Santa Helena, Cl 42 1-02, Ibagué, Tolima, Colombia

<sup>2</sup>Universidad del Tolima, Facultad de Ciencias del Hábitat, Diseño e Infraestructura, grupo de investigación Historia, Arquitectura, Urbanismo y Diseño, Campus de Santa Helena, Cl 42 1-02, Ibagué, Tolima, Colombia

Correspondence to: **Andrés Ernesto Francel-Delgado**

E-mail: [aefranceld@ut.edu.co](mailto:aefranceld@ut.edu.co)

**Author contributions**

Cergio Reyes proposed the research, designed the instruments and Andrés Francel advised the process of design, implementation, and data interpretation. Both contributed equally to the writing of the article.

