

# CHARACTERISATION OF THE BIOLOGICAL CORRIDOR OF THE SPOUT SURIA IN VILLAVICENCIO, A SOCIAL AND ENVIRONMENTAL VISION

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## SUMMARY

The environmental economics and its neoclassical orientation requires a series of limitations at the time of perform valuations both social and environmental, since it is limited only to represent monetarily impacts caused, but not tends to minimize them from the source, that is to say, that lacks the tools to lead the awareness toward a theory of the agents involved, why go to microeconomic theories such as the consumer surplus or theories of the replacement that converts the economic argument in little less than a discussion poaching. The submitted project is a proposed assessment understandable and, above all, workable, through a first characterization exercise of a biological corridor, for from then on be internalised the social and environmental problem.

For the specific case of the research is determined that the Cano Suria is going through this situation, in addition, the demand for land has disrupted the actual values, and lack of environmental controls threatens the sustainability of the gallery forests own of biological corridors, breaking the chain of balance of nature, giving way to different economic activities in search of a monetary welfare, but at the expense of a public good.

Key Words: Sustainable Development, biological corridors, land-use plan, resilience, phenomena of growth and population movement.

## **CHARACTERIZATION OF BIOLOGICAL CORRIDOR IN SPOUT Suria VILLAVICENCIO, SOCIAL AND ENVIRONMENTAL VISION**

### **ABSTRACT**

The neoclassic styles orientation of the Environmental Economy you have some limitations in order to do social and environmental valuations, because it limits only to represent monetary impacts caused, but not try to minimize on the source. It means that kind of valuation has not instruments for to allow driving the theory to create pointed out the participant agents. That is why this part of the economic science asks for help to other tools, like theories. . For example consumer surplus or substitution theories, that transforms the economics argumentation in a furtive allegation. This paper is a project to value, intelligible and overall, viable, through to the first exercise for characterization of a biological corridor, in order to understand the social and environmental problem.

Fort the specific research case, it is defined the 'cano Suria', to stream presents this situation, even more, demand for lands had affected the real values, and for lack of environmental controls, the gallery forest sustainability had been affected. That situation cut the nature equilibrium chain, which allow different economic activities, because the agents are looking for monetary welfare in detriment of the public goods. Keywords: Sustainable Development, biological Bevanâ€™S work focuses, Territorial Regulating Plan, Resilience, growth and population movement.

## 1. INTRODUCTION

The growth and development of Villavicencio has been accompanied by speculative movements around the value of the land, a situation that has led in recent years pressures that are reflected in the increase in price due to the higher demand, in turn, this has been done to encroach into spaces that undertake environmental sustainability mainly due to the lack of environmental controls that allow the owners of the land invade spaces that are own of the Africans and ravines. In this order of ideas, the incorrect handling of the public goods by individuals has broken the chain of resilience of nature itself, which has caused concern on the part of the environmental authorities of the municipality to be implicit in the Land Management Plan under the following terms:

*Within the areas of forest protective activity - producer are defined as edges or green belts to the soil, which is assigned forest uses and fulfill the function to contain the pressure of urban expansion into the area of the piedmont and mountains, while integrating the ecosystems of the area with the rural of the urban area, generating a set of ecological corridors that will improve the environmental quality of the municipal territory. This structure must be articulated with the regional context taking as the axis allayed interceptors the watercourse and the respective round water rivers of the Ocoa, Guatiquia, Black and Guayuriba. In these edges or green belts will take into account the provisions enshrined in the Law 12 of 1982 in areas of agricultural reserve<sup>1</sup>.*

This situation is due to the fact that throughout the basins of fairways and rivers and in the middle of what was before considered gallery forest, currently prevail productive farms developed by owners or holders of estates, who are difficult to understand that riparian areas are public property, managed by private landowners.

Before the situation mentioned in the previous section, it is important to bear in mind that it is not possible grow beyond its natural borders, that is, pretending you reach beyond the limits of nature is impossible. Come into conflict with the natural balance is to go counter to the sustainability of the planet. Current production systems and the concept of economic efficiency have attempted to show how much is possible grow, but this has been at the expense of the environment and once upset the balance, the process in place to move forward will be braked.

More recently, the development of the city is increasingly respondent spaces with the purpose of converting them into places of recreation, leisure or simply sets or residential housing sites countryside that end up by pressing the use of urban land at the expense of the forests. On the other hand, the urban expansion has been incorporating new sites adjacent to the periphery, because of the proximity to the population center which in turn alters the relations of production and of consumption because many of these sites were dedicated to agricultural production, but to be absorbed by urban expansion are the subject of a different dynamic to the extent that prices already do not obey to the logic of production capacity, but the expectations of recovery as urban spaces of room. These new trends are directly related to the deficiency in the actions of government policies, be they economic, environmental or how they want to call.

Phenomena of growth and population movement are generated with these new trends, in this regard Wilson picking up to Steve Vosti:

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<sup>1</sup> Decree 353 of 2000, mayor of Villavicencio, land-use plan (POT), article 194.

There is an important distinction between population growth and population movement. Policies should be examined to see if you are inducing migration of large numbers of people toward areas where the load capacity is the lowest - i.e. the areas that have less capacity to sustain large amounts of people <sup>2</sup>

Any political action that has serious implications in all economic and social lines, so a policy approach focused on population movement can have a direct impact on the natural base of an ecosystem.

By the aspects mentioned above, this research proposal aims to make a characterization of the biological corridor of the Cano Suria in Villavicencio, through a social and environmental vision. This study of characterization will allow private agents and the government understand the problem, so that the results will motivate rational use environmental resources.

### **APPROACH TO THE PROBLEM**

What is the current status of the biological corridor of the Cano Suria to infer from there a conclusion to the municipality of Villavicencio?

### **DESCRIPTION OF THE PROBLEM**

A biological corridor is that floor space that allows restore the balance of nature through the flow of matter and energy thus allowing the creation of the necessary conditions for life are preserved, retain and be renewed in their wild environment, plant and animal. In the case of Villavicencio, has to be in accordance with the land-use plan (POT) have been established a few biological corridors in the round water rivers of the Ocoa, Guatiquia, Black and Guayuriba. This Plan, in its article 194 expresses:

*The Edge or green belt is located on the northwest side of the track to Acacia, as expressed in the plane No. 5, Support System and Urban Environment in the plane No. 2, Environmental Support System of the Municipality. Presents two distinct sectors: the first of them has an average width of three hundred (300) meters and extends from the left margin of the river Guayuriba until the right margin of the Ocoa river and from the dimension 500 m.a.s.l. upwards; the second sector has an average width of five hundred (500) meters and extends from the left margin of the Ocoa river up to the right margin of the Guatiquia river, and is neighbored by the track to Acacias, soils suburban, urban and urban expansion in the western edge of the city " <sup>3</sup>*

At present the biological corridors, specifically the Cano Suria to be taken as a reference for the present investigation, are not being controlled which has led to problems related to a high rate of extraction of biotic material, both animals and plants, whose result is the depletion of the forest, by the owners of surrounding areas.

In addition to the foregoing, in the case of the rural sectors of the municipality of Villavicencio, agricultural activities, and tourist now, have been pushed to a new sector of owners, to marginal lands where their efforts have been mainly focused toward small crops and especially to livestock production systems. This type of exploitation has been invading the beds of the Africans, whose protective vegetation has been cleared to expand the pastures, to convert las vegas in pastures

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<sup>2</sup> WILSON, Ellen. The population explosion what the numbers mean? The unfinished agenda. Washington, D.C. 2002. Pg 58

<sup>3</sup> Article 194 of the decree 353 of 2000, on the adoption of the land-use plan of Villavicencio.

and in the summer season arrive until completely dry the sources. Such is the case of the Cano Suria.

Initially, the animal husbandry is practiced with landraces resistant but the activity has been transformed with the inclusion of best breeds but more demanding in terms of care and types of grass by what las vegas became areas very appreciated due to their higher levels of fertility in the Llanos Orientales characterized by the heavy soils and the high concentration of aluminum.

In fact, before the decade of the eighties and together with the potrerización launched since 1930 with the herds were rustic animals and without oriented practical genetic improvement, which only took advantage of the gleanings which at that time had the soil, but the exhausted the available areas the agricultural frontier and livestock was extended through the practice of deforestation.

Other phenomena such as drug trafficking and the oil bonanza have originated new waves of owners who see in the real estate that additional gain own of recovery. Sanchez (2009), presented in the following terms:

*From 1980 onwards, with the rise of the coca crops, the presence of armed groups and the invasion of capital from the drug trafficking, deeply impacted in the traditional productive structure of Orinoquía. The acquisition of farms was intended primarily to their recovery and extensive livestock farming as its sole activity. It is toward the year 2000 when the region enters through an accelerated process of changes in land use and ownership of: technologically advanced commercial crops, oil exploration and exploitation<sup>4</sup>.*

Changes in ecosystems affect biodiversity and this also in turn charges them productive activities that may arise by the use of the soil, so that Castro raises:

*Also, the alarming deterioration of ecosystems, the exploitation of resources, pollution of the natural resources, the reduction of biodiversity, incite to the analysis of the role that the productive activities and extractive of peasants - indigenous or mestizo - on the delicate balances of nature. This is not a background, it is not only the landscape surrounding the lives of rural societies; it is also, and above all, its base of support material and the emotional space of their daily lives<sup>5</sup>.*

The response of nature has been manifested in the variation of the rainfall regime, in the reduction of the flow of the rivers, in the decrease in precipitation and in all the events that currently fall into the generic name of climate change. That is why it is necessary to propose a valuation that transcends the financial analysis because they have to consider the implications of these effects on generations present and, above all, in the future, mainly due to the involvement of the different environmental services that provides this biological corridor.

On the other hand has to be the demand for land near Villavicencio has been increasing due mainly to the boom in the construction industry what has pressed the use of the soil so that the phenomenon of use of the land passes through the environmental barriers that already by the need for spaces for the construction of houses of rural-type, and especially for urban projects, is also urging the margin of the rivers, wetlands and streams, which dramatically reduces the habitat of

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<sup>4</sup> SANCHEZ, Hayran. The knowledge and traditional use of biological diversity in the Colombian Orinoquia. Biological Diversity strategic resource for sustainable development. Villavicencio: Universidad de los Llanos, 2009 p. 15.

<sup>5</sup> CASTRO, Pérez Francisco. Environmental collapses-cultural transitions. National Autonomous University of Mexico. 2006. P. 20

different species, pushes the biological corridors until in some cases reach its desertification, without counting the sedimentation of the beds whose devastating effects are felt with particular force in the floods that happened Colombia at the end of 2010, although the study region was less beaten than the rest of the country.

## **2. MATERIALS AND METHODS**

The available literature was reviewed and it was concluded that the economic valuation of environmental and social projects of this type is something that is to build, so that what is done in this project will be a contribution in the search for new forms of assessment.

It was initially reviewed the recent literature on the valuation of natural resources and although already showing in the theoretical framework some evidence of the major trends, a revision is required more accurate on everything that has to do with the timely assessment of each of the existing resources in the area of study. In this regard, will be reviewed studies conducted at the University of Los Llanos and other sources, such as the Autonomous Regional Corporation Cormacarena and land-use plan, as well as established in Law 99 of 1993 and other standards related to the conservation of the environment.

The research is empirical and contains quantitative and qualitative information because one of the aspects that were clear from the outset is that some elements are not assessable from the economic point of view, understood this as assigning a value to each and every one of the components of an ecosystem, which does not mean that we should not be assigned a qualitative value.

On the other hand, it is important to clarify that the term biological corridor, in the context of the present work, involves leaving a strip of land on either side of the Cano Suria, so that a way to evaluate financially approximate the cost of conservation is value at market prices updated the strip of land that will be subtracted for this effect.

The study was conducted through interviews with the actors involved in the site who made an interview with recorded depth of traditional landowners who described the evolution that has taken the Cano Suria in terms of fauna, flora, average flow, external appearance of the landscape, usages, customs, and easements, rainfall, and, in general information that may i know the transformation that has suffered the environment object of study.

The research that developed was qualitative empirical type, because it was obtained directly the motivations, attitudes, and behaviors of the individuals who are immersed in the problematic and through the inquiry and observation allowed a collation of results that is complemented with each of the exercises of development either with the interview or questionnaire .

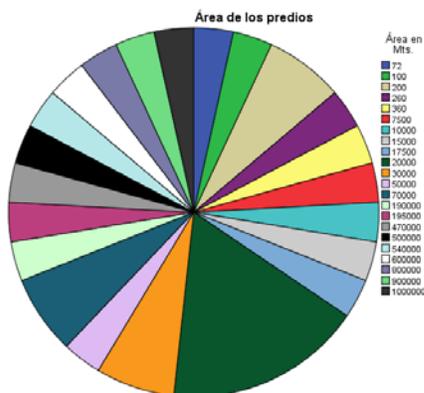
## **3. RESULTS**

In this section show the results of the field work in the area of the Cano. Initially contains a description of the general physical as well as other aspects related to the possession and customs around the source that provides information about cultural practices related to the environment.

In the first place, is to clarify that they were surveyed and visited a total of 29 farms in the area of the Cano Suria, which corresponds to more than 80% of the farms as verification that was made by the research group.

The sample is quite heterogenous as can be seen in the chart below shows the surface of each venue.

**Figure 1. Area of the premises**



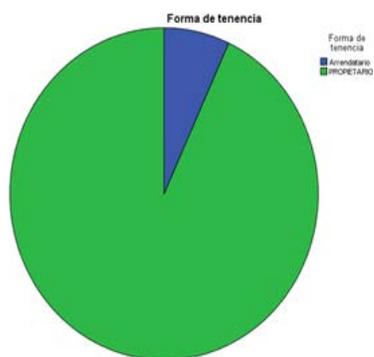
Source: own calculations from surveys

First of all it is necessary to make a methodological clarification. As well as throughout the Cano there are a variety of extensions quite scattered, some sites were related in square meters but others, by its extension, in hectares. As well, to put everything in a homogeneous and comparable measure multiplied by 10 000 hectares, so that all the extensions appear in square meters.

As can be seen, the areas range from less than 100 m<sup>2</sup> to 100 hectares in the context of the estates of the Cano constitute a great extension. The sites are so small spas located on the shores of the Cano, but extensions are more productive farms. In general terms the farms predominate medium whose average size is around 18 hectares, although a high proportion of small farms they skew the average down, although there are also farms of 50, 80 and up to 100 hectares as mentioned above.

On the other hand, figure 2 presents the proportion between owners and tenants that constitute the only forms of tenure present in the area.

**Figure 2. A form of land tenure**



Source: own calculations from surveys

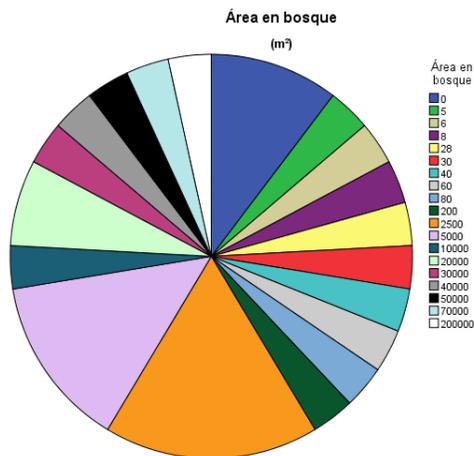
The figure shows that the property is the dominant form of tenure in the area, with a small proportion of tenants, which largely explains the sense of belonging that show the inhabitants with their sites, which can also be seen in the chart below shows the antiquity of the properties.

**Figure 3. Age of the Premises**

Source: own calculations from surveys

The study of characterization resulted in the area of forest is directly related to the size of the plots, it being understood that if a venue has a greater amount of land, this traps a proportionately greater amount of forest, but there are some irregularities directly related to the deforestation of the area and that a farm may be more extensive than others and still not have forest. The following figure shows the area in forests of the predios.

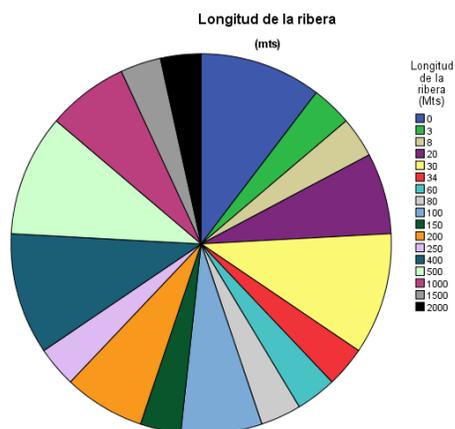
**Figure 4. Forrest Area**



Source: own calculations from surveys

As can be seen, and it was predictable, the areas in the forest is very diverse what is explained by the extension of the farms which explains that the area in forest has a range so wide that goes from 5 meters up to two hectares. Likewise with the length of the Cano (riverfront) measured in linear meters, although it is important to emphasize that there isn't always a direct relationship between the amount of wooded area with meters of Ribera del Cano and this is because of the deforestation was presented in the past. The chart shows the length of the shore.

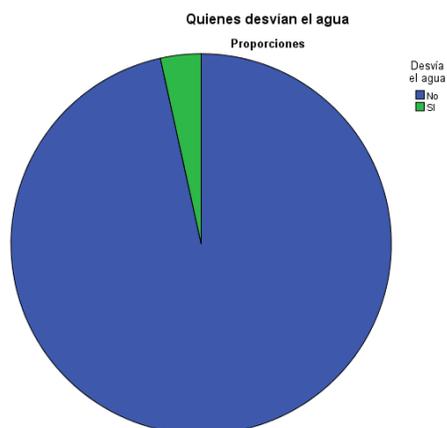
**Figure 5. Bank Length**



Source: own calculations from surveys

Also in this case, the length of the banks is diverse in proportion directly proportional to the portion of land that adjoins the Cano. In addition, the study shows that 3.4 % of the farms diverted the water from the Cano as shown in figure 6.

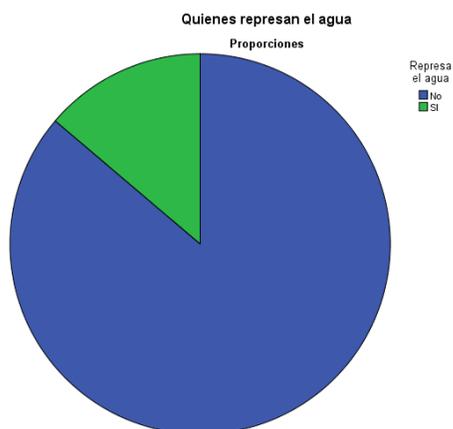
**Figure 6. Water Deviation**



Source: own calculations from surveys

It is very likely that the level of rainfall in Villavicencio do not need the diversion of the waters and that explains why also the impoundment level is low as shown in figure 7, where it has a 13.8 % dam the water.

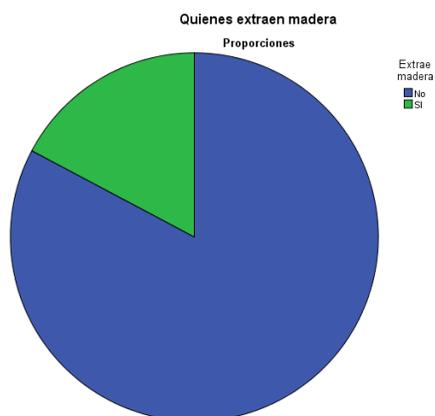
**Figure 7. Holds back runoff water**



Source: own calculations from surveys

As can be seen in the graph, the vast majority of the farms did not dam the water and also, for the case of the removal of wood is that this is mainly dry wood and which corresponds to 17.2 %.

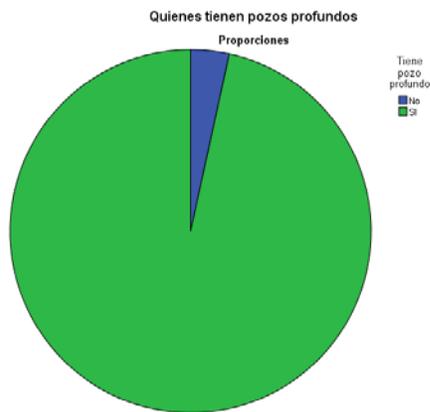
**Figure 8. Timber extraction**



Source: own calculations from surveys

Finally, in the case of the study 96.6 % of the sites have and use the cistern as a means of obtaining water for the water supply of the venue, which does not cease to mean that the water of the Cano Suria is not used for other activities in financial and some spas, or as a waterhole for cattle breeding both as milk, or simply for watering plants or other small crops of the area themselves.

**Figure 9. Deep Pit**



Source: own calculations from surveys

#### 4. DISCUSSION

In general terms the farms predominate medium whose average size is around 18 hectares.

The property is the dominant form of tenure, with a small proportion of tenants.

The average time of ownership is in 20 years, allowing infer that there is no splitting of the land during the last decade.

The area of forest is directly related to the size of the plots.

There is no direct relationship between the area of forest with the meters of Ribera del Cano, because some of these areas are far from the shore.

There is very little deviation from the channel of the Cano for part of the farms, which allows us to infer that there is no affectation of the water flow in the different times of the year.

There may be an affectation of the dammed water flow of water in a small portion of farms.

The removal of wood is dry wood for their own use, determined that there is no economic activity from the sale of this well.

The water for family use in the sector of the Cano Suria comes from wells.

The Cano Suria is not being contaminated by wastewater, because all of the sites have septic tank.

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