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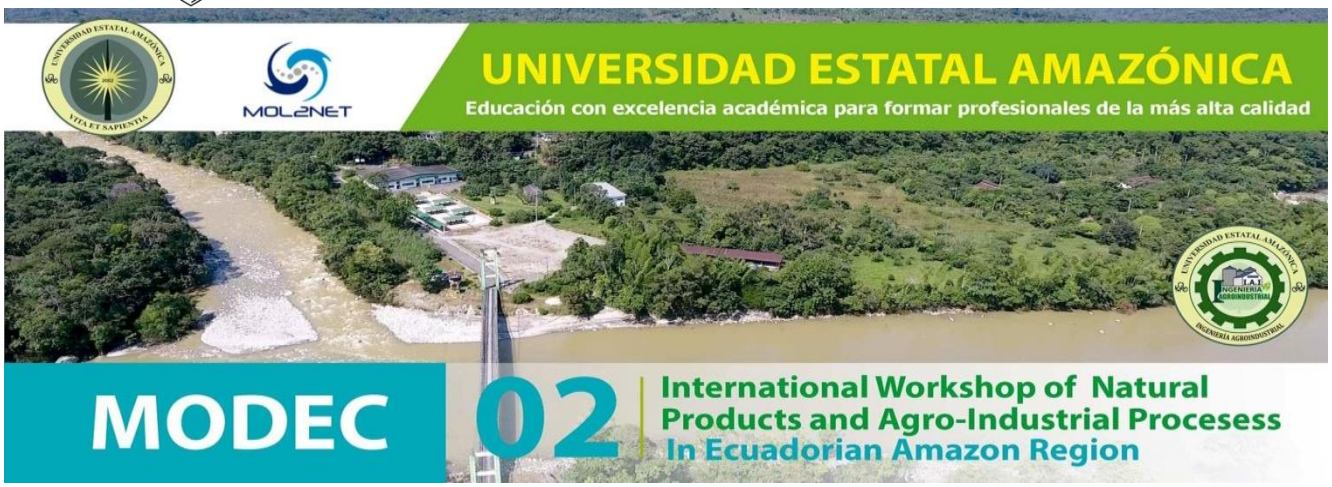

Strategic diagnosis of the local development environmental system in rural communities of the colonized Amazonian Kichwa territory

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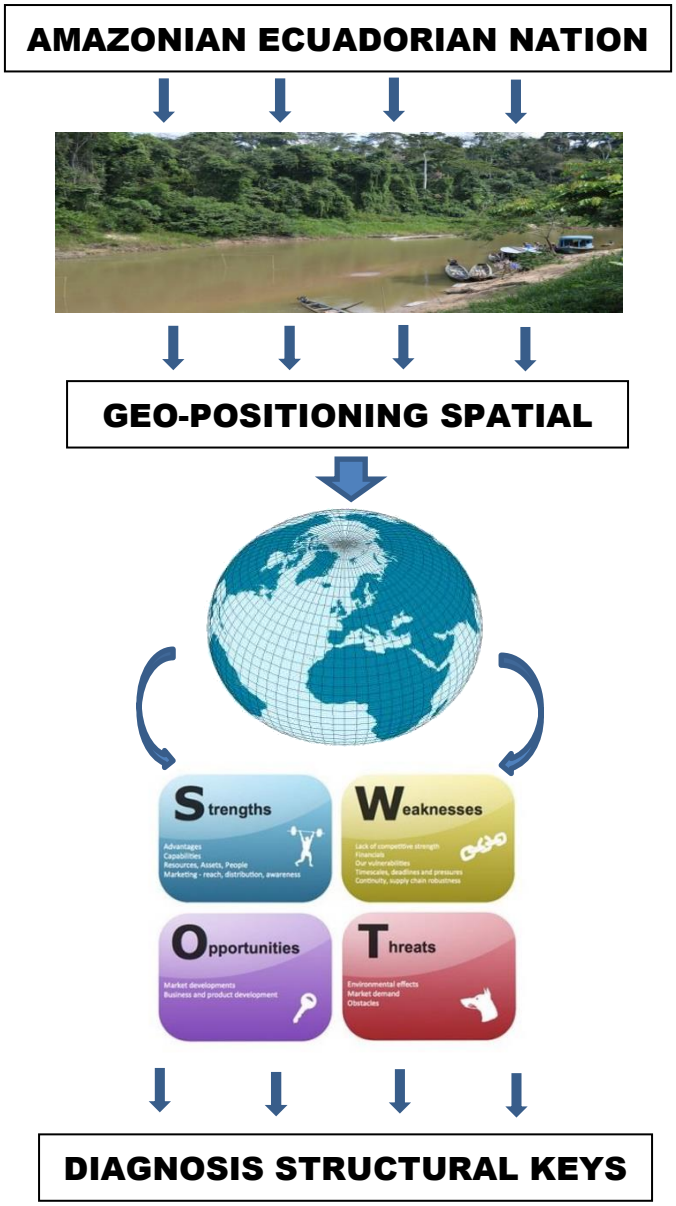
Graphical Abstract



Abstract.

With the Geographic Information Systems methods (GIS), the occupation of the environmental system is diagnosed using communities' geo-positioning, spatial relationships analysis and cartographic representation. This is the sustainable local development basis in six rural communities in the ancestral territory of the original Kichwa Amazonian Ecuadorian nation, from Tzawata, at Northeast; until Veinticuatro de Mayo at Southwest, located in the low, middle and high levels of the Anzu River valley. The fieldwork includes interviews, surveys, discussion events, as well as the communities' 64 surveyed households georeferencing, and maps with official entities public data, available in the National Information System, the geo Ecuadorian state portal of open access to national reference cartography and the National Institute of Statistics and Census. The information collected allows the structural keys based establishment on the strengths and weaknesses that are faced, and short-term keys based on perceived opportunities and threats, which are summarized for the whole study area as an internal and external analysis. It is considered that the structural generalization and short-term keys from the strategic diagnosis does not mean that the impacts and responses are common to all the communities, which is evident in the differences reported in the surveys variables analyzed.

Introduction

In the world, indigenous peoples have lived on the products of nature, many of them migrate when the area resources are exhausted, until the natural environment is regenerated and can be used again. The indigenous peoples life systems are altered by processes related to development, political decisions, exploitation of natural resources, mining, urbanization, modernization, infrastructure development, climate change and global warming (Climate Frontlines, 2013; FAO, 2013; Salick & Anja, 2007; Nakashima et al, 2012; Dublin & Tanaka, 2014).

In the Ecuadorian Amazonian region live eleven original nations with history, language, tradition, territory and origin prior to the conformation of the national State and the Spanish and Inca conquests. The indigenous nation concept does not threaten the Ecuadorian plurinational republic unity as declared by the Confederation of Indigenous Nationalities of the Ecuadorian Amazon (Confeniae) and it is a synonymous with indigenous nationality or indigenous people (Bartolomé, 2010; Héctor, 2012; CONFENIAE, 2013).

While countries with high biodiversity and external organizational support incursion into ecotourism, scientific research, agroforestry, extraction and processing of forest products, in the Ecuadorian Amazon region efforts to find alternative incomes are scarce and dispersed and rural non-agricultural employment possibilities depend on education, infrastructure and investment (Vasco et al., 2013). In the rural communities settled in the colonized territory of the original Kichwa nation of the Ecuadorian Amazon, there is weakness for the economic and social use of the Amazonian diversity that can be strategic in the approach of sustainable local development, for which the research question is raised: What resources and natural, historical, social and economic conditions should be considered as local potentialities (opportunities) for sustainable development in rural communities settled in the Kichwa territory colonized in the Anzu River valley, in the Ecuadorian Amazon; What are its weaknesses, threats, strengths and weaknesses? Consequently, this work aims to diagnose the environmental system of sustainable local development in rural communities of the colonized Amazonian Kichwa territory.

Materials and Methods

Were used Geographical Information Systems methods (GIS) to capture the communities' geo-positioning under study, store data, analyze spatial relationships and map the research using ArcGIS software version 10.0, from the Environmental System Research Institute (ESRI). The maps were elaborated with the information obtained in the field by georeferencing communities and households surveyed, and with the official entities public data, available in the National Information System (SNI), the Ecuadorian state portal of open access to the national reference cartography (Instituto Geografico Militar (IGM), 2011, 2013 and National Institute of Statistics and Census (INEC, 2011).

Six communities located in the ancestral territory of the original Ecuadorian Amazon Kichwa nation were studied, from Tzawata, to the Northeast; until Veinticuatro de mayo to the Southwest, located in the low, middle and high levels of the Anzu River valley (figure 1); the communities were settled since the end of the 19th century and come from the province of Napo, excepted Union de Llandia, with a larger population of migrant farmers from the Interandina region, as a result of the colonization process of the 1960s. They are rural communities, representative of a common origin and express a vulnerability gap in relation to the initiatives of development carried out by the Decentralized Autonomous Governments (GAD) and the national planning units.

Based on variables analyzed in the surveys applied to families in the communities, interviews with community leaders and discussion events, structural and circumstantial clues are generalized in the environmental system strategic diagnosis. The structural keys correspond to the strengths and weaknesses observed while the circumstantial ones refer to the perceived opportunities and threats.

Results and Discussion

Table 1 presents the synthesis of the strategic diagnosis of the environmental system, with the structural and circumstantial keys that define the current territorial model. However, it is necessary to emphasize that the generalization of these keys does not mean that the impacts and responses are common to all the communities, which is evident in the differences reported in the variables analyzed in the surveys.

The role assigned to the Ecuadorian Amazon as a resource extraction territory, colonization and legal ownership of ancestral territory are conflicts that generate permanent tension (San Sebastián et al. 2003; Zulay, 2008; Iturralde, 2013; Vallejo, 2014). It is considered key for the communities of the area and for the region to promote sustainable development (Hidalgo, 2011; Gudynas, 2011; Gaona, 2013).

Table 1. Strategic diagnosis of the environmental system.

Structural keys	
Strengths	**Weaknesses**
Key position in the ancestral Kichwa territory close to service axes. Vegetable cover compatible with the conservation vocation assigned. Richness of landscapes, biodiversity and associated knowledge of species uses, fine and soft woods, fibers, medicinal plants, food, rituals, cosmetics, wild animals and natural fishing. Red roads do not reach all communities that allows not to multiply the ambition of colonizing possession over the territory.	Lack of legality and there is uncertainty about the access scope, travel and use of the ancestral territory. Market pressure on ecosystems and resource. Weak use of existing resources in landscapes and biodiversity. Legal and illegal mining incursion. In an area of increasing monetary income requirement, there is no cultural experience in trading possibilities, nor is there smooth access to a road system.
Circumstantial keys	
Threats	**Opportunities**
Degradation of existing landscapes and resources, due to pollution. Extinction of species by overuse, misuse, natural climate change and associated polluting operations.	Declaration of sustainability axes and change of production matrix in national development plans for good living. Worldwide concern for the conservation of biodiversity.

Source: Prepared by the authors based on the variables analyzed in the surveys.

The installation of the roads facilitated the colonization that displaced the communities, caused the loss of the domain of the communities of their ancestral territories and determined the disuse of the waterways that served until then as the main means of communication to the native nations. As a result, the communities also lost control and visibility in the valley of the Anzu River. The highway from Ambato to Puyo was inaugurated in 1947, facilitating colonization with those displaced by the 1949 Ambato earthquake. The road between Puyo and Tena reached the middle of the road - Santa Clara- in 1964 (PDOT, 2012). The rivers decreased their flow because they were used to supply the growing cities.

It is remarkable that the Kichwa culture is current in the communities near the growing Amazonian cities. The original communities maintain their treatment systems of the environment, farms, and cultural ceremonies of healing and show their evidence of possession and transit in the ancestral territories through the petroglyphs (Dahua, 2013). Also, the settlers peasants who live in the area have contributed with their cultural traditions brought from diverse origins (Dall'Alba, 1992).

However, a contradictory and diffuse feeling about the current occupation of the soil by forests, crops and small populated areas was diagnosed, with an agricultural, recreational use and vocation for the biodiversity conservation, facing a threatening perspective of occupation by companies mining, oil and lumber companies, given the business requests for concessions to the State, despite the fact that, in a general manner, the national development plans up to the period 2013-2017 and the National Development Plan 2017-2021 and the All Life Plan, reiterate the need of the Ecuadorian nation to move from an economy dependent on the unsustainable extraction of resources to an economy at the local level, that uses bio-knowledge to generate income that guarantees stable, just and dignified work, as well as to establish a solidary economic system and sustainable, based on human talent, that exceeds extractivism, that achieves full employment, greater productivity and democratization of the means of production and wealth (National Secretariat for Planning and Development (Senplades), 2013; 2017). In the discussion events, interviews and surveys reaffirms by leaders and residents the sustainable vocation

of the Amazonian territory and resources, through the use of bio-knowledge and the extractive rejection forms of resources without the prior informed consent of the communities.

Conclusions

The environmental system strategic diagnosis of sustainable local development in rural communities of the colonized Amazonian Kichwa territory, elaborated from the analyzed variables of the surveys, interviews and discussions in the participation events, reveals greater affiliation for the conservation and use of the resources of biodiversity and uncertainty about the probable future occupation by extractive companies. The generalization of the structural and circumstantial keys does not mean, however, that the impacts and responses are common to all the communities or families, which is evident in the differences reported in the variables analyzed in the survey.

The work in the rural Amazon must contribute from the local level with the perspectives of territorial ordering that value the comparative advantage of possession, use and occupation of the Amazonian space, compatible with the need of the Ecuadorian nation to transit from an economy dependent on extraction towards an economy at the local level that uses bio-knowledge to generate income that guarantees stable, fair and dignified work and the democratization of access to monetary economic resources based on the knowledge and work of the inhabitants in association with the decentralized autonomous governments and universities.

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