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Regional Wealth with Biodiversity and Socioeconomic Marginality

Riqueza Regional con Biodiversidad y Marginalidad Socioeconómica

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ABSTRACT

Purpose. Mexico is a country with a richness in biodiversity and a high level of Natural Capital throughout the territory; however, the highest concentration is distributed in regions where a population with high levels of marginalization and socioeconomic poverty lives.

Methodology. The characteristics of genetic resources and their sustainable use in conservation require the establishment of cross-cutting strategies in the design and implementation of comprehensive public policies focused on society and the diversity of territories and social needs.

Findings and originality. This reality highlights the relevance of identifying the main elements that characterize the Natural Capital in the environments, mainly in the South Pacific region due to its social and cultural importance. The originality of this document is the analysis of the socioeconomic and marginalization conditions of the population with the most incredible wealth in biodiversity and establish strategies that facilitate the conservation of genetic resources in tune with sustainable social and economic growth in the medium and long term.

RESUMEN

Propósito. México es un país con una riqueza en biodiversidad y alto nivel de Capital Natural a lo largo y ancho del territorio, no obstante, la mayor concentración de ésta se encuentra distribuida en territorios donde habita una población con altos niveles de marginación y pobreza socioeconómica.

Metodología. Las características de los recursos genéticos y su aprovechamiento sustentable en la conservación requieren establecer estrategias transversales en el diseño e implementación de políticas públicas integrales, focalizadas entre la sociedad y diversidad de territorios y necesidades sociales.

Hallazgos y originalidad. Esta realidad pone en evidencia la pertinencia de identificar cuáles son los principales elementos que caracterizan al Capital Natural en los territorios fundamentalmente en la región del Pacífico Sur por su importancia social y cultural. La originalidad de este documento se basa en analizar las condiciones socioeconómicas y de marginación que tiene la población que habita con mayores riquezas en biodiversidad y, establecer estrategias que faciliten la conservación de los recursos genéticos en sintonía con un crecimiento social y económico sostenible en el mediano y largo plazo.

1. Introduction

Biodiversity in Mexico is abundant thanks to its geography and diversity of flora, fauna, climates, and soils, among other factors present in the territories and their nature. According to the National Commission for the Knowledge and Use of Biodiversity (CONABIO), there are 23 groups of species (including bees, fish, birds, mammals, grasses, insects, etc.) that range from 5% to 94% as endemic to the country; In addition, the institution points out that “among amphibians and reptiles, where most of the species are small, more than 45% of the species are endemic. On the other hand, in birds with great dispersal capacity, only 11% of the species are endemic.” (CONABIO, 2020, p. 1).

1.1. Origin Denomination

On the other hand, the nation has Denominations of Origin that represent a potential reserve for development and growth in most of the territories (Model Rice, Yahualica Chile, Chiapas Coffee, Veracruz Coffee, Papantla Vanilla, Grijalva Cocoa, Habanero Chile, Mango Ataulfo, Tequila, Mezcal, Bacanora, Sotol, Charanda). However, this richness in biodiversity is generally distributed in territories with a population with high levels of marginalization and

poverty. In some cases, negative externalities may arise in the production processes of spirits, which generally require strategic actions for the reconversion or reuse of waste.

1.2. Wealth in Natural Capital

The country is considered a megadiverse in ecosystems, species, genetic diversity, flora, fauna, and agrobiodiversity. For this reason, it is very complex to establish indicators that identify the social and cultural value represented by the heritage of ecosystems that harbor the excellent potential for conservation of their characteristics and heterogeneity. However, substantial efforts have been made for the above, in such a way that a synthetic index called the Natural Capital Index (NCI) had been created that approximates the situation of aquatic and terrestrial biodiversity in the different agricultural and natural ecosystems (Czúcz et al., 2012)). This indicator is located at the municipal level for most of the 2,463 that currently exist in the country.

2. Methodology

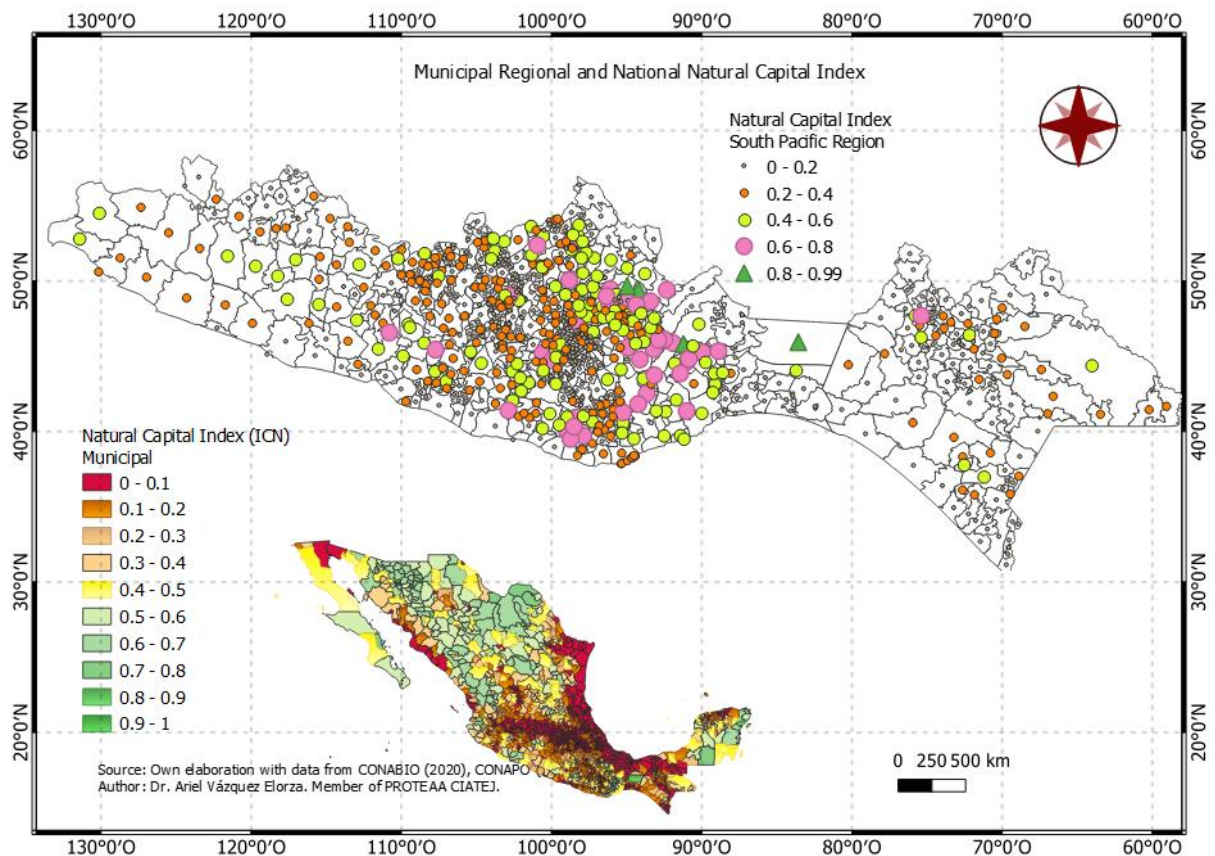
The structure of the original concept and implementations of the NCI is made up of aggregate biodiversity indicators proposed for widespread international application (Ten Brink, 2000; Ten Brink et al., 2003; CBD, 1997). The indicator construct is based on a direct and straightforward approach to the conceptual model: $NCI = \text{ecosystem quality} \times \text{ecosystem quantity}$ (Czúcz et al., 2012. p. 145). The measurement scale is between 0 and 1 (dimensionless), where the quality of 1 means an entire state, and a quantity of 1 means that natural ecosystems still occupy the whole study area. Czúcz et al. (2012) state that “if there is more than one distinct ecosystem (biome, habitat type, patch, etc., depending on the objectives of the study and the exact formulation of the indicator) in the target area with separate estimates of quantity and quality, then the INC changes.” Anthropogenic effects relate to the “relative amount of all anthropogenic areas within the study area that are excluded from the study (or, equivalently, that are considered to have quality 0” (Czúcz et al., 2012. p. 145).

Once the construct on the NCI indicator has been contextualized, relations between the territories will be made according to each of the municipalities' social and economic levels, fundamentally in the South Pacific region (Guerrero, Oaxaca, Chiapas).

3. Results

Figure 1 shows that unlike what could be considered in the South Pacific of the country, there were large extensions of territories with a high level of Natural Capital; these would correspond to the regions of the highlands, north central and north-east. With large wings and an NCI greater than 0.7 on average (this means ecosystems with an entire state). On the contrary, there are municipalities located in the Gulf of Mexico, Central, Pacific, among others, whose Natural Capital has been strongly violated by the anthropogenic effects of man. Although the state of Oaxaca and Chiapas are considered "sustainable" in the territory as a whole based on the general average of the NCI indicator (CONABIO, 2020b), the configuration changes completely when each municipality is analyzed in particular, in such a way that, localities highly affected by anthropogenic effects are observed.

Figure 1. Municipal National and Regional Natural Capital Index – South Pacific.



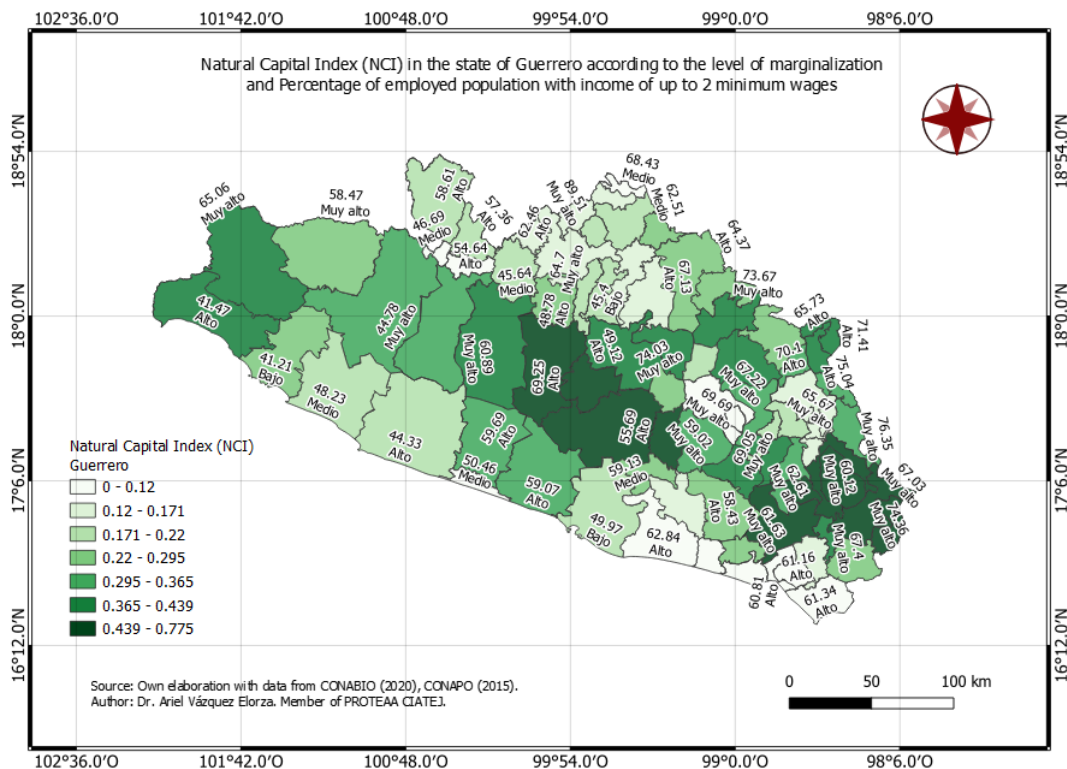
Source: Own elaboration based on information from CONABIO (2020b).

In the case of Guerrero, it is considered at "risk," and there are also municipalities with higher levels of risk or less sustainability.

Figure 2 relates the NCI according to the level of marginalization of the Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL, 2018) with the percentage level of the employed population with income of up to 2 minimum wages.

The results show a positive relationship between populations with high levels of biodiversity (Natural Capital) and high levels of social deprivation and income. Namely, the Pearson correlation with a p value=.01 (bilateral) is significantly positive between the NCI and Percentage of occupants in dwellings without electricity (0.354), Percentage of dwellings with some level of overcrowding (0.380), Percentage of occupants in dwellings with dirt floors (0.416) and marginalization index (0.322).

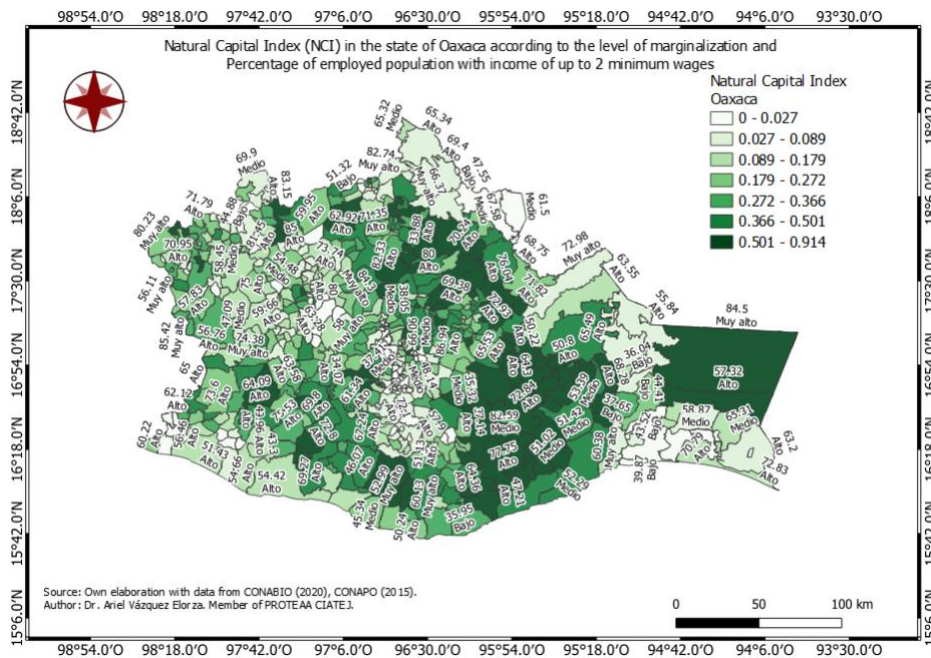
Figure 2. Natural Capital Index in Guerrero.



Source: Own elaboration based on information from CONABIO (2020b).

Figure 3 relates the NCI according to the level of marginalization and the percentage level of the employed population (incomes of up to 2 minimum wages in Oaxaca).

Figure 3. Natural Capital Index in Oaxaca.



Source: Own elaboration based on information from CONABIO (2020b).

The results show a positive relationship between populations with high levels of biodiversity (Natural Capital) and high levels of Percentage of population aged 15 or over illiterate (0.117) with a p-value = .01 (bilateral) statistically significant, in addition, it is related in the same direction with Percentage of the population aged 15 or over without completing elementary school (0.194), Percentage of occupants in dwellings without electricity (0.172) and Percentage of dwellings with some level of overcrowding (0.188).

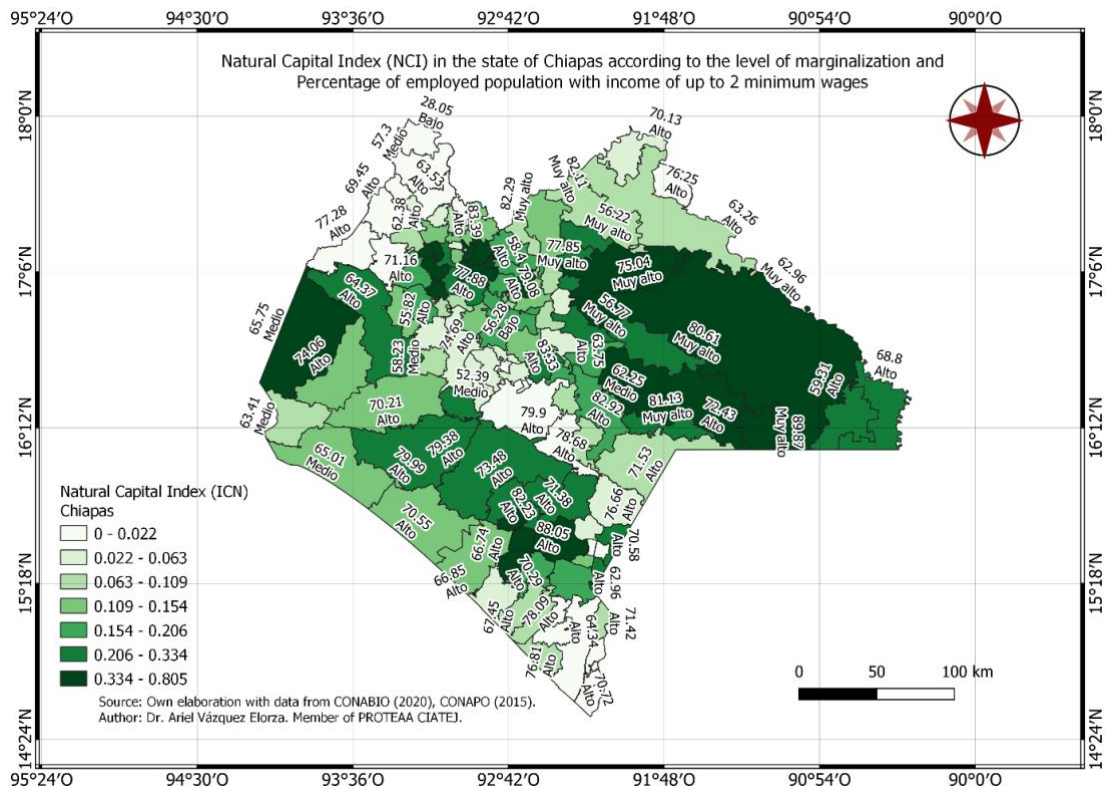
4. Discussion

On the contrary, the NCI is inversely negative with the total population (-0.121); as the population increases, the natural biodiversity in the entity is reduced. Likewise, in **Figure 4**, the Natural Capital increases and marginality also increases (from high to very high). In the same sense as Guerrero, the entity presents a latent risk due to natural loss in the medium and long term. It should not be forgotten that this state is characterized by an essential production of maguey agaves for the spirit drink of mezcal that, in recent years, has increased (whose genetic population of the wild plant is at risk due to constant over-exploitation).

Figure 4 shows a positive relationship between populations (with incomes of up to 2 minimum wages in Chiapas) with high levels of biodiversity (Natural Capital) and high levels of Percentage of population aged 15 or over illiterate (0.272) with a p-value = .01 (bilateral)

statistically significant, in addition, it is related in the same direction with Percentage of the population aged 15 or over without completing elementary school (0.331),

Figure 4. Natural Capital Index in Chiapas.



Source: Own elaboration based on information from CONABIO (2020b).

Percentage of occupants in dwellings without electricity (0.306) and Percentage of dwellings with some level of overcrowding (0.321). On the contrary, the NCI is inversely negative with the total population (-0.032), which is clear that, as the population increases, the natural biodiversity in the entity decreases.

5. Conclusion

The South Pacific concentrates the wealth of Natural Capital with great potential to increase conservation in agrobiodiversity; however, on the contrary, it also inhabits a population with high levels of social deprivation.

Theoretical implications. It is necessary to establish strategic planning in the design and implementation of public policies by participation and governance among the actors of the South Pacific communities, considering attending each of the territorial priority needs in the

medium term. Likewise, it is imperative to conserve biodiversity and ecosystems due to the latent risk of anthropogenic effects and the exploitation of natural resources and genetic wealth. Government actions to protect biodiversity in the main marginalized territories with high poverty levels need to be based on a logic of transversality and multidisciplinary that attends to the different needs of rural families. In addition to the above, it is necessary to increase wages, food security, social services, and added value to those products and derivatives in a sustainable manner.

Practical implications. It is essential to recognize that in the majority of indigenous and rural peoples, it is necessary to establish a national system for the protection of ancestral knowledge and activities to preserve and conserve genetic resources, traditional knowledge, and the system of appropriation of community knowledge as a social and intangible value of Mexican people.

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