

Review of: "Unlocking Natural Capital in the Megadiverse Colombian Pacific Basin: Navigating Challenges and Governance Gaps"

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Potential competing interests: No potential competing interests to declare.

Revision manuscript: Unlocking Natural Capital in the Megadiverse Colombian Pacific Basin: Navigating Challenges and Governance Gaps

Major points

In broad terms, this is a highly interesting and crucial topic that warrants attention in scientific literature. As the authors emphasize, this marks the initial attempt at evaluating ecosystem services for the Pacific region of Colombia. It is evident the substantial effort invested in compiling this intricate manuscript, illustrating the challenges in aligning the sparse information on ecosystem services with the appropriate ecological and geographic scales. In that sense, the paper is not only pioneering but also ambitious, not just due to the expansive geographic scale of the study but also owing to its transdisciplinary nature.

In my view, it is this latter aspect that gives rise to most of the conflicting points in this submitted version of the manuscript, requiring a couple of rounds of editorial work to harmonize the different aspects covered in the integrated manner the authors desire.

While the paper is conceptually strong in its economic components, it becomes notably weak, superficial, or vague, and at times even confusing, when addressing the core aspects of the geographic, ecosystem, and biological components. My primary concerns arise from the definition of the study area, continue with a confusing citation to biomes and ecosystems, and highlight the absence of integration of the monetary results with the provision of ecosystem services (the core subject of the paper). Therefore, I do not recommend the manuscript in its current stage for publication. However, I strongly encourage the authors to address the points I have listed below and resubmit the manuscript for evaluation in this journal.

Some minor points to consider in a resubmission

The so called Pacific basin, is not recognized as one of the Colombian natural regions. It is not considered in the attempts of biogeographic subdivisión of the country, and not corresponds to a political subdivisión or to an environmental management unit in Colombia. Socioeconomic process related with the transformation (present and projected) of the natural environments are related with historical political boundaries, in many instances determined by geographic and even ecological conditionants and that is why the authors foun such a contrasting results in terms of the usage of the natural capital across their subdivisión; aspect that is barely addressed in the Discussion Sections of the current versión

of the manuscript. As an additional note, the use of the term "very wet forests of the Colombian Pacific Basin" is inappropriate. The authors should employ one of the formal designations found in the literature, such as those established by Rangel, Cuatrecasas, Holdridge, Gentry, and other geographers and ecologists.

If the authors decide to keep the geographic subdivision proposed, it is crucial to elucidate the rationale behind the selection of this study area. What managerial logic underpins this delineation?

Assuming that the proposed study area has political and environmental coherence, another aspect that raises concerns is the number of biomes and ecosystems mentioned by the authors as ecological units considered in the analysis. The authors state, "According to the information sources detailed in the preceding sections, 80 specific biomes are reported (and 65 general

ecosystems. Supplementary material 2) for the Colombian Pacific Basin." Firstly, it seems puzzling that there are more biomes than ecosystems, considering that biomes are typically larger hierarchical and inclusive ecological units. Additionally, clarification is needed for the terms "specific biomes" – what does "specific" imply in this context? – and "general ecosystems" – what does "general" mean for the authors in this paragraph?

Authors need to consider what is the significance of the applied equations if there is a lack of clarity on the definition of geographic and ecological units such as a biome or a region (Pacific Basin)? In keeping with the same line of thought, as a general recommendation, I suggest that the authors enhance the precision of their geographic and ecological terminology. I have noted specific instances that require double-checking, such as:

"The Pacific Basin is considered a Hotspot" (this needs to be more specific, hotspot of Biodiversity).

Please consider to rephrase: "Therefore, the literature about the economic valuation of ecosystem services (ES) and the spatial information about remnant natural resources after human transformation in the Colombian Pacific Basin was revised using various sources of information."

Suggestion: Hence, a comprehensive review of the literature on the economic valuation of ecosystem services (ES) and the spatial data pertaining to remaining natural resources post-human alteration in the Colombian Pacific Basin was conducted, drawing upon diverse information sources.

Please define "the American continent."

And correct the following statement: "The country is divided into 32 geographic regions" (departments), those are not geographic regions!! They should be referred as first order political subunits or units.

Please use capitals in "Capital District" of Bogotá) of (change by: with) 8,879,000 inhabitants. In general, the Methods section lacks the necessary depth corresponding to the

comprehensiveness of the research.

On the other hand, in the Methods Section, it is highly advisable for the authors to utilize terms coined in scientometric

assessments. For instance, they can specify, "A systematic literature search was conducted using journals whose papers included the following search engines"

The authors should provide clearer definitions for the term "sites" in the following statement: "The environmental good (or service) in both sites, including any proposed change in provision levels, should have approximately the same characteristics." Additionally, it is necessary for the authors to elaborate on what they mean by "proposed changes in provision levels" and specify the characteristics that should be approximately the same. If this section was copied from other manuscript, it needs to be cited with quoting marks.

Same here: "2. The population in both areas should have similar characteristics, including income, education level, and culture." What are the areas to be contrasted and why?

While the authors note the application of a "five-step standardization process: price level, currency, spatial unit, temporal unit, and the beneficiary unit, as suggested by De Groot et al.

(2020), allowing for the advancement of adjusted unit values transfer" additional details are required to assess the adequacy of these procedures.

Extra information is necessary to understand the criteria used for the homologation of ecosystems in the statement: "Ecosystem names were homologated, according to the IUCN Global Ecosystem Typology 2.0 (Keith et al., 2020)." Does this imply that the authors modified or adjusted the boundaries of these ecosystems?

More details are required regarding the specific economic valuation method employed for each transferred unit value in: "The specific economic valuation method employed was documented for each unit value transferred, following the categorization of economic valuation methods built by Brander et al. (2018) and De Groot et al. (2020)."

Please avoid the use of acronyms in titles. For example, consider revising the title to: "Phase 2: Estimation of the Current Remnant Natural Capital (RNC)."

It is strongly recommended that the authors cite and provide details about the layers used in each equation (e.g., BIOMEREMNANT i, vector spatial layer). Additionally, it is necessary for the authors to define the terms: i) vector spatial layer and ii) vector information layer. We also require more detailed information regarding the geographic analyses implemented. The sole reference provided is: "All spatial analyses were conducted using the Spatial Analysis function of the R program (Development Core Team, 2019), and all maps were edited in QGIS (Version 3.16.15)."

In the Results Section, the authors state, "At an ecosystem scale (Figure 3B, Supplementary material 5), the Mosaic agroecosystem of crops, pastures, and natural spaces (619,349 hectares), Transitional transformed (360,883 hectares), Crop and Pasture Mosaic Agroecosystem (306,239 ha), and Secondary vegetation (292,816 ha) are the most extensive in the Colombian Pacific Basin." How does this information align with the 8 million hectares of the biomes and their transformation?

More importantly, the Results Section of the manuscript lacks clarity regarding which ecosystem services contributed the

most to the estimated natural capital.

As a final note, I must mention that the maps are virtually impossible to read in the submitted version.

I hope these comments help the authors in constructing a more robust version of this interesting and necessary manuscript. I strongly encourage the authors to resubmit.