The Bioeconomy in South America: understanding visions, concepts and narratives

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Abstract. As the climate breakdown and the environmental degradation demands new pathways for sustainability, dozens of countries have been working on strategies and policies towards a bioeconomy. Researchers have been concerned essentially in the state of bioeconomy strategies in Global North, as the case of European countries and its vision towards a green transition. In South America, some countries have been working on bioeconomy strategies and development plans related. However, it still lacks an overview to understand what are the visions, concepts, and narratives that are driving the initiatives in this region. The mainstream discourse, of course, has a strong influence, but there are alternative models towards a bioeconomy in many of these countries. This research has the task to assess the bioeconomy strategies and plans related in a selected number of countries through an analytical framework that has been applied throughout the literature. The hypothesis is that there is no vision that converges these strategies toward an integrated framework driven by structural change and environmental sustainability aimed at reversing biodiversity losses and providing food security to local communities. After assessing and comparing selected strategies, it is expected to discuss the findings in order to provide a strong overview that could be considered for further cases in the whole region and even in many Global South countries.

Keywords. Bioeconomy, South America, sustainability, biodiversity, structural change.

1. Introduction

Since climate change has been causing a breakdown throughout the whole planet (1), there is greater concern regarding biodiversity loss and the balance within ecosystem services (2). For changing for a sustainable development based on a more resilient model for economic systems, dozens of countries and international organisations worldwide are currently working on strategies and policies to promote a trantsition to a bioeconomy (3).

The bioeconomy first emerged from the need to consider the biologic origins and systemic implications of economic processes of production, utilization, and conservation of biological resources (4,5) – including its associated scientific, technological, and innovative developments oriented towards providing information and services aimed at a sustainable economy. However, at the moment, the mainstream understanding of the concept is associated with the "Green Economy" (6) – which is conceived as a type of economy that aims at growth of income and improvement of human well-being along with significant reduction of environmental risks and ecological scarcity (7).

The bioeconomy mainly implies comprising three elements: renewable biomass, converging technologies, and the cross-sector integration within productive structures (8). Bioeconomy policies have been developed inside broader strategies or even as disaggregated ones. Comparative analysis of official bioeconomy strategies from the Global North – such as from the EU, Germany, Sweden, USA and the OECD – were developed regarding contexts, visions and guiding implementation principles (9). In South America, it is considered that six countries have strategies towards bioeconomy development: Argentina, Brazil, Chile, Colombia, Paraguay, and Uruguay (10). Basic perspectives have already been highlighted as guidelines for these countries. However, the visions, conceptions, and narratives supporting their strategies and policies towards bioeconomy are not clear yet.

Alternative bioeconomy models based in strong

sustainability visions, such as the socio-biodiversity bioeconomy in Brazilian Amazon, have been proposed regarding a model oriented towards local communities (11,12). Other countries such as Ecuador and Bolivia have not yet formulated a specific bioeconomic policy (13), but are well known to have framework policy regarding sustainability and nature rights in their Constitution normative (14,15).

This leads to the question : what exactly are the visions, conceptions, and narratives supporting bioeconomy strategies in South America?

The definition of bioeconomy within the strategies – whether formally or informally, as well as the activities and practices it is oriented towards – determines its scale, scope, and the value that different stakeholders place on it (16).

Hypothesis: South American bioeconomy policies are still lacking a vision that converges these strategies toward an integrated framework driven by structural change and environmental sustainability aimed at reversing biodiversity losses and providing food security to local communities. Answers are expected to be found through systematizing strategies and policies from countries that already have some bioeconomic policies established (Argentina, Brazil, Chile, Colombia, Paraguay, and Uruguay) plus two countries (Bolivia and Ecuador) with important frameworks regarding environmental sustainability and local communities

2. Approach and Methods

As global bioeconomy police is still grounded on asymetric relations – both economically and ecologically –, embracing a framework deep rooted in sustainability is paramount (17), posing as a desirable and feasible possibility to deal with such asymmetries. Desirable because it goes beyond the assumption of substitutability and aligns more emphatically with nature-economy relationships along the lines of biological evolution, conservation systems, and ecological planning. Feasible because it has a wider scope, which allows dialogue with different realities of the Global South countries and their respective fields of research, and also because it considers a range of indicators that translate a more credible diagnosis of the extent of asymmetries regarding factor endowments and the social output distribution.

Similarly with the analysis of european bioeconomy strategies (18), this research takes three key steps: the identification of a sample set of national, regional and industrial bioeconomy related strategies in South America (**see table 1**); the development of syntheses of each of the selected strategies according to a meta-analytical framework; and a comparative analysis between them in order to present key similarities and differences and understand how the bioeconomy is conceived and applied at different levels of governance. The criteria to select documents that fit the analytical framework involves identifying bioeconomy related strategy or vision document statin national government intentions.

This paper is fundamentally descriptive in its nature in the same way of the previously cited paper (16], to provide a comprehensive picture of how the bioeconomy is being envisioned and shaped within South America. An analytical scheme was used based on the topics and questions listed in **Table 2**, and the following section provides contextualization and relevant information to arrive at a comparative evaluation and preliminary remarks regarding the plans and strategies listed. The expectation is to provide key insights by thinking about the elaboration of bioeconomy strategies for the entire South American region. The assessment of the strategies and plans that are related to the bioeconomy can reveal whether there are traces of a bioeconomy model adapted to the needs of the region and whether they meet the points made above or even present other principles and requirements (14). Similar to what has been done in previous studies (10), this paper addresses cases of the absence of a dedicated bioeconomy strategy by examining policy strategies – such as development plans – that have strong links to the assumptions and development goals of a bioeconomy.

Tab. 1 – Selected plan/strategies for bioeconomy in South America

Country	Document Title	Year
Argentina	*Bioeconomía Argentina: modelos de negocios para una nueva matriz productiva* (19)	2017
Bolívia	*Política y Estrategia Plurinacional para la Gestión Integral y Sustentable de la Biodiversidad 2019 – 2030* (20)	2018
Brazil	*Plano de Ação em Ciência, Tecnologia e Inovação em Bioeconomia* (21)	2018
Chile	*Estrategia Climática de Largo Plazo de Chile* (22)	2021
Colombia	*Bioeconomía: para una Colombia Potencia viva y diversa hacia una sociedad impulsada por el conocimiento* (23)	2020
Ecuador	*Estrategia Nacional de Biodiversidad 2015-2030* (24)	2016
Paraguay	*Política y Programa Nacional de Biotecnologia Agropecuaria y Forestal del Paraguay* (25)	2011
Uruguay	*Plan de acción em Economía Circular* (26)	2019

3. Analysis of the bioeconomy strategies

The starting point should be that a bioeconomy strategy is not just an official document or government plan. It is much more than that as it reflects the materialization of a context and the overall approach to research and innovation in a country.

A development strategy based on the bioeconomy could: (i) boost the production of biomass and reduce its loss to agricultural activities and other sectors with regional impact on the generation of jobs compatible with sustainability; (ii) increase added value by improving strategic externalities and complementarities between industrial capacities, biomass generation and technological innovation (27).

Tab. 2 - Analytical framework for bioeconomy comparative assessment. Adapted from (18).

Goals, structural change and priorities
What are the main goals? How does the plan/strategy relate to the country's structural change challenges? What are the prioritized areas/sectors?
Financing, research and innovation
How do the countries envisage the funding structure of their plans/strategies? Which emphasis is placed on research and innovation?
Biomass and land use
What assumptions are considered for biomass use? What are the concerns related to land use?
Governance Arrangements
What assumptions are made about governance mechanisms and arrangements?
Assessment structure
Which indicator systems have been adopted? What are the priority assessment mechanisms defined?

In the document published by ECLAC to serve as a framework for national strategies in Latin America and the Caribbean, authors attempt to discuss mechanisms and forums where countries can share knowledge and experiences in developing their strategies and how to measure the impact of policies and public policy interventions that support the development of the bioeconomy (28). They also consider that a strategy should have at least three elements: (i) a governance system with defined roles and responsibilities; (ii) definition of a model that ensures the economic and financial sustainability of the process, and that makes it viable to reach the market with bioeconomic innovations; (iii) a system of communication, coordination, and political dialogue with the social actors involved. Such a governance system in the first point would also have to contain: (i) integration among institutions, in particular the ministries/bodies involved in the national bioeconomy strategy; (ii) horizontal integration with other relevant sectors, such as logistics and transportation; (iii) articulation with development policies at the national and regional levels (ibid.).

One topic of great concern is financing and funding the green transition strategies, such as the bioeconomy plans. The whole Latin America and Caribbean faces $110 billion-dollar annual gap in financing for climate change, and the institutions that should work to reverse this reality seems to not work as expected (29)

Agriculture is one of the largest contributors to GHG emissions in the South America region; therefore, any decarbonization strategy to be implemented must include the use of the potential of biomass production and integral use in circular bioeconomy schemes. In the case of livestock production, the experiences in the region refer to a complex of technologies and policies aimed at improving the economic and environmental performance of these productions (30). However, for assessing properly the selected strategies/plan, it is not the case to be only restricted if there is enough high-techonology investment involved. How the process is developed matter in a way it needs to comprise a holistic approach based on community dialogue, mutual interactions between disciplines and to work within diverse kinds of bioeconomy (31). That means if one works just with crude metrics – such as profitability and GDP – and evaluates regarding the actual context in these countries, one will conclude that much of the mainstream expectation is driven by promissory discourses (32). For example, in Brazil, the mainstream political project for a bioeconomy can be considered as a case of conservative ecological modernization because it promotes some technical and economic upgrading, but preservinf social inequalities and reingorcing skewed power structures (33). This is well revealed wheh mapping (34) much of scientific work related to bioeconomy in Brazil that shows a concentrated research to sectors far away from critical regions for sustainable development in Brazilian context.

One challenge for this research is relating the topic with the Development Theory and its approaches in Latin America, considering their authors has an important tradition in building the economical thought in the countries this paper is considering. One topic that is lacking on bioeconomy strategies, and it has been critical recently is the regional integration, mainly if we consider that these ties have been weakening on the last decade (35). This is also an outcome from the neoliberalization context where the aim to go towards “good governance” undermined the self-identity between these countries (36). This regional integration could be materialized in the constitution of economic blocks

and international organizations, as a way to help technological transformation to overcome underdevelopment (37).

4. References

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