Dossier: Biocultural diversity and bioeconomy(ies): dialogue between concepts and dimensions for a sustainable future

Dossiê: Diversidade biocultural e bioeconomia(s): diálogo entre conceitos e dimensões para um futuro sustentável

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The modernisation of agriculture, based on the technological package, which expanded the use of chemical inputs, mechanisation and biotechnology, increased agricultural productivity with a focus on the economic dimension without considering the social, environmental and cultural dimensions. As a consequence, even though this hegemonic model presents relatively satisfactory productivity data, it triggers social and environmental impacts that, in the medium and short term, intensify social inequalities and injustices, food insecurity (either due to the unavailability of food or the quality of the food offered), and environmental crisis (Cruz, 2020; Goodman; Dupuis; Goodman, 2012; Rede Penssan, 2022; Wiskerke, 2009).

Regarding environmental issues, this model is compromising biodiversity, including a reduction in pollinators, which, paradoxically, are of crucial importance in the productivity of some crops (Silva; Carvalheiro, 2021), silting and/or contamination of rivers, compromising springs, indiscriminate use of pesticides (Scorza; Beltramim; Bombardi, 2023), soil erosion, among other consequences. One of the tangible expressions of the impacts of this model is extreme climatic situations, such as the droughts that, in Brazil, are recurrently present in the northern region, in the Amazon, and the recent floods in the southern region. Extreme climate events such as these indicate the need to review, among other aspects, the agricultural and livestock production model so that investments are made so that

agricultural production, responsible for 22% of greenhouse gas emissions (IPCC, 2023), is carried out considering, in addition to the economic dimension, the environmental dimension.

In this sense, more sustainable-based systems have been identified as possible alternatives that can be adopted at different production scales and regions. From this perspective, the transition towards more sustainable agricultural production models requires financial investments, but it mainly involves new perspectives on nature and the relationship between human beings and it (Silva, 2007).

These new perspectives involve considering and conserving biocultural diversity, which concerns the diversity evidenced by the interaction between natural systems and human cultures (IPBES, 2019) and the notion of socio-biodiversity (Diegues, 2005). Agrobiodiversity, or agricultural diversity (FAO, 1999), considers all components of biodiversity relevant to agriculture and food, which, from this perspective, constitute agroecosystems. These notions, increasingly present in studies and mobilised by public policies, have been used to highlight the importance of products linked to different biomes, not in the restricted sense of preservation, but in the sense of conservation, which includes, among other aspects, the use of natural resources present in these biomes to guarantee sovereignty and food and nutritional security, as well as generating income for the populations of these regions, in an idea of coexistence. Although small within a hegemonic logic, income generation is fundamental to guaranteeing the ways of producing that guarantee biomes' standing.

This understanding is supported by the concept of bioeconomy, which has been adopted by several governments as a climate change mitigation strategy (Dietz *et al*., 2018), but which has also encouraged a critical debate about historical cycles of economic exploitation of natural resources (Malheiro; Porto-Gonçalves; Michelotti, 2021), and about the meaning of bioeconomy in the context of traditional peoples and communities. Most of these communities do not know the term bioeconomy, but they know how to properly explain the processes related to products extracted or produced in their territories (Baniwa *et al*., 2024). It is not about one perspective overriding the other but precisely about valuing this plural understanding in socio-biodiversity. As a result, the topic of cultural and economic valorisation of socio-biodiversity products (Diniz; Cerdan, 2017) has returned to academic debates and projects and from governmental and non-governmental organisations, with emphasis – although not exclusively – on the more specific contexts of countries with tropical forests (Nobre; Nobre, 2018).

Considering such notions and debates, this dossier sought to disseminate and expand studies, research, and reflections on the socioeconomic and environmental potential linked to socio-biodiversity products in different contexts and regions, and it was organised into three major themes. The first theme sought to briefly bring the historical context and a dialogue between the concepts of bioeconomy and biocultural diversity, which was done in the first pages of this editorial. The second and third themes, respectively, “Adding value and access to markets for agrobiodiversity products from family farming and traditional communities” and “Conservation of socio-biodiversity, ecosystem services and sustainable, productive restoration models”, are present in the seven articles of this dossier and, in a certain way, dialogue with each other and contribute to broadening and deepening concepts and empirical data about biocultural diversity and bioeconomy(ies), the latter treated in the plural with the expectation of contemplating the diversity and uniqueness of socio-biodiversity products, in addition to processes and territories to which different analysed products are linked.

In the first article of this dossier, “Opportunities and challenges for the development of the Cerrado bioeconomy: an analysis from the agents of the baru supply chain”, Andrés Burgos Delgado and Frédéric Mertens present elements of the economic, social and environmental dimensions in the development of the baru chain, reflecting on strategies to strengthen it, as well as to promote the autonomy of agroextractive families. The study highlights the social and cultural importance of the fruits of socio-biodiversity in the lives of people and communities in the Cerrado.

Following this, the article "The commercialisation of tucumã (*Astrocaryum aculeatum*) by extractivists in riverside communities in the Amazon", by Lindomar de Jesus de Sousa Silva and co-authors, addresses the potential of native food plants as promoters of the bioeconomy of socio-biodiversity. The research draws attention to the diversity present in the commercialisation circuit of the fruit of the tucumã palm tree in the state of Amazonas and its importance in local food culture.

In the third article, "Financial and economic viability analysis of baru almond (*Dipteryx alata* Vogel) agroextractivism in the Urucuia River Valley, Arinos/MG", Gabriel Valadão and Álvaro Nogueira de Souza analyse the scenario of expanding demand for baru nuts in the national market, presenting a study of the economic viability of selling this species to agroextractive families in the Urucuia Valley. The study points out that increasing income is more likely to be successful through organisational strategies among agroextractive families.

The article "Bioeconomy and climate changes: agro-extractivist cooperatives experiences in the Brazilian Amazon", authored by Aline Souza Nascimento, Lucas Gabriel da Silva Moraes and Éberton da Costa Moreira, presents the trajectory of three agroextractive cooperatives in the Amazon, to reflect on the importance of economic policies in strengthening these activities. The authors argue that in the context of climate change, the experiences of traditional peoples and communities that have knowledge and practices based on a balanced relationship with nature constitute responses to the socio-environmental problems experienced today.

Sônia de Souza Mendonça Menezes and José Natan Gonçalves da Silva, in the article "Exploring Socio-biodiversity Alternatives in Sergipe's Sertão – Brazil: The Leading Role of Women, Family Farmers, and Traditional Groups in Caatinga Conservation", explore changes in the Caatinga context, especially due to the expansion of agricultural activities. Based on such changes, which compromise the socio-biodiversity of the biome, the authors point out possibilities aimed at conserving the Caatinga based on experiences, knowledge and practices of social groups and traditional peoples who, integrated into the biome, contribute to the construction of productive models more sustainable.

Gabriela Coelho-de-Souza and collaborators, in the article entitled "Ecological restoration for SocioBioCotidiano: Nexus + in the context of the climate catastrophe in the PAN Lagoas do Sul territory", add the concept of socio-environmental security to the Nexus approach, which deals with water, energy and food security. From this fourth dimension, the authors consider the concept of Nexus+ to propose the notion of SocioBioEveryday as a regional supply strategy in the territory of the National Plan for the Conservation of Lake and Lagoon Systems in Southern Brazil to promote conservation and biodiversity restoration, climate change mitigation and socio-environmental justice.

In the seventh and final article, entitled "Institution-based access implications faced by traditional communities in Amazônia: towards co-managing protected areas and Terms of Compromise for socio-biodiversity?", Marcelo Inacio da Cunha explores access to socio-biodiversity resources in the context of quilombola communities in the Rio Trombetas Biological Reserve, in the state of Pará. Emphasising Brazil nuts, the author shows that the institutionalisation and formalisation of agroextractivism, while formalising the use of nuts, restricts access to natural resources and the market, limiting the benefits of the bioeconomy to quilombola communities.

We hope that this Dossier can contribute to deepening the theoretical, methodological and empirical debate on biocultural diversity and the different economic and social contributions of biodiversity.

We wish you all a good and inspiring read!

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