

Sustainable Development Goals in Brazil in the context of the global environmental Agenda 21 (using the example of SDG 15)

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Abstract. The article examines the policy of one of the Latin American countries, Brazil, in the field of achieving SDG 15 (Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss). Some aspects of achieving the Sustainable Development Goals have been identified. The research is based on a systemic approach using statistical and neural network analysis methods. The research revealed a contradiction expressed in the priorities of SDG 15 and Brazil’s institutional capabilities. For Brazil, the key problem is the deforestation, the reduction of biodiversity, and land degradation.

1 Introduction

The 2030 Sustainable Development Goals (SDGs) adopted by the United Nations (UN) in 2015 are shaping the international agenda in many ways today. The SDGs demonstrate the need for an integrated approach, assuming that efforts to promote economic growth and solve social issues are taken in parallel with actions to protect the environment. The environmental agenda is reflected to a greater or lesser extent in several SDGs, among which SDGs 6, 12-15 are considered the most relevant for environmental protection.

The purpose of this article is to examine the most pressing issues and consider some aspects of SDG 15 that contribute to Brazil’s environmental development.

The UN declared 2021-2030 to be the Decade of Ecosystem Restoration, which is closely related to SDG 15. Brazil was chosen for this review because it is the country with the richest biodiversity in the world, has the second-largest forest area, and exhibits a diversity of biomes, i.e., it is particularly in need of protecting its natural wealth. The

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country is also the world's second-largest food producer and one of the few countries with the potential to scale up agriculture as the world population continues to grow (FAO). Today, environmental neocolonialism is becoming increasingly widespread. As a result, environmental protection policies are imposed on countries without any consideration for their national interests; rather, goals and objectives of other international actors are pursued. The implementation of SDG 15 is no exception here, and it is also criticized for the presence of an apparent global asymmetry between North and South. This article demonstrates that the global environmental agenda is often implemented in accordance with local understandings of sustainable development, using the example of Brazil, and Brazil is no exception.

Brazil ranks 50th out of 166 in the sustainable development ranking (Sustainable Development Report, 2023), and its achievement of SDG 15 is of particular concern. One of the criticisms of the Sustainable Development Goals (SDGs) or the 2030 Agenda is that they are a bit out of touch with country-specific realities [1]. Brazil does not have policy coordination, and unlike other countries, it has not made institutional changes in its governance structures to address some of the SDGs. In Brazil, only scattered efforts are being made in this direction [2] (Fig. 1). There is little scope for policy change, and Brazil is so far considering only four sustainable development scenarios: Human Potential, Better Governance, Trade and Investments, and Comprehensive Push [3].



Fig. 1. Brazilian governance conditions for sustainable development goals implementation. **Source:** Own elaboration.

2 Overview of some aspects of SDG 15 aimed at green development

The implementation of the Sustainable Development Goals (SDGs) in Brazil is more or less evenly distributed. Brazil ranks 50th out of 166 countries in terms of meeting SDG targets. Fifteen of the SDGs in Brazil's modern agenda are estimated at 55 points. This is slightly higher than the average for the Latin American and Caribbean region. The total number of points for all SDG tasks is 73.7 points (fig.2).

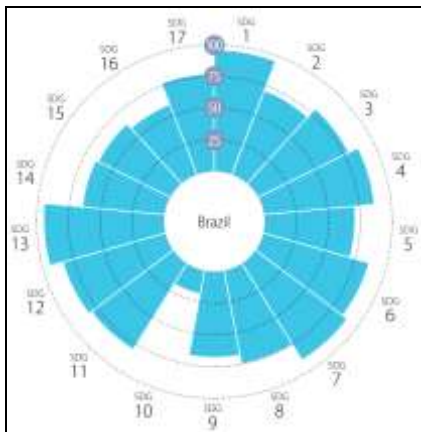


Fig. 2. Average Performance by SDG, Brazil.
Source: SDGs in the Americas and Caribbean Region.

Goal 15 is dedicated to protecting, restoring, and promoting the sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification, halting and reversing land degradation, and halting biodiversity loss (SDGs in the Americas and Caribbean Region). Achieving Goal 15 requires countries to demonstrate their strength in five areas: policy and legislative capacity; institutional capacity; human resource and leadership capacity; financing capacity. The UN has defined 12 Targets and 14 Indicators for SDG 15 (table 1).

Table 1. Targets and indicators of GOAL 15.
Source: SDGs in the Americas and Caribbean Region.

Targets of GOAL 15	Indicators
15.1.: Conserve and restore terrestrial and freshwater ecosystems	<i>15.1.1: Forest area as a proportion of the total land area.</i>
15.2: End deforestation and restore degraded forests	<i>15.2.1: Progress towards sustainable forest management.</i>
15.3: End desertification and restore degraded land	<i>15.3.1: Proportion of land that is degraded over the total land area.</i>
15.4: Ensure conservation of mountain ecosystems	<i>15.4.1: Coverage by protected areas of important sites for mountain biodiversity..</i>
15.5: Protect biodiversity and natural habitats	<i>15.5.1: Red List Index.</i>
15.6: Protect access to genetic resources and fair sharing of the benefits	<i>15.6.1: Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits.</i>
15.7: Eliminate poaching and trafficking of protected species	<i>15.7.1: Proportion of traded wildlife that was poached or illicitly trafficked.</i>
15.8: Prevent invasive alien species on land and in water ecosystems	<i>15.8.1: Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species.</i>

Targets of GOAL 15	Indicators
15.9: Integrate ecosystem and biodiversity in governmental planning	<i>15.9.1: Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020.</i>
15.a: Increase financial resources to conserve and sustainably use ecosystem and biodiversity	<i>15.a.1: Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems.</i>
15.b: Finance and incentivize sustainable forest management	<i>15.b.1: Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems.</i>
15.c: Combat global poaching and trafficking	<i>15.c.1: Proportion of traded wildlife that was poached or illicitly trafficked.</i>

From our point of view, the key issues for Brazil are deforestation, land degradation and loss of biodiversity. We have decided to focus on these in this paper. These problems are reflected in the objectives and indicators of Goal 15 (15.2.,15.3., 15.5.). Next, we give an overview of these problems.

2.1 Forest management and the role of indigenous peoples in forest conservation

South America has the largest area of forests in the world, primarily intended for social services. According to the UN Food and Agriculture Organization (FAO), 28% of the forest area in Brazil is intended to protect the culture and way of life of the people who live within and depend on forests. Their area is 139 million hectares (almost a third of Brazil’s total forest area) (Global Forest Resources Assessment, 2020).

Forested lands are located in six biomes of Brazil: Amazonia, Mata Atlantica, Caatinga, Cerrado, Pampa, and Pantanal. The country’s total forest area in 2020 was 496.7 million hectares (about 12% of the world’s total), of which primal forests cover 216.2 million hectares. About 30% of the forests are located in specially protected areas (FAO). Brazil is estimated to have the largest timber reserve in the world of 120 billion cubic meters or 22% [4]. Brazil is among the top ten countries in terms of timber exports with a global share of 7% (Global Forest Resources Assessment, 2020). The country’s forests contain significant reserves of carbon and fresh water. At the same time, Brazil is one of the world’s largest agricultural producers (SFB, 2017), playing an increasingly important role in providing food to humanity. Combining agricultural production and environmental protection is one of the greatest challenges currently faced by this country [5].

The indicators developed for SDG 15 mainly relate to the extent of forests and the coverage of protected areas. For example, indicator 15.1.1 – forest area as a proportion of total land area and indicator 15.1.2 – the proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type [6].

According to the MapBiomias project, between 1990 and 2020, vegetation mantle on indigenous people’s lands recognized by the Brazilian government decreased by just 1%, which was 20 times less than on privately owned lands. However, about 10% of the demarcated territories do not receive constitutional protection. These forest lands of indigenous people are being invaded for the purposes of illegal mining, deforestation or drug trafficking [7].

According to the Brazilian National Institute for Space Research (Instituto Nacional de Pesquisas Espaciais, INPE), the total area of deforested land increased from 15.2 million

hectares in 1978 to 41.5 million hectares in 1990, in 2000 it was about 58.7 million hectares, and a year later this figure increased by another 2 million hectares (Instituto Nacional de Pesquisas Espaciais). The annual rate of forest area reduction increased from 3.78 million hectares in 1990-2000 to 3.95 million hectares in 2000-2010, and then decreased to 1.50 million hectares in 2010-2020. The rate of devastation of forests in 2021-2022 was 1.2 million hectares per year (FAO). Indicator 15.1.1, which estimates the forest area as a percentage of the total land area, shows that Brazil's forest landscapes are shrinking.

In the context of national policy, forest administration is based on the conventions resulting from the 1992 Rio de Janeiro Conference: United Nations Framework Convention on Climate Change (UNFCCC), Convention on Biological Diversity (CBD), United Nations Convention to Combat Desertification (UNCDD). As of 2018, Brazil had 9.7 million hectares certified (only about 2% of the country's forested area), of which 6.6 million hectares are FSC certified and 3.1 million hectares are CERFLOR certified [SFB, 2017].

2.2 Brazil's biodiversity and the risks of its loss

Brazil's role in the processes related to biodiversity conservation is particularly significant, as it outperforms other nations in the world, being second only to Indonesia in terms of the number of endemic biological species. Brazil tops the list of 17 so-called mega-diversity countries with the largest number of biological species (Convention on Biological Diversity). From a biogeographic perspective, Brazil represents a combination of two key biodiversity hot spots globally, namely the Amazonia and Cerrado ecoregions, with the addition of six terrestrial biomes and three large marine ecosystems. Amazonia is a zone of tropical rainforests with the world's maximum abundance of species of animals and plants (up to 10% of the total number of species of living beings on Earth). According to the Sistema de Informação sobre a Biodiversidade Brasileira (SiBBR) portal, it includes over 39,000 plant species out of about 354,000 currently described (Total Numbers of Accepted Species), 1,924 species of birds out of about 11,000 species recognized today as valid [8], 720 species of mammals out of 6,495 that exist on the Earth [9], 1,024 species of amphibians out of about 8,100 known to science (State of the World's Amphibians: The Second Global Amphibian Assessment), and 764 species of reptiles out of the total global of 12,000 [10].

Brazil joined the Convention on Biological Diversity in 1992 and two years later adopted its own Program Nacional da Diversidade Biológica, becoming one of the first Latin American countries to make biodiversity conservation a key government priority. In the second half of the 2010s, Brazil became the country with the highest increase in protected natural areas (in absolute and relative terms) among all other countries in the world. By 2010, almost a third of the Amazonia biome, about 8% of the biomes of Cerrado, Caatinga, and Atlantic Forest, almost 5% of the Pantanal and over 3% of the Pampas and the coastal and marine areas of Brazil were under state protection. However, these are only small parts of the territories that need protection to preserve the country's biodiversity.

2.3 Combating land degradation and improving food security in the region

For SDG 15, there is an indicator characterizing the extent of land degradation – 15.3.1: proportion of land that is degraded over total land area. Its assessment is based on three sub-indicators: 1) soil mantle and its change; 2) land productivity; and 3) above- and underground carbon reserves. The development of approaches and methods for studying soil organic carbon within the framework of sub-indicator 15.3.1 is a priority for the SDGs.

The expansion of agricultural activities in Brazil has resulted in the loss of approximately 50% of the native vegetation of the Cerrado biome. In addition to contributing to accelerating climate change, the destruction of native vegetation is associated with increased soil degradation [11]. Strong signs of degradation are manifested mainly in pastures and lowlands, which are usually used for grazing livestock. According to the World Bank Cerrado has been identified as one of the regions with significant potential to contribute to the growing demand for food production. Expansion of areas for cattle ranching and agricultural production (mainly soybeans) is recognized as the main driver of land conversion in Amazonia and Cerrado. Previous pieces of research show that 30% of the growth of the soybean crops in Cerrado between 2000 and 2014 was due to the reduction of natural vegetation, while in Amazonia, a similar expansion occurred between 2004 and 2005 (Brazil - Land governance assessment, 2015).

In the past 30 years, the Brazilian semi-arid region (Caatinga biome) experienced severe droughts, which have led to a significant decline in land productivity, posing a threat to food security, the local economy, and indigenous people [12]. The UN Convention to Combat Desertification proposes using vegetation indices derived from Earth outer space observations for the purpose of monitoring land degradation in regions [13]. The issue of providing water to the region and access to fresh water is being addressed through the implementation of the 1 Million Cisterns and Freshwater programs [14]. A combination of unsustainable traditional land management practices for such cases as fires, replacement of forests with pasture, and anthropogenic activities, including inadequate road planning, are the main triggers of degradation processes.

2.4 Socio-economic peculiarities of the SDG 15 implementation

Brazil's rapid economic development in recent decades has been accompanied by widespread environmental degradation and growing social inequality. The parallel occurrence of these processes contributed to the fact that for the people, and as a consequence, for the government and social movements, environmental issues are considered to be less important and secondary to economic ones. For Brazil, as for many other countries, the economic and social SDGs are more critical than the environmental ones [15]. Each and every country seeks trade-offs and compromises between different SDGs based on its particular priorities, as it inevitably has to choose between the three pillars of sustainable development: economic, environmental, and social.

SDG 15 includes three key logics mediated by the following sustainable development priorities (IBGE. Mapa de Biomass do Brasil): 1) the production and market logic corresponds to the economic component of sustainable development; 2) the logic of environmental sustainability is aimed at solving problems such as climate change and loss of biodiversity; 3) the logic of community and empowerment requires taking into account the interests of various social groups, including indigenous peoples.

These are the three components of sustainable development that compete with each other and require compromises. Their relevance and domination in managerial decision-making change over the years and depend on the political course chosen by the country's leader, which is especially true for Brazil. The market logic prevails in Brazil today (IBGE. Mapa de Biomass do Brasil) and the risks of socio-economic development are so far considered as a matter of higher priority than environmental issues.

3 Discussions

Brazil demonstrates inconsistency in its environmental policy due to several factors. Firstly, the peculiarity of Brazil is that all spheres of public life are largely determined by the

personality of the politician at the head of the country and the vector of development he proposes for it. It is quite typical and usual that a shift in power leads to significant changes not only in politics and economics, but also in the understanding of environmental problems and Brazil's role in solving them. In particular, Jair Bolsonaro, who was president in 2019-2022, quite openly demonstrated disinterest in the environmental agenda and considered it secondary for the country. At the same time, the return of Luiz Inácio Lula da Silva to the presidency is considered as a reversal of the country back to involvement in solving environmental issues, both at the national and global levels (IBGE. Mapa de Biomass do Brasil). Thus, it is the political context that largely determines the angle of consideration for environmental concerns.

Secondly, Brazil has a relatively high percentage of people living in poverty, which makes environmental problems closely interconnected with economic issues. According to data provided by the Brazilian Institute of Geography and Statistics for 2021, 62.5 million people or 29.4% of the country's population lived in the grip of poverty at that time, of which 17.9 million lived in absolute poverty (OECD Economic Surveys: Brazil, 2023). According to the Organization for Economic Cooperation and Development (OECD), the poverty rate in Brazil is more than twice the average for the members of this organization (Sustainable Development Report 2023). In such a situation, the solution of socio-economic issues becomes a necessary condition for the formation of an environmental agenda (Fig.3).



Fig. 3. Interaction of participants at the national level in Brazil about the Agenda 21.

Source: Own elaboration.

Some indicators of Goal 15 have been measured and their performance has been determined (fig. 4).

By 2023, Brazil's international secondary effects index is 98.2, which is 2 points higher than the average for Latin America and the Caribbean. When target 15.1 is met, the goal is considered achieved: terrestrial and freshwater biodiversity threats embedded in imports amounted to 0.3 per million population. But there is no information about the progress of the task at the moment. However, progress has been made in forest conservation, but the rate of deforestation in Brazil remains quite high and amounts to 0.52%. A significant challenge is the Red List Index of species survival (worst 0–1 best), for Brazil the indicator is close to the maximum — 0.9. However, the trend is decreasing. Task 15.5 for protected in terrestrial and freshwater sites continues to have major challenges and is in a stagnating state. [15].

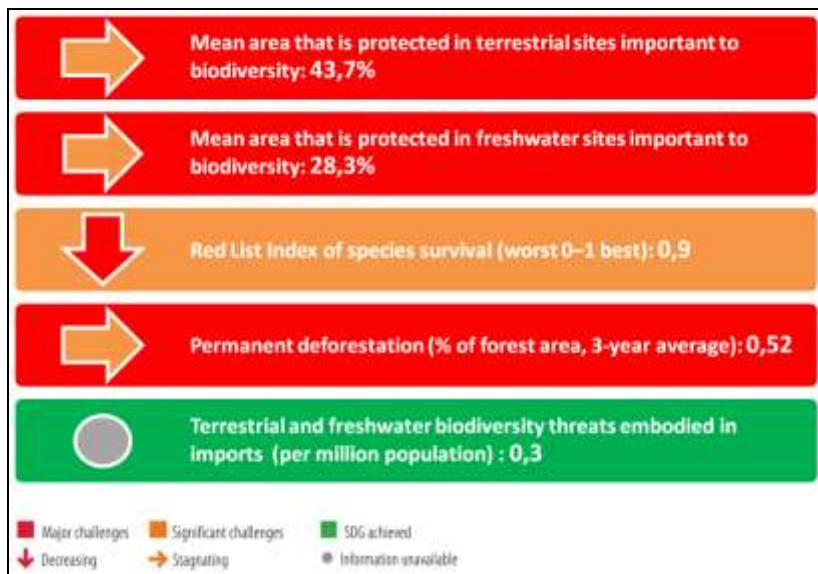


Fig. 4. Interaction of participants at the national level in Brazil about the Agenda 21 (2018-2022).

Source: Own elaboration based on the data of Sustainable Development Report 2023.

4. Conclusions

Brazil is one of the key countries in the world for the implementation of SDG15, as the country has a unique biodiversity due to its forests. At the same time, the country rather declares its commitment to the global environmental agenda than implements it in practice. This is due to two factors: firstly, the neocolonial nature of environmental initiatives promoted by international organizations, which allows to talk about the transformation of ecology into an ideology, and secondly, the specifics of the socio-economic and political development of the country, for which the problem of inequality turns out to be much more pressing than environmental conservation. As a result, land degradation continues in Brazil, the country's forest landscapes are shrinking, which leads to the loss of a significant number of species in all taxonomic groups. Accordingly, addressing socio-economic problems that are considered a priority by the national government over others (creating jobs, reducing poverty and social inequality, etc.) slows down the country's progress towards achieving SDG15. Brazil builds its environmental policy based not only on the UN SDGs, but also on the understanding that the country possesses a unique richness of nature that can and should become the basis for prosperity, first and foremost, of its own people. However, the beneficiaries of the environmental management strategy that is being implemented in Brazil are often transnational corporations, rather than the population of the country, which negatively affects both the state of the environment and the socio-economic situation.

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