G20 GLOBAL LAND INITIATIVE

Land Restoration in Brazil: A National Systems Perspective on Achievements and Challenges

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1. Introduction

The need to analyse the restoration of land in each country with a national systems approach is highlighted in an essay recently[1]. `Different socio-economic factors and policies/institutions together may impact the effectiveness of efforts towards land restoration in different contexts/countries. The contribution of any one factor, say private property rights, may be different in different contexts depending on the presence (or absence) of other enabling factors'[2]. This is the rationale for using a national systems approach to view socio-economic and institutional enablers of land restoration.

We use this approach to describe the achievements and challenges in terms of land restoration in Brazil in this essay. Brazil is the 5th largest country in the world and also has nearly 60 percent of Amazon river basin. Hence the conservation of land in Brazil is important globally. There are international concerns about the national policies and actions of Brazil which have a bearing on its forests and land. However, we note that there are interesting lessons from Brazil in this regard which other developing countries can learn.

The basic framework of the national systems approach is to categorise the whole land into different ownership types, identify the incentives (of different stakeholders) to restore land, and their interactions. Figure 1 summarises this categorisation of land into private lands (owned and used by private individuals/ households and firms); community lands (which owned and/or operated by a community of people); lands leased out to private sector; and public lands (owned and controlled by the government). Based on this framework, following sections analyse the status and challenges in each category of land in Brazil.

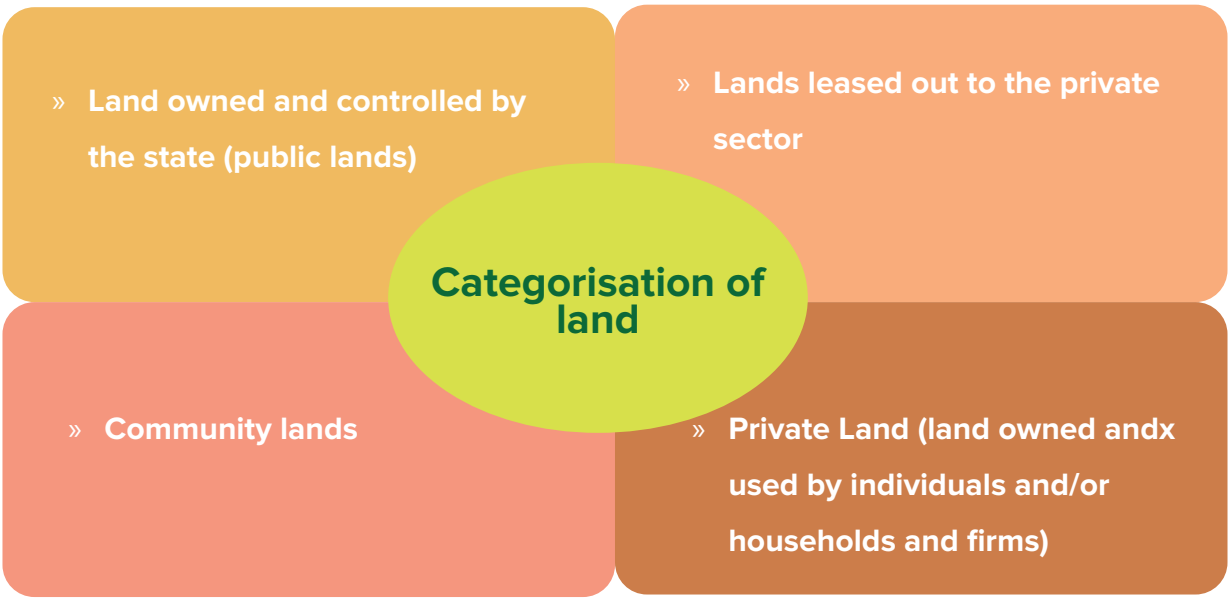

Figure 1: Categorisation of land

2. Private Land (land owned and used by individuals and/or households and firms)

Incentives or disincentives to degrade/restore private agricultural lands play an important role in determining land restoration at the aggregate level. These incentives can be shaped by laws, government subsidies, tax rebates, market incentives, the opportunity cost or importance of land (in the life of people), etc. Let us consider a few of these aspects of Brazil in the following paragraphs.

2.1 Legal mandate to protect a part of private Land

Out of the total land in Brazil (8.5 million square km), 44.2 percent are privately held[3]. Brazil has a law which compels private land owners to conserve/restore a part of their farms. Such farms include large plantations which are owned by private corporations (and these plantations are an important part of the land-use in Brazil). This mandate was part of the National Vegetation Protection Act or the so called forest code that came to exist in 1965[4]. This act was revised in 2012, and region-specific limits on deforestation were fixed for agricultural and other purposes. The share of land that needs to be restored in each private holding can be between 20 to 80 percent depending on the region. In addition, the sides of water bodies and mountain tops within private lands are also to be restored. I could see a few of these restored areas as part of my visits in Bahia and Goias states of Brazil. Though a few other countries have incentives for such restoration in private land[5], a legal mandate for this purpose is not at all common[6]. The experience of this mandate can be something that people from other developing countries can learn from Brazil.

Though this legal mandate has the potential to restore a sizeable amount of land[7], there are challenges in enforcing it fully[8]. One problem is the bias towards the protection of forests whereas other ecosystems such as grasslands and pasturelands may be overlooked (even within private lands)[9]. This can be an issue in the Cerrado region of the country. The absence of adequate and verifiable records of restored land in private holdings is another major challenge. Hence the government in Brazil made it mandatory for all land holdings to be mapped and registered through a system known as CAR (Cadastro Ambiental Rural). However, farmers have to declare the details of their farm and restored areas and these have to be validated by state governments. In the state where it has progressed most, it could validate only about 70 percent of registered properties, and five states are only in the enrolment process[10]. There are delays in verification even though such information is connected to the disbursement of rural credit and other benefits. More action is necessary within Brazil to get the full benefits of this legal mandate.

The average land-holding size is relatively higher in Brazil than that in India or China and many other developing countries[11]. This may facilitate the institution and enforcement of a law which mandates restoration (or the upkeep of forests) in parts of private lands. Since 90 percent of the population in Brazil lives in urban areas, a major share of poor people also lives there[12]. This may have reduced the pressure of poorer people on rural land. Though commercial agriculture is an important part of Brazilian economy, the share of its population depending on agriculture is less than 10 percent. Hence, the impact of poverty and underdevelopment on land degradation may not be that high though there are areas where poverty is leading to the disappearance of forests[13]. Though human development indicators of Brazil are not that high, these are better than those of India and sub-Saharan Africa. All these may enable the restoration of a part of private land in Brazil.

2.2 Private firms/investors in the business of land restoration

Private companies also to get into the business of land restoration in Brazil. I could visit two such firms namely Re.green (https://re.green/en/) and Symbiosis (https://symbiosis.com.br/). These firms and/or (wealthy) individuals are starting to buy land and using it for developing multi-species tree farms with plans for sustainable harvest[14]. These can restore lands even though such farms may not have all qualities of a natural or secondary forest. In addition to indigenous tree plantations, there are secondary forests also

in these farms in Brazil based on the legal mandate that is mentioned earlier. There can be plantations of exotic species which also have secondary forests based on legal mandate or with a voluntary choice to restore land. One such effort by BTG Pactual[15] and Timberland Investment Group aims at creating eucalyptus plantations with about fifty percent of the land devoted to natural regeneration[16].

The vegetative cover over soil in these tree plantations can be left somewhat undisturbed[17], and hence it can help the conservation of soil and water. The nutrients in soil are also enriched through this process. Hence these plantations serve almost all purposes of land restoration other than the conservation of a higher degree of biodiversity. Moreover, such harvested woodlots can be as good as natural forests in terms of absorbing carbon dioxide[18].

The fact that the price of agricultural land is relatively lesser (USD 3000-5000 per hectare in certain areas) in Brazil and land is available for agricultural purpose are enabling factors for these private tree farms[19]. There are multiple initiatives of this kind and some of these have plans for (or started) expanding the acreage. However these firms are yet to make a positive financial return on their capital. This can be due to multiple reasons: Though such private restoration firms have acquired hundreds of hectares, the area may have to be much larger to get a return by considering the fixed and operational costs[20]. The harvesting of timber at a viable scale may require 20 or 30 years of plant-growth and hence it may take time. There is also a perception that illegal timber reaches Brazilian markets[21] and that is dampening the prize of timber. This can reduce the returns from legally cultivated and harvested timber. The cost of labour is higher considering other opportunities which are available in commercial agriculture[22] or industrial/ service sector in Brazil compared to other developing countries[23]. The managers of these tree-farms mention the need to build up skills[24] among workers but then the cost of retaining such skilled workers may be higher. These factors work against the scaling up of these tree-farms. The income from non-timber forest products including eco-tourism is not that high for these firms and hence these have to depend solely on timber and carbon credit. However the money from the latter is yet to become a viable source of income for these private actions of land restoration. However, the enthusiasm of private companies to have indigenous tree plantations remains higher in Brazil.

The returns from such multi-species indigenous tree plantations can be partly financial and partly social/ environmental benefits. It is not unusual to see a set of wealthy individuals who invest their money for social/environmental benefits. The fact that this activity, though is common in developed countries like the USA, is catching up in Brazil and that many of these investors are domestic citizens are interesting. This experience may provide important lessons to other emerging and developing economies.

Stop soil erosion, Save our future - Epagri (Agricultural Research and Rural Extension Company of Santa Catarina) in partnership with the Xavantina City Hall and Copernia Cooperative held the Field Day, Xavantina, Santa Catarina - Brazil ©Angelo Brambila Reck / FAO

3. Community Lands

Community-land ownership exists in Brazil in the territories where indigenous people and Quilombolas live[25]. The issues in these territories are somewhat different from private farms[26]. These people may not have sizeable private holdings and hence the legal mandate may not make a significant impact there. Some of these groups have community control over larger territories, and most of these areas sustain secondary or even natural forests. The potential of indigenous territories in reducing deforestation is recognised[27] but there are challenges too[28]. Moreover their use of land may not be that intensive like commercial farming or ranching[29]. The leasing in of land by outsiders is made illegal in indigenous territories based on a Brazilian law (amended in 1988)[30]. It has been noted that though there is deforestation in Brazil, indigenous territories are largely unaffected by it, especially in Amazon[31]. These are enablers for land restoration.

However these territories are also facing drought and other such challenges[32]. Moreover, these people (especially Quilombolas) need to see an increase in incomes to mitigate their poverty and vulnerability, and hence there is a need to explore income-generating options without degrading land. Though activities such as ecotourism or the cultivation/collection/processing of land-based products and their marketing can enhance incomes[33], there is a need for higher support (in terms of capacity-building and capital investments) for this purpose. Moreover the community ownership/control over territories also make collective action a lot more difficult. There is a need for strengthening those initiatives which aim at addressing these challenges.

4. Public Lands

Nearly 35 percent of the total area of land in Brazil is owned by the government. These may include national parks but also non-forest land owned by the government. There is a good network of national parks in Brazil, and there are major efforts to protect these areas. However there are persisting challenges also which include the lack of enough personal considering the land-area of these parks, certain level of illegal activities, etc[34]. The government of Brazil also tried partnership with private parties for the protection of national parks. These were not that successful since there are not enough revenue for these private partners to recover the cost of conservation[35]. Non-Timber Forest Products (NTFP) or eco-tourism (including wildlife tourism) are not that important sources of revenue from forests in Brazil.

There are major challenges in protecting public lands which are not forests or protected areas. There are illegal encroachment of these lands due to the poorer enforcement of public ownership[36]. This could be due to the lack of enough personnel and resources to be devoted to the protection of these large areas. The enforcement cost of protecting these lands is very high, and that may be forcing the government of Brazil to carry out a sub-optimal enforcement. Encroachers may be using deforestation and cultivation of public land as a way to claim private property rights over time. It has been noted that `the small risk of conviction simply pales in comparison with tempting financial incentives such as land-tenure regularisation, rural credit, short-term profits, and amnesties for illegal deforestation'[37]. Land tenure regularisation incentivises land-grabbing[38]. Hence there is illegal encroachment, and associated land degradation. Based on different commentators, this illegal encroachment is the major cause of land degradation in the country and not the private ownership or the formal leasing of public lands. There is also illegal sale of timber possibly from this encroached land. Such illegal supply, as noted earlier, creates challenges for those who supply timber legally from restored lands.

Public land is allocated for mining and other such industrial activities. Formal regulation on the use of this land aims at restoration that is possible with these industrial activities but there are challenges in its enforcement. There are multiple laws, presidential decrees, and instructive norms which regulate mine land rehabilitation and restoration[39]. There is a mechanism to collect fines from companies which harm environment and use it for restoration-related activities[40].

The efforts to conserve land in Brazil may be affected by the political economy which may lead to an increase in the allocation of forested land to corporations for economic activities without adequate enforcement of environmental regulations[41]. (We discuss this issue briefly in the last section).

5. Cross-cutting Actions and Challenges

Brazilian Development Bank (BNDES)[42] - which is fully owned by the Government of Brazil - has a sizeable amount of money[43] for investing in land restoration. It is also managing the Amazon Fund[44], and the Climate Fund[45] and other relevant financing mechanisms[46]. The money for BNDES for these purposes comes from Brazilian petroleum companies as royalties, other countries (like Norway which finances the Amazon Fund), private firms which causes land degradation, impact investors and the government. A part of this money is disbursed as grants and the rest as soft loans. BNDES is also coming out with innovative solutions such as the creation of a platform where money from impact investors is pooled for restoration. This is facilitated by using the credibility of the BNDES.

However the uptake of the money that is available with BNDES for restoration is not that high. Investments in this regard are relatively new and that could be one reason for the lower demand. There may be a need for regulatory and procedural reforms so that newer firms which come to exist for restoration can access these financial resources. The challenges faced by private farms and firms in restoration (which are mentioned in a previous section) could be another reason. There is a also a governmental financing facility (which is part of IBAMA[47]) which uses fines collected from companies which harm environment. This money is accessible to government initiatives but here too procedural reforms are needed. However the experiences the BNDES and IBAMA and private banks (like BTG Pactual which are involved in restoration) are worth looking at by banks/investors of other developing countries.

Brazil has the experience of successful collective action by different stakeholders (private sector, NGOs, investors/banks, and government initiatives) in influencing or shaping policies for restoration. The restoration pact for Atlantic forests (https://www.pactomataatlantica.org.br/)[48], and the Brazilian coalition on climate, forests, and agriculture (https://coalizaobr.com.br/en/) are interesting cases. The latter has a restoration task force which is involved in developing monitoring mechanisms and platforms for restoration, capacity-building and awareness-creating programs. The task force on silvicultural practices connects the research in universities with market outcomes so that restoration becomes financially viable. The experiences of these multi-stakeholder coordination mechanisms are something that other countries can learn from Brazil.

The scaling up of nurseries for native species is a major challenge for land restoration all over the world. Many nurseries are of small-scale in nature with limited ability to assimilate more capital and better technology. However organisations like Bioflora[49] (which has become part of Re.Green, a company which is in the business of land reforestation) has developed appropriate technologies and scaled up production of seedings (to millions per year). Other companies like Symbiosis are also involved in developing appropriate technologies for nurseries. This experience is also useful for other developing countries. There are possibilities of technology transfer between the countries of global south in this regard.

Among developing countries, Brazil is a leader in terms of research on the science of restoration. This could be partly because of the closeness of academic research with large-scale nature-based (including agricultural) production systems in the country over a longer period of time. Many scientists who were

trained in conventional agricultural/forestry sciences have moved towards restoration research in the country.

6. Impact of global factors

Land degradation or restoration does not depend solely on internal factors. This is especially so in a country like Brazil where a major part of the Amazon river is located. The developments in Brazil in this regard are watched keenly by global actors. There were international concerns and actions when the policies of government of Brazil were seen as affecting the conservation of Amazon forests.

The global factors including climate change are also affecting the status of land in Brazil. Not only Amazon but other geographies of Brazil also face challenges of desertification and require greater attention. We have mentioned Atlantic forests previously. The central parts of Brazil with Savannah-like topography (or Cerrado region) have non-forest ecosystems[50] and need plans for restoration[51]. Even southern parts of Brazil (which have a temperate climate like that of Europe) are encountering frequent droughts[52] recently (provably a reflection of climate change). Hence the protection of forests and land is an important imperative all over the country and not only in Amazon.

7. Enabling political environment for land restoration

Almost everybody whom I have interviewed during this trip highlighted the interest of the present government and its top leadership in avoiding land degradation and restoring forests and land in general. The current goal is to increase agricultural production without degrading any more land[53]. The new plan for agricultural development called Plano Safra (which has an allocation of USD 76 Billion) has a major focus on sustainable crop production[54]. Its specific plans for strengthening environmentally sustainable production systems include a reduction in interest rates for recovery of pastures and rewards for rural producers who adopt agricultural practices which are considered more sustainable[55]. There are plans to reward those farmers who are registered in the Rural Environmental Registry (CAR) which is part of the process for the implementation of the legal mandate for the conservation of natural ecosystems in private agricultural lands.

Hence the political climate of Brazil is conducive not only for energising land restoration within the country but also to enable it to take a global leadership role in this regard[56]. The Brazilian presidency of G20 countries can be an opportunity to strengthen this leadership role. It may be good if there is adequate planning on the ground as part of its presidency so that this conducive political climate is utilised effectively for furthering the agenda of land restoration in Brazil and the world.

Endnotes

1 https://practiceconnect.azimpremjiuniversity.edu.in/envisioning-a-national-system-of-land-restoration/; https://practiceconnect.azimpremjiuniversity.edu.in/envisioning-a-national-system-of-land-restoration-part-2/

2 Refer Footnote 1.

3 Gerd Sparovek, Bastiaan Philip Reydon, Luís Fernando Guedes Pinto, Vinicius Faria, Flavio Luiz Mazzaro de Freitas, Claudia Azevedo-Ramos, Toby Gardner, Caio Hamamura, Raoni Rajão, Felipe Cerignoni, Gabriel Pansani Siqueira, Tomás Carvalho, Ane Alencar, Vivian Ribeiro,

Who owns Brazilian lands?, (2019), Land Use Policy,Volume 87,104062,ISSN 0264-8377,

https://doi.org/10.1016/j.landusepol.2019.104062.

4 https://www.nature.org/en-us/about-us/where-we-work/latin-america/brazil/stories-in-brazil/brazils-forest-code/#:~:text=In%201965%2C%20Brazil%20created%20and,farm%2020%20percent%20of%20it.

5 For example, there are tax rebates for this purpose in Brazil.

6 Brazil also offers financial incentives such as a lesser interest rate for rural credit that is given to farms which meet this legal mandate under its national credit program for agriculture called Plano Safra (2023-24).

7 Brock, R.C., Arnell, A., Simonson, W. et al. Implementing Brazil's Forest Code: a vital contribution to securing forests and conserving biodiversity. Biodivers Conserv 30, 1621–1635 (2021). https://doi.org/10.1007/s10531-021-02159-x

8 https://www.climatepolicyinitiative.org/wp-content/uploads/2020/12/Where-does-Brazil-Stand-With-the-Implementation-of-the-Forest-Code-2020-Edition.pdf

9 Bonanomi J., Tortato F. R., Gomes R. S., Penha J. M., Bueno A. S., Peres C. A. (2019). Protecting forests at the expense of native grasslands: Land-use policy encourages open-habitat loss in the Brazilian Cerrado biome. Perspectives in Ecology and Conservation, 17(1), 26–31. https://doi.org/10.1016/j.pecon.2018.12.002

10 https://www.climatepolicyinitiative.org/wp-content/uploads/2020/12/Where-does-Brazil-Stand-With-the-Implementation-of-the-Forest-Code-2020-Edition.pdf

11 The average farm size is about 63 hectares. https://www.researchgate.net/figure/Average-farm-size-ha-by-region-Brazil-1970-2006_fig1_311159054

12 This is despite the fact that urban poverty in Brazil is nearly half of that in rural areas.

13 Nicole Harari notes: `If you take for instance the Bosque Atlantico Dry Forest in the South of Brazil, there we have deforestation due to poverty – the last forest patches are disappearing due to poverty and people trying to make a living by illegally selling a few trunks of trees.'

14 There are projects all over the world and it is seen as a land restoration strategy. Refer, Rodríguez, J.C.; Sabogal, C. Restoring Degraded Forest Land with Native Tree Species: The Experience of "Bosques Amazónicos" in Ucayali, Peru. Forests 2019, 10, 851. https://doi.org/10.3390/f10100851

15 https://www.btgpactual.com/

16 Hence the income from plantations and carbon credit from naturally regenerated forests becoming the main source of financial return.

17 We have seen this in the tree farm of Symbiosis in Bahia state, Brazil.

18 Bernal et al (2018) Global carbon dioxide removal rates from forest landscape restoration activities, Carbon Balance Management, https://cbmjournal.biomedcentral.com/articles/10.1186/s13021-018-0110-8

19
is increasing to 5000 USD per hectare, and looking for areas where it is still available at about 3000 USD per

hectare.

20 There have to be investments for nursery and qualified technical personal. The per-unit cost may be higher when the size of the farm is relatively small.

21 Reboredo, F. (2013). Socio-economic, environmental, and governance impacts of illegal logging. Environ. Syst. Decis. 33, 295–304. doi: 10.1007/s10669-013-9444-7

22 Since these workers can get jobs in commercial plantations, the burden to have such workers may be unreasonable for indigenous farms if their financial returns are lesser.

23 A worker in agribusiness can get around USD 500-600 per month. Inferred from https://www.erieri.com/salary/job/farmworker-livestock/brazil#:~:text=Updates%20%2D%20August%202023-,Salary%20Recap,BRL%2030%2C237%20and%20BRL%2044%2C462.

24 This is noted by both Symbiosis and Re.Green.

25 A quilombola is an Afro-Brazilian resident of quilombo settlements first established by escaped slaves in Brazil. They are the descendants of Afro-Brazilian slaves who escaped from slave plantations that existed in Brazil until abolition in 1888.

26 It may be noted that the issues related to land are different for these two groups. Indigenous people have by and large access to land/territories. Though they constitute only 0.4 percent of the population, nearly 13 percent of the country's land area is designated as territories of indigenous people. Refer, https://pib.socioambiental.org/en/Demarcation. However the land titles were started to issue to quilombolas only in 1988. Even today this process is incomplete, and the majority of these communities is yet to get titles. https://cpisp.org.br/direitosquilombolas/observatorio-terras-quilombolas/quilombolas-communities-in-brazil/#:~:text=Currently%2C%20only%20207%20quilombola%20territories,are%20pending%20before%20federal%20authorities.

27 Sze, J. S., Carrasco, L. R., Childs, D. & Edwards, D. P. Reduced deforestation and degradation in Indigenous Lands pan-tropically. Nat. Sustain. 5, 123–130 (2021)

28 Satellite data shows deforestation in indigenous territories too. Refer, Silva-Junior, C.H.L., Silva, F.B., Arisi, B.M. et al. Brazilian Amazon indigenous territories under deforestation pressure. Sci Rep 13, 5851 (2023). https://doi.org/10.1038/s41598-023-32746-7

29 This is the case of Kalunga territory of Quilombolas near Caval Cante, which I have visited.

30 There were talks about making this legal under the previous government under Jair Bolsenaro.

31 Begotti R. A., Peres C. A. (2020). Rapidly escalating threats to the biodiversity and ethnocultural capital of Brazilian indigenous lands. Land Use Policy, 96, 104694. https://doi.org/10.1016/j.landusepol.2020.104694

32 Stories like these note this trend. https://news.mongabay.com/2020/05/green-alert-how-indigenous-have-been-experiencing-climate-change-in-the-amazon/

33 We have seen the potential for such activities in the Kalunga territory of Quilombolas near Cavalcante in the state of Goias.

34

35
the past.

36 Schneider M, Biedzicki de Marques AA, Peres CA. Brazil's Next Deforestation Frontiers. Tropical Conservation Science. 2021;14. doi:10.1177/19400829211020472

37 Refer footnote 26.

38 Schneider M., Peres C. A. (2015). Environmental costs of government-sponsored agrarian settlements in Brazilian Amazonia. PLoS One, 10(8), e0134016. https://doi.org/10.1371/journal.pone.0134016

39 Aronson J, Brancalion PHS, Durigan G, Rodrigues RR, Engel VL, Tabarelli M, Torezan JMD, Gandolfi S, et al. What role should government regulation play in ecological restoration? Ongoing debate in São Paulo State, Brazil. Restoration Ecology. 2011;19:690–695.

40 http://www.abc.gov.br/training/informacoes/InstituicaoIBAMA_en.aspx

41 This was a major concern during the government headed by Jair Bolsonaro

42 https://www.bndes.gov.br/SiteBNDES/bndes/bndes_en

43 It is also using the royalty from the petroleum fuels that is produced in Brazil; and this money is used for the (sustainable) development of Brazil.

44 https://www.amazonfund.gov.br/en/home/

45 https://www.bndes.gov.br/SiteBNDES/bndes/bndes_en/Institucional/Social_and_Environmental_Responsibility/climate_fund_program.html

46 https://www.bndes.gov.br/SiteBNDES/bndes/bndes_en/Institucional/Social_and_Environmental_Responsibility/

47 http://www.abc.gov.br/training/informacoes/InstituicaoIBAMA_en.aspx

48 Renato Crouzeilles, Edson Santiami, Marcos Rosa, Ludmila Pugliese, Pedro H.S. Brancalion, Ricardo R. Rodrigues, Jean P. Metzger, Miguel Calmon, Carlos A. de M. Scaramuzza, Marcelo H. Matsumoto, Aurelio Padovezi, Rubens de M. Benini, Rafael B. Chaves, Thiago Metzker, Rafael B. Fernandes, Fabio R. Scarano, Jair Schmitt, Gabriel Lui, Pedro Christ, Rodrigo M. Vieira, Mateus M.D. Senta, Gustavo A. Malaguti, Bernardo B.N. Strassburg, Severino Pinto, There is hope for achieving ambitious Atlantic Forest restoration commitments, Perspectives in Ecology and Conservation, Volume 17, Issue 2, 2019, Pages 80-83, ISSN 2530-0644, https://doi.org/10.1016/j.pecon.2019.04.003.

49 https://www.black-jaguar.org/the-first600/022/

50 It has multiple eco-systems and not only forests. Refer, Giselda Durigan, Cássia Beatriz Munhoz, Maria José Brito Zakia, Rafael S. Oliveira, Natashi A.L. Pilon, Raul Silva Telles do Valle, Bruno M.T. Walter, Eliane A. Honda, Arnildo Pott,

Cerrado wetlands: multiple ecosystems deserving legal protection as a unique and irreplaceable treasure, Perspectives in Ecology and Conservation, Volume 20, Issue 3,2022, Pages 185-196, ISSN 2530-0644, https://doi.org/10.1016/j.pecon.2022.06.002.

51 https://www.worldwildlife.org/stories/saving-the-cerrado-brazil-s-vital-savanna#:~:text=Why%20Preserving%20the%20Cerrado%20Matters,capybaras%2C%20to%20name%20a%20few.

52 Nobre, C. A., Marengo, J. A., Seluchi, M. E., Cuartas, L. A., & Alves, L. M. (2016). Some Characteristics and Impacts of the Drought and Water Crisis in Southeastern Brazil during 2014 and 2015. Journal of Water Resource and Protection, 8(02), 252.

53 In his first big overseas speech since winning election, Lula said Brazil did not need to clear another hectare of rainforest to be a major agricultural producer.....'. https://www.theguardian.com/environment/2022/nov/16/lula-vows-to-undo-brazils-environmental-degradation-and-halt-deforestation

54 https://en.mercopress.com/2023/06/29/lula-government-promoting-brazilian-agriculture-with-us-76-billion-financial-support

55 https://www.gov.br/agricultura/pt-br/assuntos/noticias/presidente-anuncia-plano-safra-2023-2024

56 However the lack of focus on this aspect by the previous government indicates that sustainable development in Brazil can be affected by the politics, and there is no consensus on this matter across political parties.