

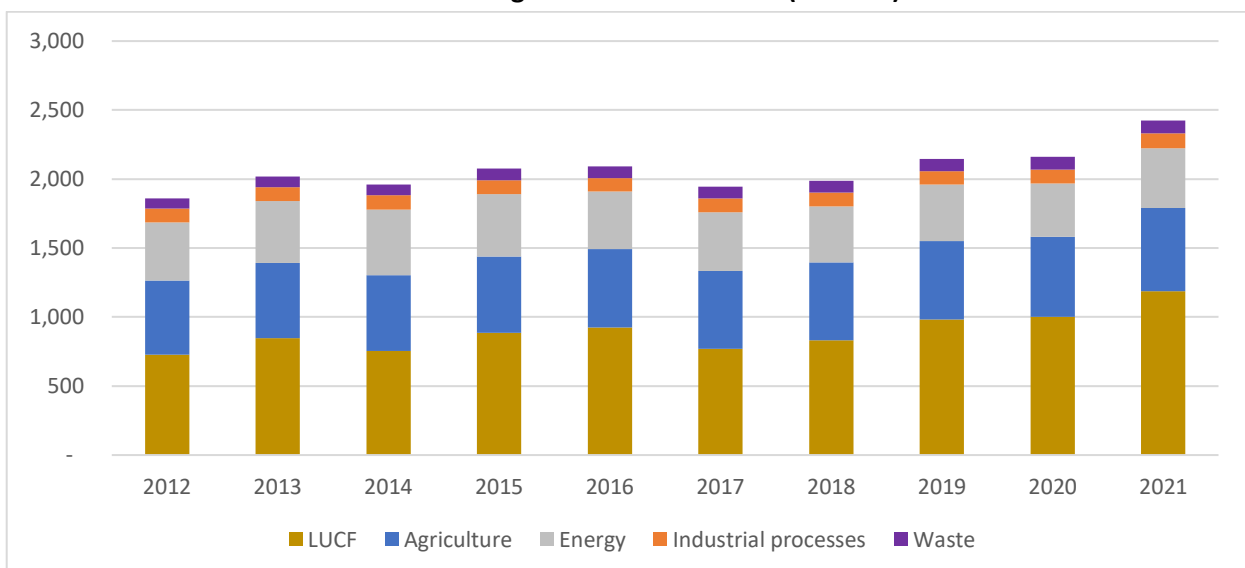
## Research for workshop of Climate Arc on Climate Finance in Brazil

### Executive Summary

In Brazil, **all financial regulators have taken initiatives in the ESG agenda, including climate risks and opportunities management, but they are not clear enough to produce real impact.** Main shortcomings include lack of clarity regarding the universe of financial transactions to be assessed and concerning sources of environmental and social data to be consulted, as well as lack of requirements to consider sector-specific climate, environmental and social impacts. Disclosure requirements are still also too vague.

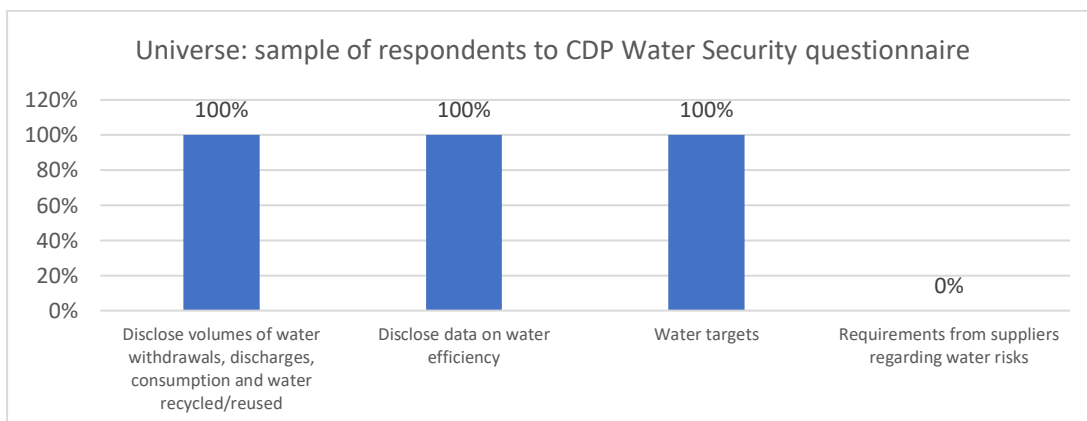
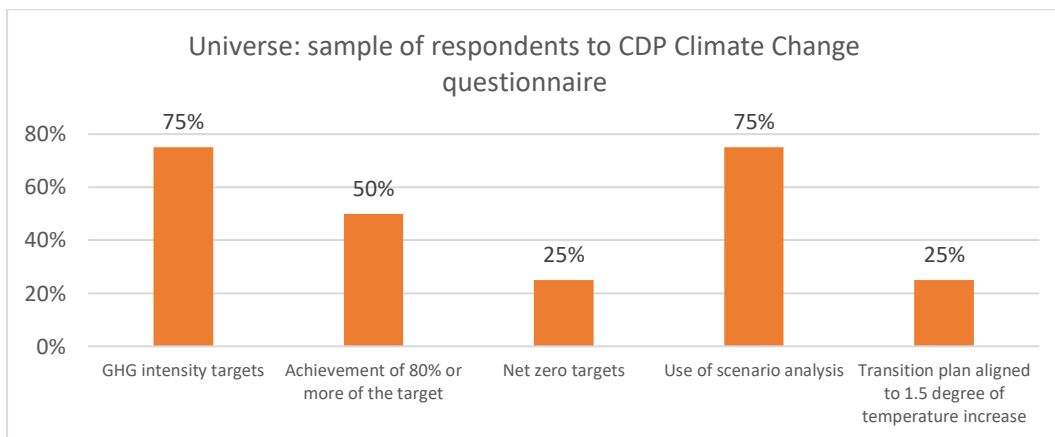
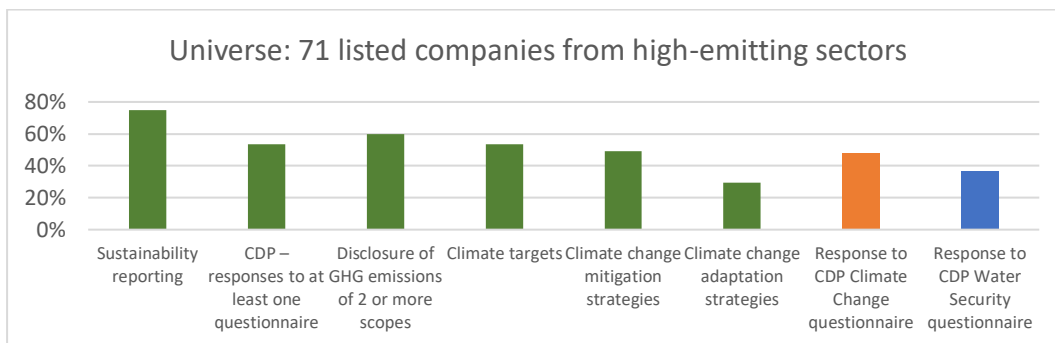
There are five **key economic sectors and activities that are drivers of climate change** in Brazil: 1) land use change (mainly, deforestation), with almost half of GHG emissions; 2) agriculture (mostly, use of chemical fertilizers) and livestock (enterical fermentation and poor animal manure management), with about 25%; 3) energy (basically, fuels, once electricity mix is mostly low-carbon), with around 18% of the emissions; followed by 4) industrial processes (4.5% of emissions) and 5) waste disposal (3.8%). Key drivers vary across the territory. In the Amazon biome, that covers North, part of Center-West and Northeast regions (around 50% of Brazil), almost 90% of emissions come from land use change, with around 10% coming from agriculture. In Cerrado biome, that includes most of Center-West region and parts of Northeast and Southeast regions, land use change is responsible for over 40% of emissions and Agriculture for around 30%. It is important to note that Cerrado has more total GHG emissions than Amazon. The Southeast region (mostly Atlantic Forest biome) has about half of the Amazon's emissions, and the main sectors are Energy (41%) and Agriculture (25%). In the Northeast region (mainly Caatinga and Atlantic Forest biomes), most of the emissions come also from land use change (mostly from Cerrado), followed by Agriculture and Energy. In the South region (the last of the five Brazilian regions), the main emitting sectors are Agriculture and Energy.

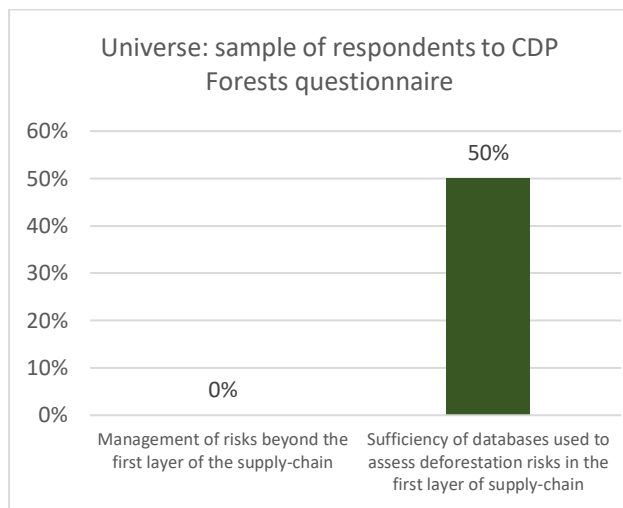
**Greenhouse gas emissions in Brazil (MtCO<sub>2</sub>e)**



Source: Prepared with data from [System of Estimatives of Emissions of Greenhouse Gases \(SEEG\)](#) (2022)

We assessed **climate disclosures of listed companies that operate in the high-emitting sectors (even if risks are in the supply-chain)**. We identified the 71 key companies among those listed in the São Paulo Stock Exchange and analysed their Sustainability reporting and answers to the Carbon Disclosure Project. As shown in the table below, the most serious limitations refer exactly to the main source of GHG emissions in Brazil, which is deforestation. Companies operating in high deforestation risks sectors are usually not monitoring their supply-chain and even less taking enough actions to mitigate these risks.





It's important to note that, from the universe of listed companies from high-emitting sectors that operate in high deforestation risks sectors (which excludes, for example, airlines), only 12% answer to the CDP Forests questionnaire.

With the purpose to assess the impacts of the **voluntary carbon credits market in Brazil**, in the country's climate actions, we evaluated its **level of transparency**. Most projects refer to forest conservation or restoration, a relevant portion to renewable energy and a small share to waste disposal. No public information was found about the credits purchasers and, considering the low prices practiced, it would be important to have this information in order to verify if carbon offsetting is working as a cheaper alternative to decarbonization. There is urgent need of a regulated carbon credit market in Brazil, in order to increase transparency.

We then described **strategies for climate change mitigation and adaptation for the high-emitting economic sectors and activities**. For climate change in agriculture, livestock and forestry (including land use change), the strategies are: a) integration between agriculture and forestry, livestock and forestry or agriculture, livestock and forestry (agroforestry systems), increasing productivity and resilience to climate change; b) restoration of degraded pastures, reducing demand for land; c) biological fixation of nitrogen (for fertilizers), reducing emissions from fertilizers use; d) direct planting system, reducing risks of soil erosion and use of water, and increasing productivity; e) animal manure treatment, to reduce GHG emissions; f) sustainable management of planted forests; g) forest restoration (in both cases, for climate regulation). Regarding electricity generation, the country dependence of hydro powerplants creates a big exposure to climate risks. Key strategies are: a) modernization of half of existing hydropower plants; b) continue to expand wind and solar energy, now exploring the opportunity of producing green hydrogen; c) expanding the use of biomass. Regarding fuels, the country is already a big producer of biofuels, with potential for expansion (including aviation and maritime transport) and also big opportunities to increase efficiency in the use of fuels by vehicles. In the terrestrial transportation sector, GHG emissions can be reduced via: a) expansion of railways; b) electrification in the railway system; c) expansion of collective local transport, with preference for Light Rail Vehicles (lower costs); d) electrification or use of biofuels by collective local road transport and trucks; e) expansion of active mobility; f) electrification or use of green hydrogen for individual terrestrial transport. Biofuels may also contribute for decarbonization of industrial sector through substitution of fossil fuels by biogas and biomethane produced from waste or by green hydrogen produced from biomethane. In industry, the main emitters are cement and steel. For cement, the key strategies are: a) increase the addition of other substances (calcinated clays and lime filler) to clinker; b) increase the use of alternative

fuels, replacing petroleum coke per solid waste. For the steel industry, they are: a) use of biofuels or green hydrogen; b) improve energy efficiency; and c) increase scrap production for electric arc furnace applications. For both industries, carbon capture, use and storage technologies are also relevant. Finally, the main source of GHG emissions in the waste disposal sector is the final disposal of domestic solid waste. The key strategy is to increase reuse rate via: a) biologic treatment of the organic fraction; b) recycling of recyclable materials; c) recovery and energy use through thermic treatment. This would reduce need of landfills, which emit methane permanently after closure. Adoption of cloistered flare for biogas of landfills could reduce their methane emissions by 90%.

Moving to the financial sector, we identified the **main climate information gaps for use of the financial sector**. As for deforestation, from the public sector, the main gap is the availability of information online and integrated at national level on authorizations for vegetation suppression. From private sector, there is a lack of value-chain disclosures. In agriculture, the main gap is information on use of chemical fertilizers and animal manure treatment. On electricity, the main gap on the public sector is an energy zoning plan, a platform on biofuels and a database on ideal energy efficiency levels. In the private sector, more disclosure is needed from energy sector companies. In the industry, the public sector needs to update its National Plan for Decarbonization of the Industry and the steel industry has to improve on climate disclosures. In the sector of waste disposal, from the public sector, a mapping of financial and technical demands of States and Municipalities is needed. Finally, we addressed the **main climate disclosure gaps of financial sector**, considering the results of the [Ranking of Environmental and Social Actions of Financial Institutions in Brazil](#), where ten banks comprising more than 80% of Brazilian lending market were assessed, and the following gaps can be mentioned: a) available deforestation data are not always used and, when they are, it is mostly only for rural loans, and similar requirement is not made from invested companies that have farmers in value chain; b) verification of the legality of deforestation is even more limited – databases used are not appropriate; c) use of chemical fertilizers and animal manure management (big sources of GHG emissions) are not assessed; d) other public databases or questionnaires for companies on key climate topics, such as water efficiency, energy efficiency and energy mix are not accessed or too vague; e) most banks do not have public sectoral policies that enable them to assess KPIs for each industry and not all transactions with climate risk sectors are assessed, there are thresholds that exclude a relevant universe even if the sector risk is high, and aggregate impacts are not considered; f) information on lending and investments focussed at climate change mitigation and adaptation are rarely available; g) there is little information on impacts of engagement with companies on climate risks; h) no information is found about how climate risks affect pricing of loans and investments; i) no information is found about how climate performance influences compensation schemes of high management of financial institutions; j) there are no clear climate targets thus far (except for Net Zero, without details on how this will be reflected in loan or investment portfolios) and very little information is disclosed at portfolio-level; k) concerning climate physical risks, no location of companies is disclosed, and apparently value-chain risks are not considered. So, in general: - transparency is low; - relevance of climate risks and opportunities in banks business strategies is not clear enough; - climate risk management is clearly insufficient with regards to the major risk (deforestation), and probably also regarding other key issues.