



Post-Schumpeterian Economics: Innovation and Green Jobs in Brazil

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Technological innovation and productive transformation are at the core of the transition toward a low-carbon economy.

Green jobs represent one of the most tangible expressions of achieving sustainable development.

This is important in Latin America and Brazil for several social, economic, and environmental reasons.



Drought in the Amazon



Flooding in the South



Economic Losses



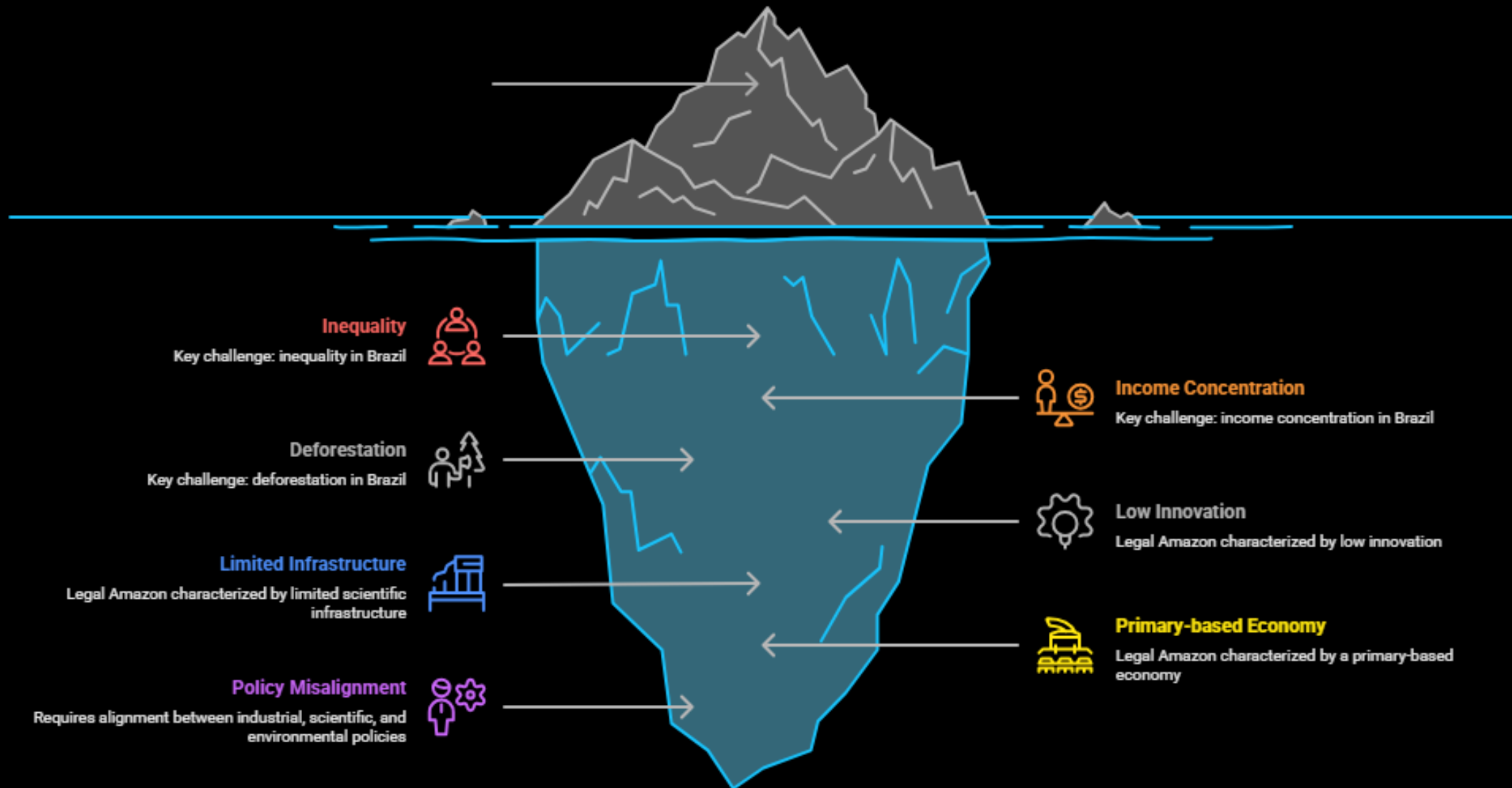
Poverty

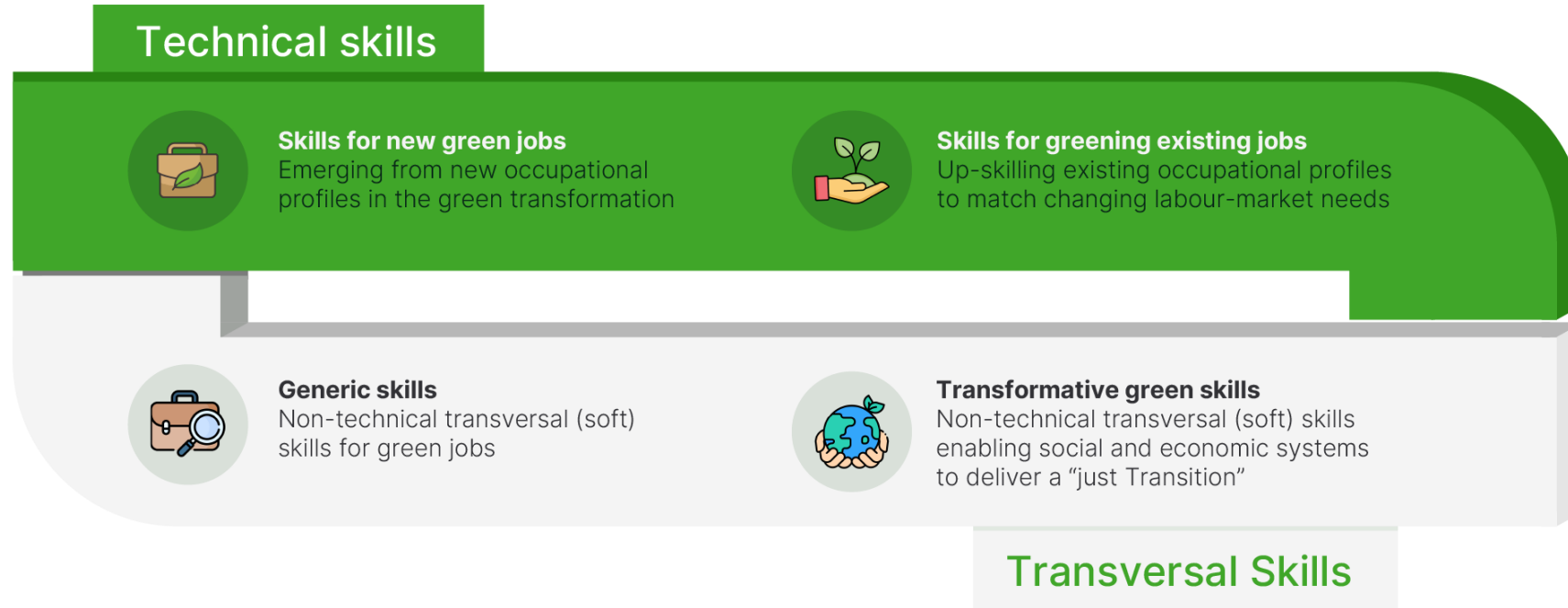
A Post-Schumpeterian Economics Perspective helps broaden the analysis to include the co-evolution among technology, institutions, and social goals (Callegari, 2022; Seo, 2024).

How to promote sustainable development in Brazil?



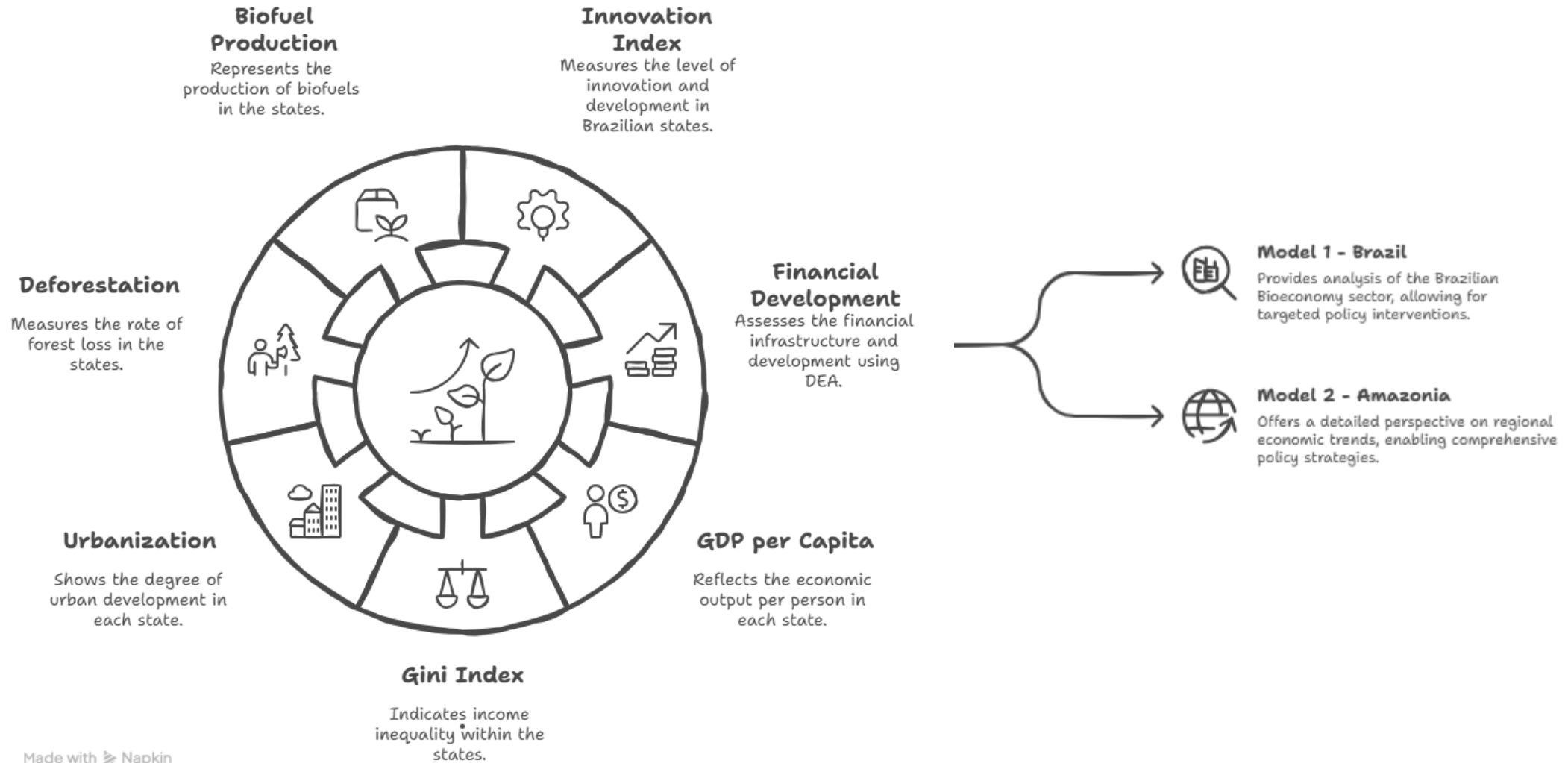
Brazil's Bioeconomy Potential: Unveiling the Hidden Depths





- ✓ O*NET classification (U.S.): defines green occupations according to their contribution to sustainability (O*NET, 2024).
- ✓ Linking O*NET and the Brazilian Occupation Classification (CBO).
- ✓ Green Jobs variable: represents the number of workers in sustainable occupations within the bioeconomy sector (2014–2022).

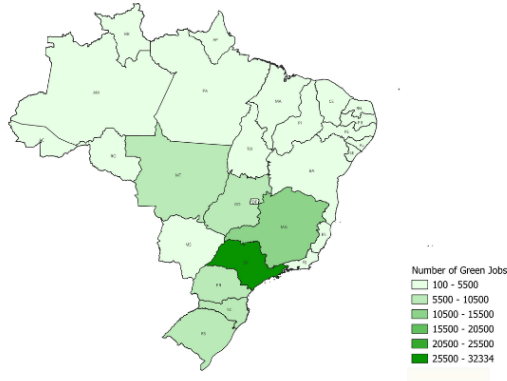
Green Jobs Analysis



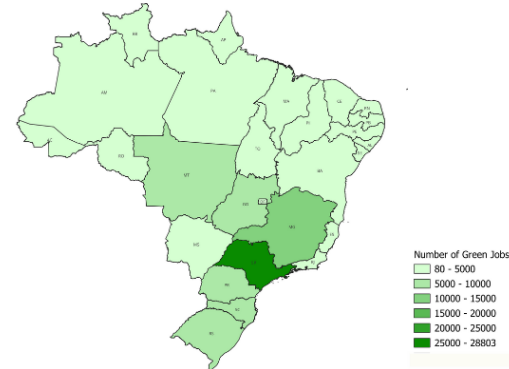
Results and Discussion

Figure 1. Spatial Distribution of Innovation and Green Jobs

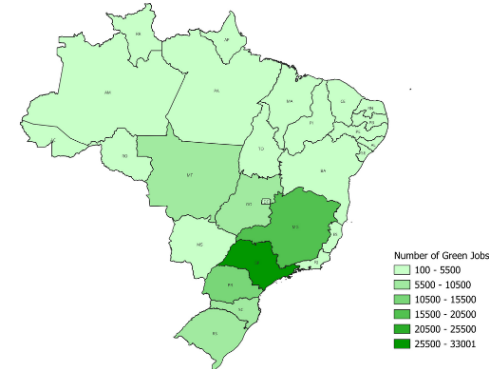
Green Jobs in the Bioeconomy across Brazilian States in 2014



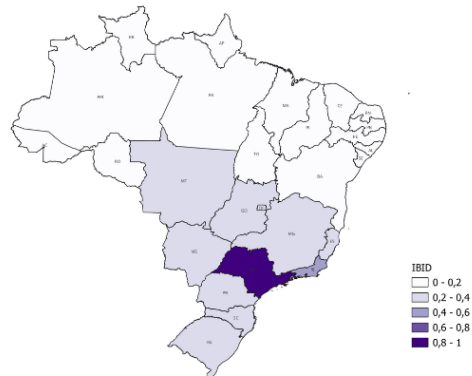
Green Jobs in the Bioeconomy across Brazilian States in 2018



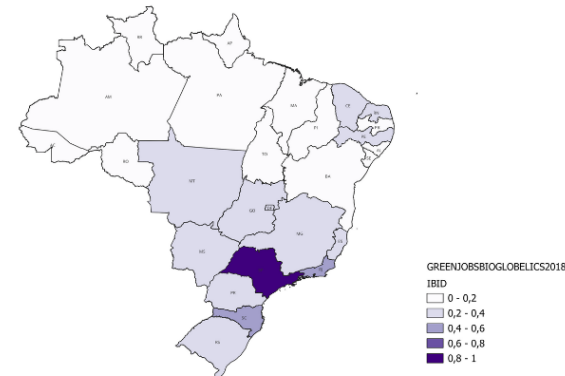
Green Jobs in the Bioeconomy across Brazilian States in 2022



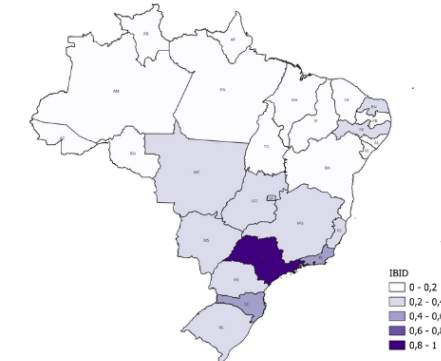
Brazil Innovation and Development Index (IBID) across Brazilian states in 2014



Brazil Innovation and Development Index (IBID) across Brazilian states in 2018



Brazil Innovation and Development Index (IBID) across Brazilian States in 2022

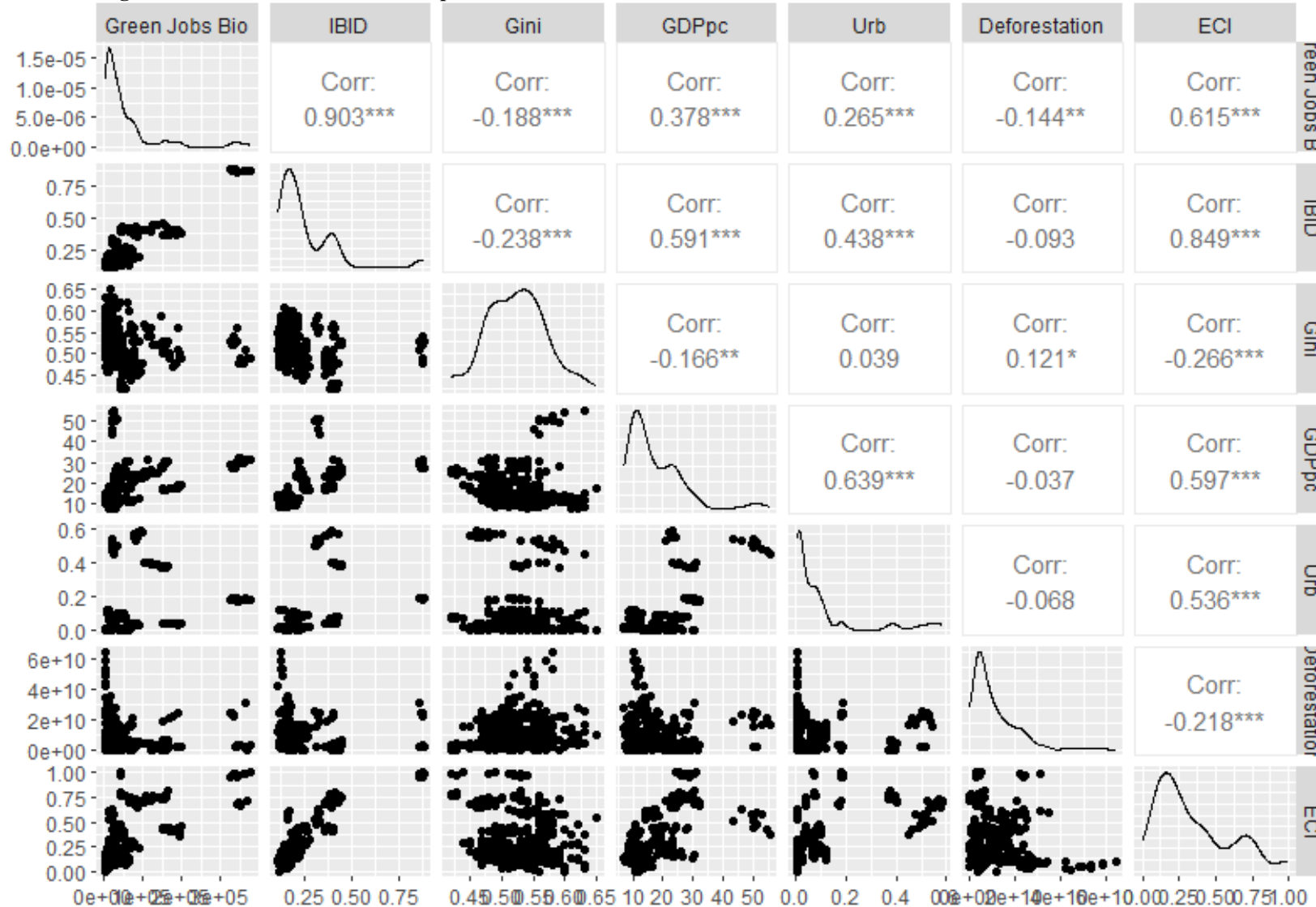


Green Jobs and Innovation distribution from 2014 to 2022

- ✓ Green jobs are concentrated in São Paulo and the southern states.
- ✓ Innovation is concentrated in São Paulo and other states in the Southeast, South, and Midwest regions.
- ✓ The Legal Amazon consistently exhibited low levels of both green jobs and innovation, highlighting structural regional inequalities in the green transition.

Results and Discussion

Figure 4. Pearson Correlation Graph – Brazil



Positive correlation with Innovation

- ✓ Regions with higher innovation are better able to generate sustainable employment.
- ✓ Highlights the importance of knowledge-intensive sectors and technological capabilities for the green transition.

Negative correlation with Inequality

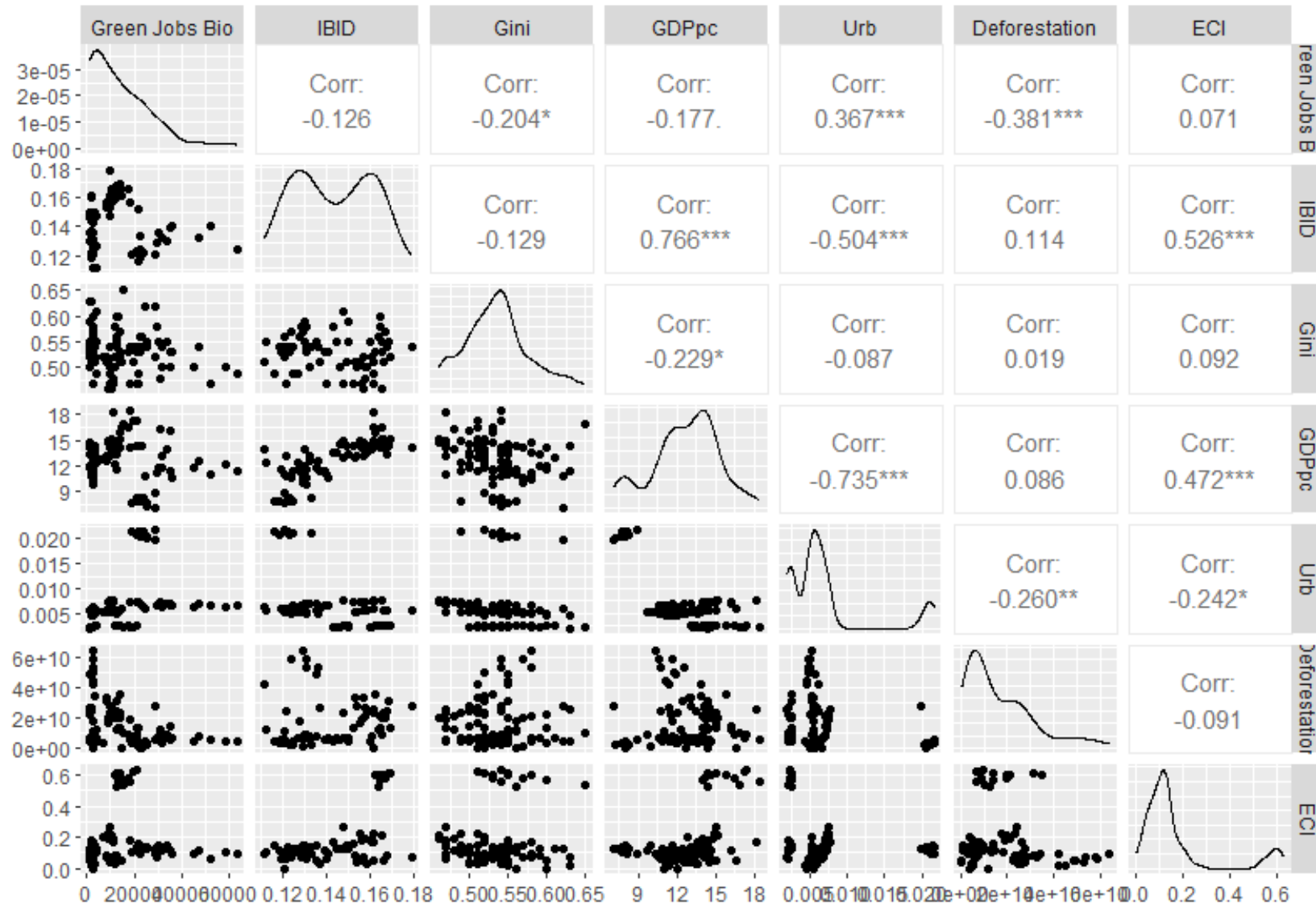
- ✓ Higher income concentration may face barriers to equitable green job creation.
- ✓ Reflects structural social and economic constraints that limit access to knowledge-intensive, sustainable occupations.

Positive effects of GDP per capita and urbanization

- ✓ Richer and more urbanized regions have better infrastructure, education, and industrial diversity, facilitating the development of green jobs.
- ✓ Urban centers may offer more opportunities for innovation adoption and sectoral diversification.

Results and Discussion

Figure 5. Pearson Correlation Graph – Legal Amazon



Deforestation negatively correlated with green jobs (institutional proxy)

- ✓ Suggests that environmental degradation undermines the potential for sustainable employment.

Inequality negatively correlated with green jobs

- ✓ Social disparities limit access to education, training, and employment in sustainable sectors.

Innovation does not show statistical significance

- ✓ Suggests that innovation has limited influence in the Legal Amazon due to low industrial diversification, scarce R&D infrastructure, and weak regional innovation systems.

Findings and Discussion



Negative effects of inequality and Deforestation

- ✓ High income concentration limits access to sustainable occupations.
- ✓ Worst green institutions reduces green jobs.

Innovation positively impacts green jobs

- ✓ Critical role of technological capacity in generating sustainable employment.
- ✓ Regions capable of absorbing and applying knowledge can develop green.

Financial Development

- ✓ Critical role of financial development in generating sustainable employment.

Results highlight the importance of integrated policies that combine:

- ✓ Innovation promotion and financial development,
- ✓ Social inclusion, and
- ✓ Decarbonization strategies.

Innovation not significant

- ✓ Technological capacity and R&D infrastructure are currently insufficient to drive green employment, highlighting a regional disparity compared to more developed areas.
- ✓ Reflects the region's limited human capital, low innovation networks, and scarce knowledge-intensive industries.

Financial development is required as well as the **combination innovation*financial** development.

Results highlight the importance of integrated policies that combine:

- ✓ Invest in infrastructure and urban development to support knowledge diffusion and green sector growth.
- ✓ Promote social inclusion and equitable access to education and training.
- ✓ Strengthen regional innovation systems and foster technological learning to translate biodiversity into sustainable economic opportunities linked to financial development.



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