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integrated climate impact research
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Exploring Land Use & Land Cover Change in Brazil

Building adaptive capacity in the context of climate change migration and conflict

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Activities in Brazil 12-24 September 2022

- Expand networks / meet with partners
- Carry out research activities—integrate capacity building
- MA Project
- Primary aim: explore to what extent human mobility and immobility are affected by different types of land use and land cover change.

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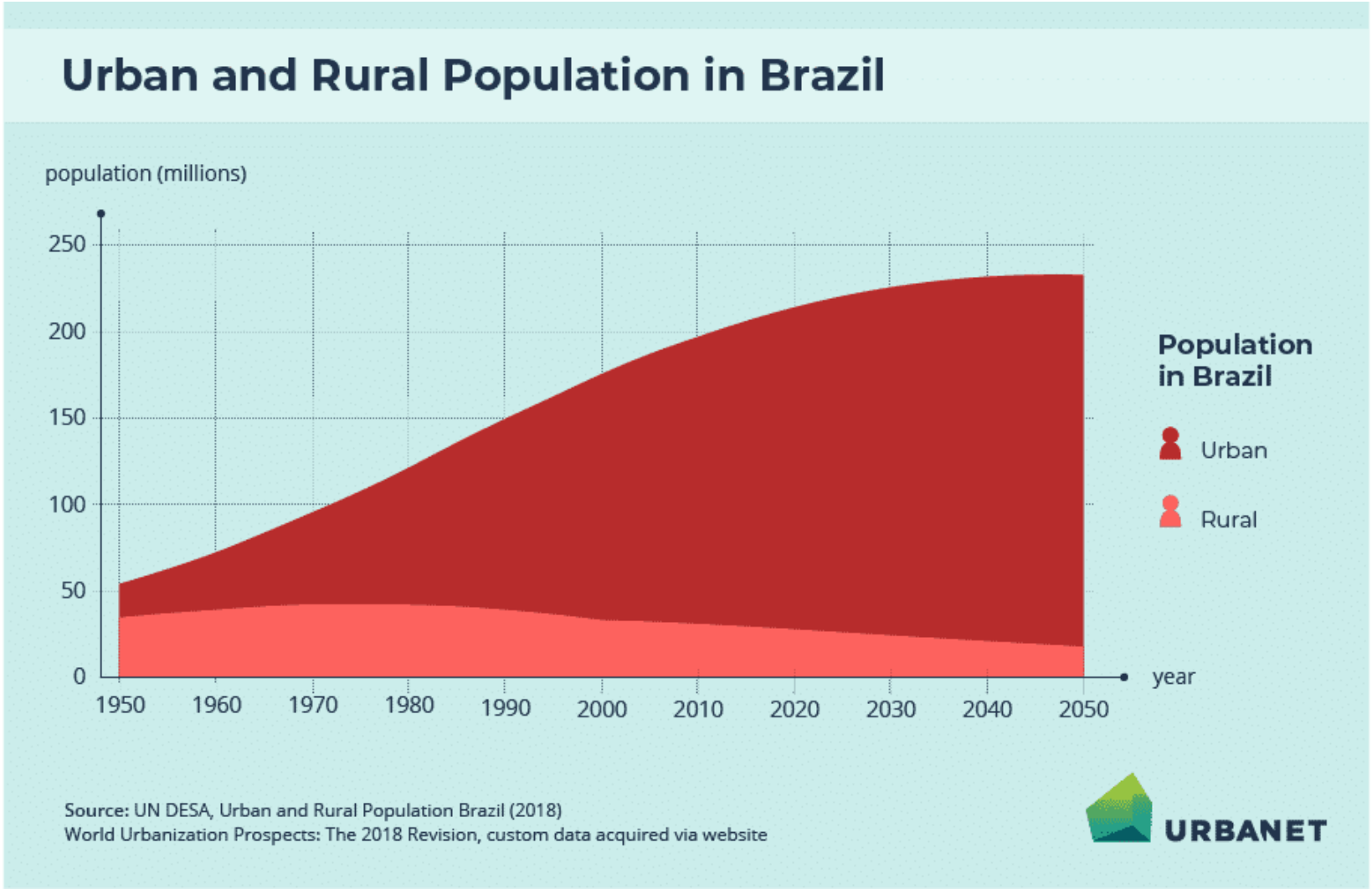
Population- 214 million



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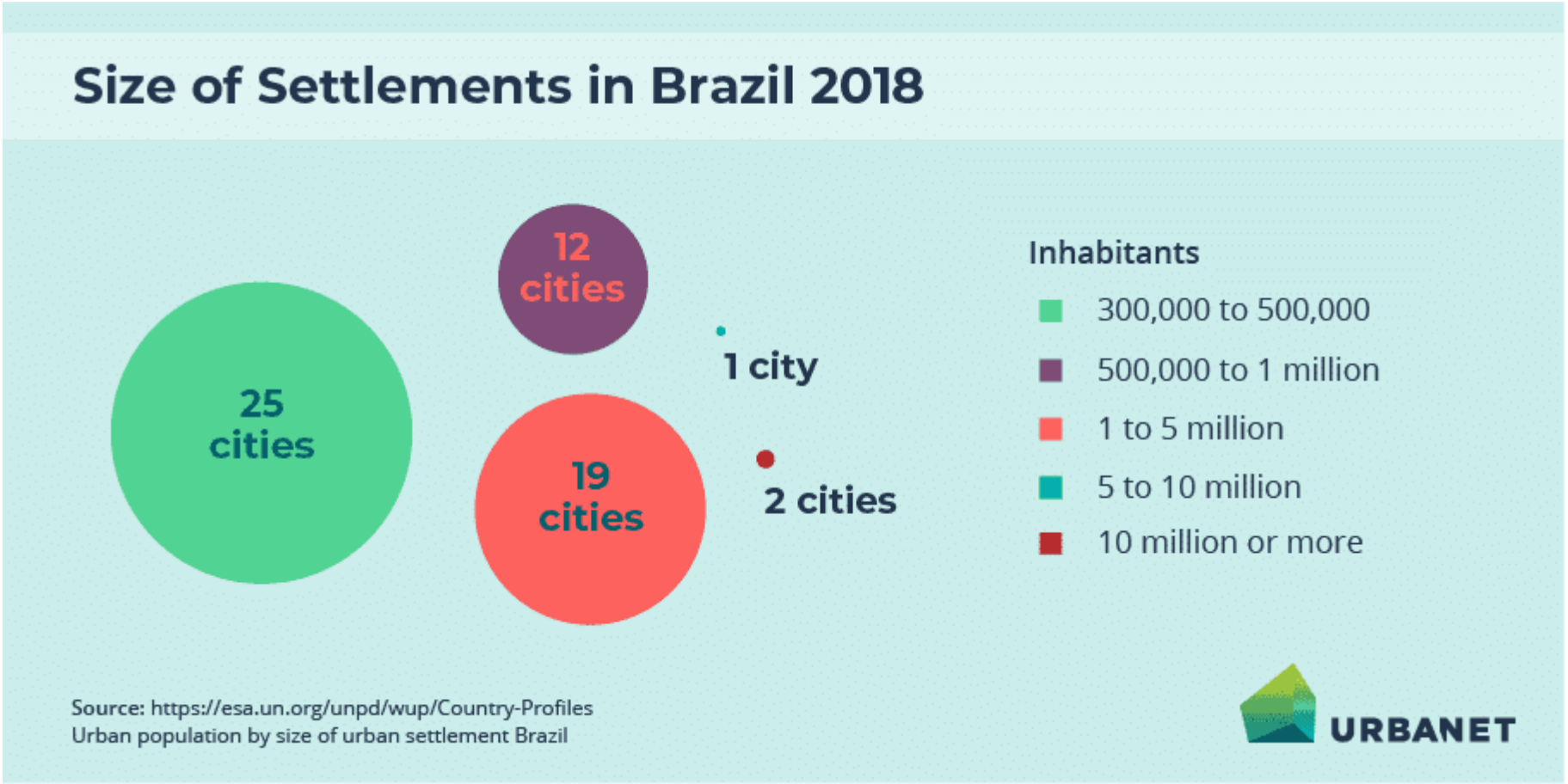
More Population

37 medium-sized cities 300k-1m

19 cities 1m-5m

2 mega cities 10 m +



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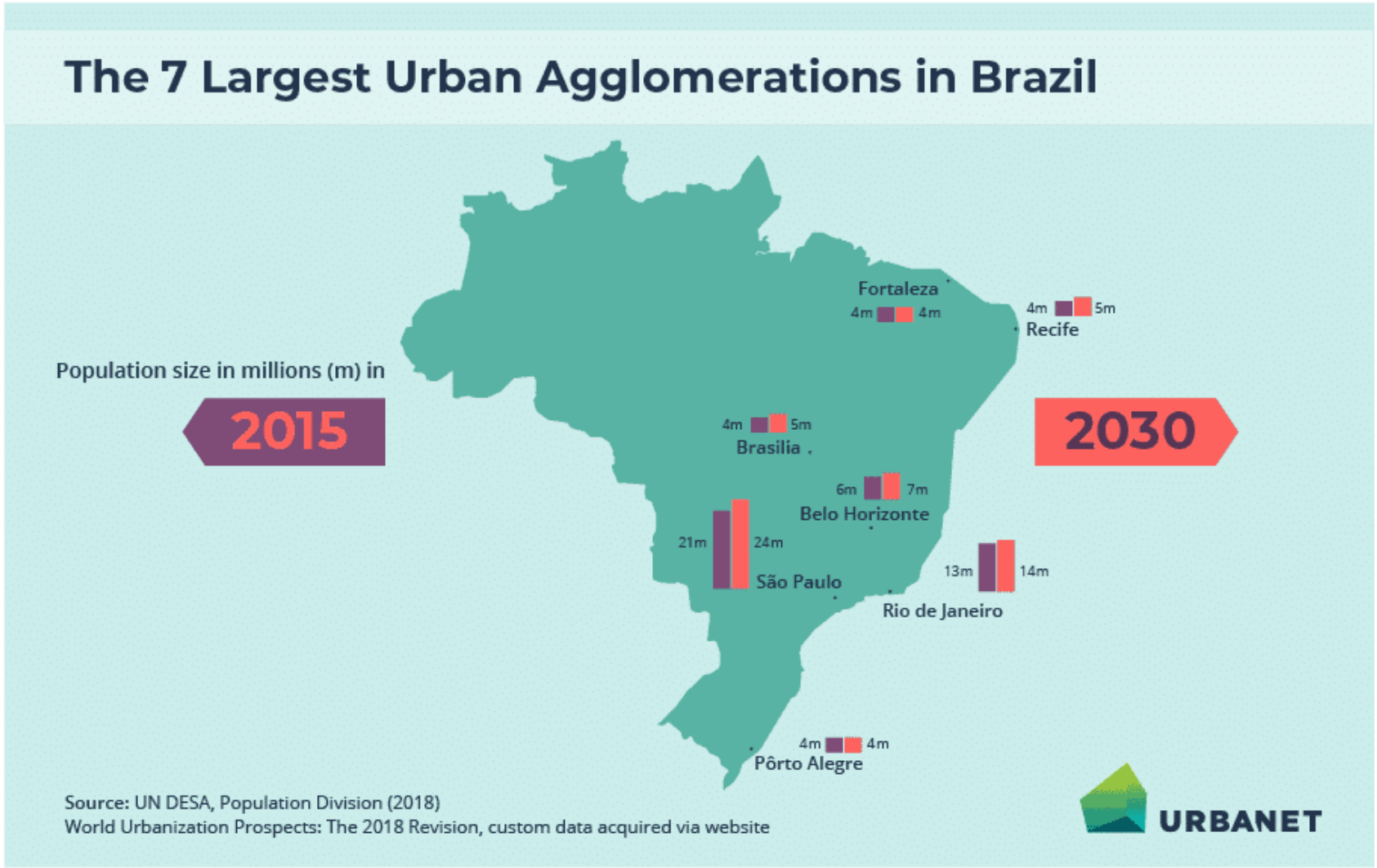
And more population



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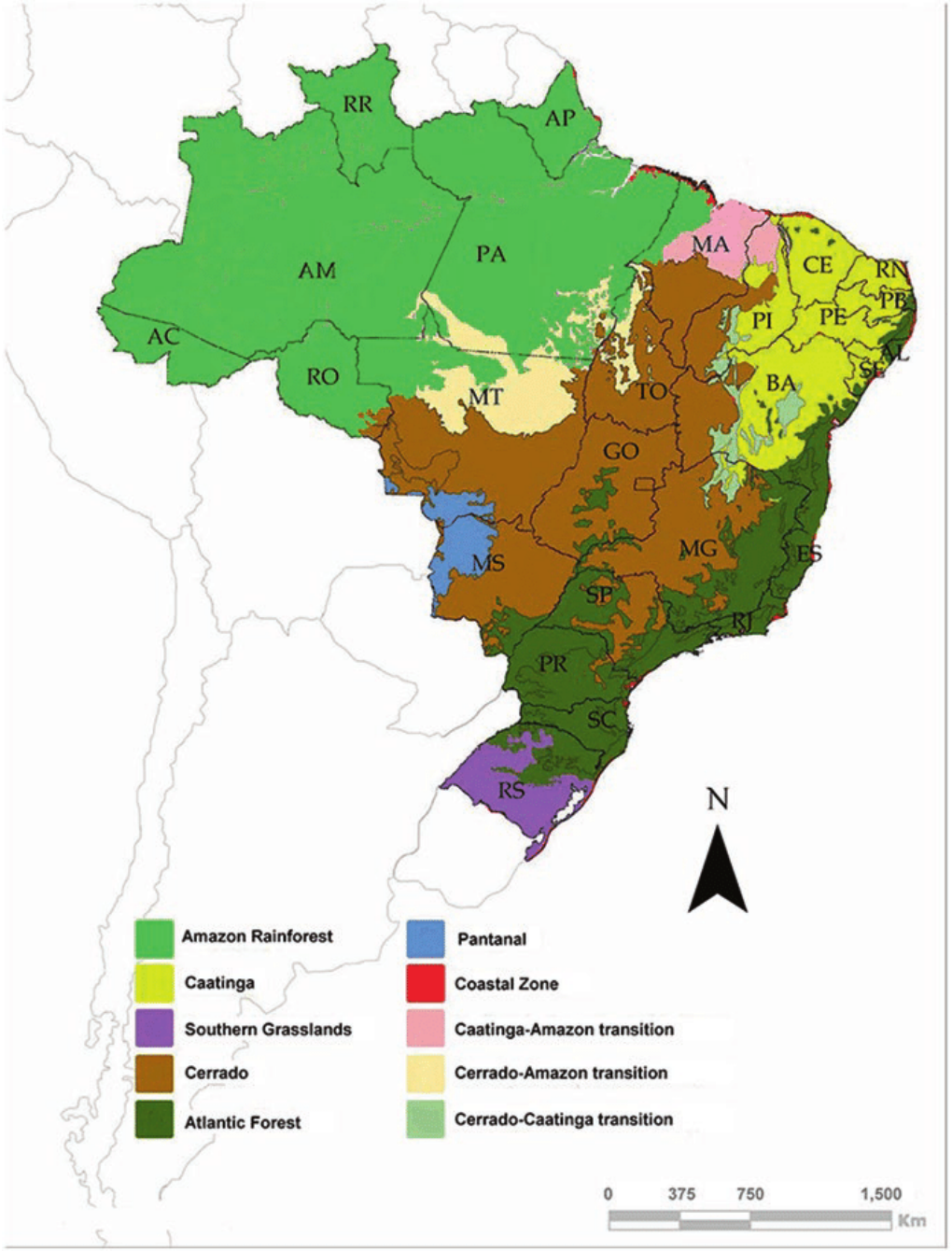
States and Biomes



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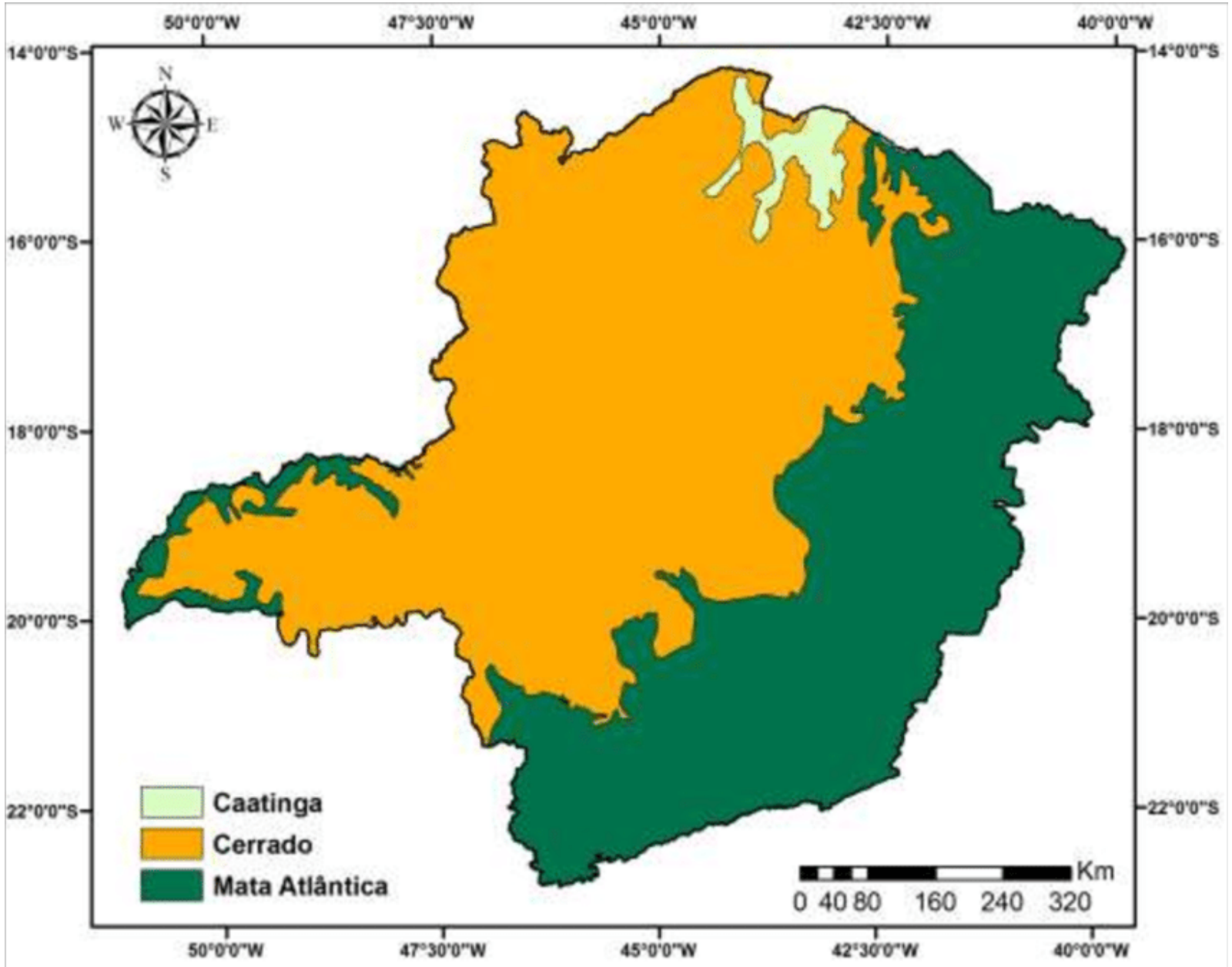
Minas Gerais Biomes



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Minas Gerais—3 biomes

› Atlantic forest—semi-deciduous,

› caatinga (semi-arid type, which has historically problems related to climate vulnerability and out-migration)

› cerrado (a savannah-like biome)

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Atlantic Forest

› stretches from the northeastern to the southern regions of Brazil and northern Argentina and southeastern Paraguay.

› A fraction the size of the Amazon, but just as bio-diverse

› Only 13% of pristine vegetation left

› 70% of Brazil's population, including mega-cities like Rio de Janeiro and Sao Paulo; accounts for 80% of its gross domestic product.

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- NE: extensive semi-dry area
- Some studies have shown a loss of up to 80% of agricultural production in periods of long drought
- 40% of NE pop considered poor
- SE has 3 of the largest urban centres
- Historically, poor socioeconomic indicators associated with periods of drought and demographic pressures have motivated peaks of out-migration (from NE to SE)
- Changes in internal migration patterns, but the constant is NE-SE flows.

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Context to the study

› IPCC (2022:5-2698) there is currently *limited evidence* and *low agreement* in the literature as to whether various forms of migration is an effective adaptation strategy to localised impacts of climate change.

› This project will contribute localized findings on the climate-migration-conflict nexus, in an exploration of land use and land cover change effects on (im)mobility and conflict through a focus on case studies of deforestation and reforestation in Brazil.

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Issues of interest from the literature

- implications for public policies seeking to advance forest recovery and long-term conservation through sustainable development growth at the local and regional levels.
- Rural out-migration diminished LU pressure; triggered forest transition—deforested to new forest cover
- This transition leading a counter-migration of people moving to rural areas as a newly valued amenity
- Potential to reshape the rural landscape with positive outcomes to the Atlantic forest cover?

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Brazil research project

- Primary aim: explore to what extent human mobility and immobility are affected by different types of land use and land cover change

- Objective; to compare*, using case study and mixed methods, the influence of reforestation and deforestation on household or individual decisions to ‘stay or leave’.

- *Case study sites in at least three biomes in the state of Minas Gerais in Brazil—Atlantic Rainforest, cerrado and caatinga.

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Brazil research project

› Interested in migratory flows and forest recovery following the Atlantic Forest Protection Law of 2006.

› Conflict/tension issues??

--restrictions on land available fo farming?

--rural-urban migration...competition for jobs, resources, housing, etc? Sustainability of forest recovery vs land disputes?

--Amazon...rural-urban migrants eyeing return to reforested lands ...MG follow suit?

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Methods (at this point)

› local researcher semi-structured interviews with key informants

› Baseline questionnaire household surveys in selected communities in Atlantic Forest biomes.

› Capacity building: involvement of local university research student

› Given the vast area size of both biomes, communities will be selected in consultation with local partners, incl NGOs as well as the University of Sao Paulo and the Federal University of Minas Gerais.

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Outcomes considered (at this point)

› contribute localized findings on the climate-migration-conflict nexus

› Social implications of environmental policy--poor small holders and wealthier counter-migrants?

› Understand land use and land cover change effects on (im)mobility and conflict through a focus on case studies of deforestation and reforestation in Brazil.

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Key References

- Barbieri, A.F., Domingues, E., Queiroz, B.L. *et al., 2010.* Climate change and population migration in Brazil's Northeast: scenarios for 2025–2050. *Popul Environ* **31,** 344–370
- Chazdon, R.L., Lindenmayer, D., Guariguata, M.R., Crouzeilles, R., Benayas, J.M.R. and Chavero, E.L., 2020. Fostering natural forest regeneration on former agricultural land through economic and policy interventions. *Environmental Research Letters*, *15*(4), p.043002.
- da Cunha, J.M.P. (2019). Internal Migration in Brazil over the Past 50 Years: (Dis)Continuities and Ruptures. In: Arretche, M. (eds) Paths of Inequality in Brazil. Springer, Cham. https://doi.org/10.1007/978-3-319-78184-6_10
- Silva, R.F.D., Batistella, M. and Moran, E.F., 2018. Regional socioeconomic changes affecting rural area livelihoods and Atlantic forest transitions. *Land*, *7*(4), p.125.
- Mataveli, G.A.V. and Chaves, M.E.D., 2014. Análise da distribuição espacial dos focos de queimada no Estado de Minas Gerais entre 2009 e 2012. *Anais do I Simpósio Mineiro de Geografia, Alfenas, MG, Brasil*, pp.1657-1669.

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