

Climate Changes in Brazil: Systemic Effects Among the Brazilian Economy from Changes in Agricultural Productivity (in progress).

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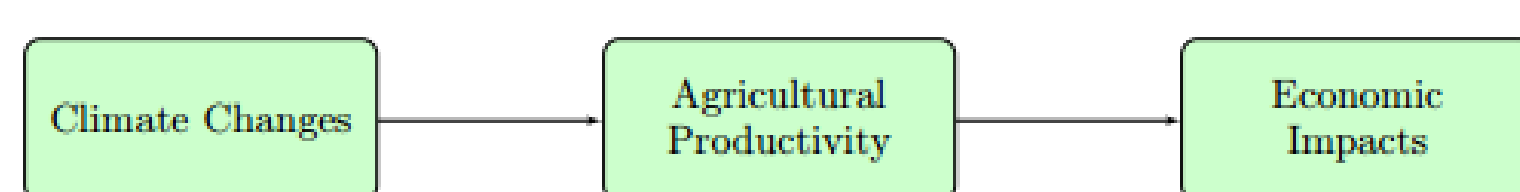
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1 - Abstract

The objective of this project is the estimation of the impact that the projected climate changes for the different Brazilian regions can have on the economy of the country. The aim of the study is to analyze the vulnerability of the country's agriculture sector to possible future climate change through the effect they may have on the productivity of Brazil's agricultural crops.

Besides, the study intends to formulate a map of the systemic effects of shocks of agricultural productivity for the different sectors and regions of the Brazilian economy.

It is expected to identify, in the context of computable general equilibrium models, how agricultural productivity shocks from projections of climate change may affect a large number of economic variables such as production, prices, activity level, demand of factors, consumption, well-being, and others.



2 - Methods and Materials

1 - The Econometric Approach:

$$y_{i,t} = f(\text{climate}_{i,t}, \text{prices}_{i,t-1}, \text{technology}_{i,t})$$

$$A_{i,t} = f(\text{climate}_{i,t-1}, \text{prices}_{i,t-1}, A_{i,t-s})$$

2 - The CGE Model:

Once the relationship between the weather and the agricultural productivity is estimated, it is possible to use the framework provided by the computable general equilibrium models in order to estimate the economic impacts of climate changes among Brazilian regions and sectors.

By "general equilibrium" one must understand the analytical framework that sees economics as a complete and interdependent system whose components (sectors, families, government, investors, importers and exporters) interact with each other. Such models consider that the economic shocks in a given sector do not only affect this one, but end up generating a chain effect that creates repercussions through the system as a whole.

By "applied", it should be understood that the main focus of these models is to provide results that allow the quantitative analysis of policy and economic problems across countries, sectors or regions.

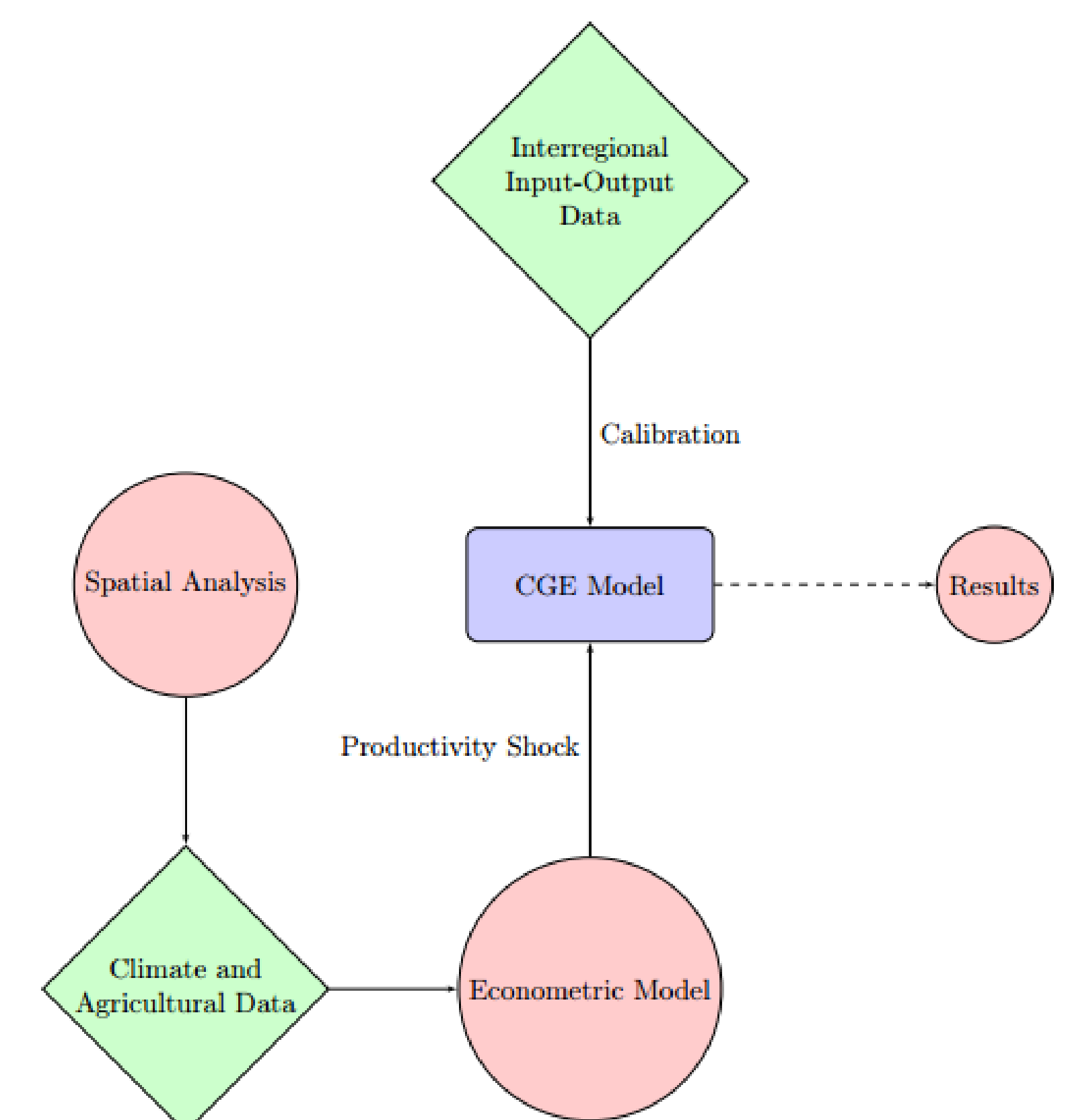


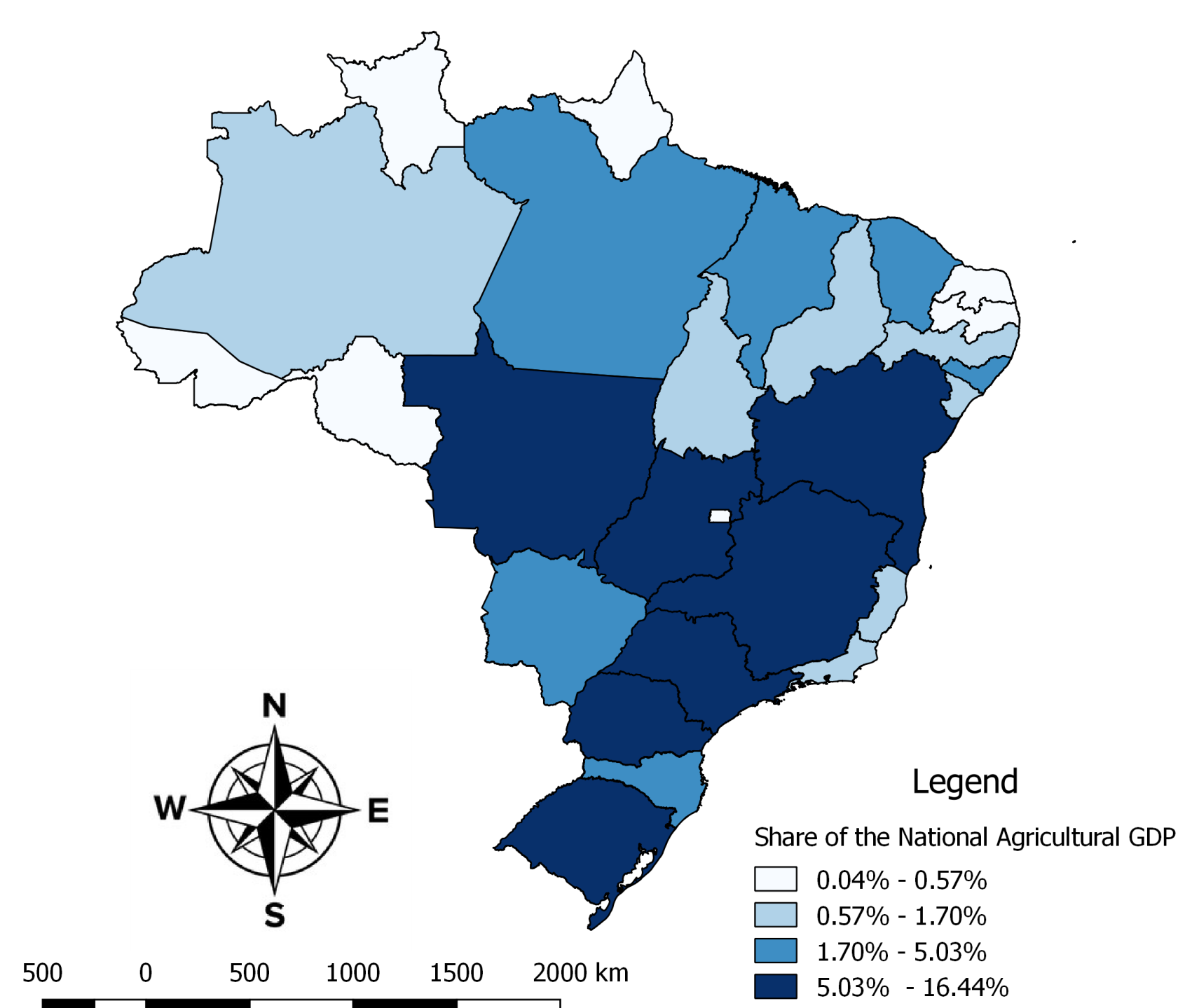
Image 1. The Framework

3 - B-MARIA-27 (2011)

The Brazilian Regional and Interregional Analysis Model² is a multisectoral and multiregional model that divides the Brazilian economy into 68 productive sectors which spreads through the 27 Brazilian states.

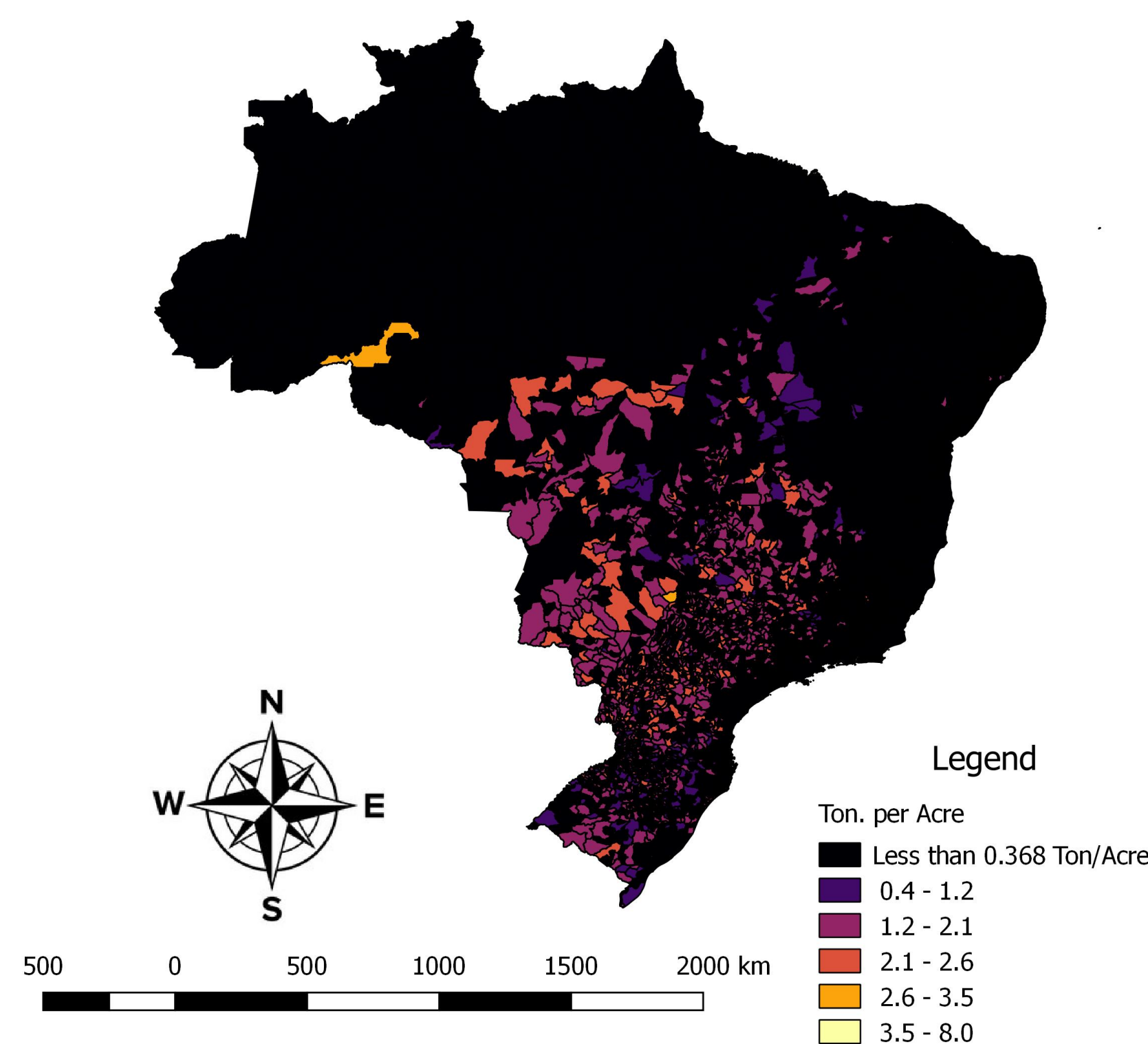
Thus, the model has a representative consumer and investor by region, regional and federal government structure and a single external sector that can be traded with any domestic region. The model is calibrated for the year of 2011 and assumes that the tax structure and national tariffs can be replicated for all regions of Brazil that same year.

The Agricultural Sector in Brazil - 2011

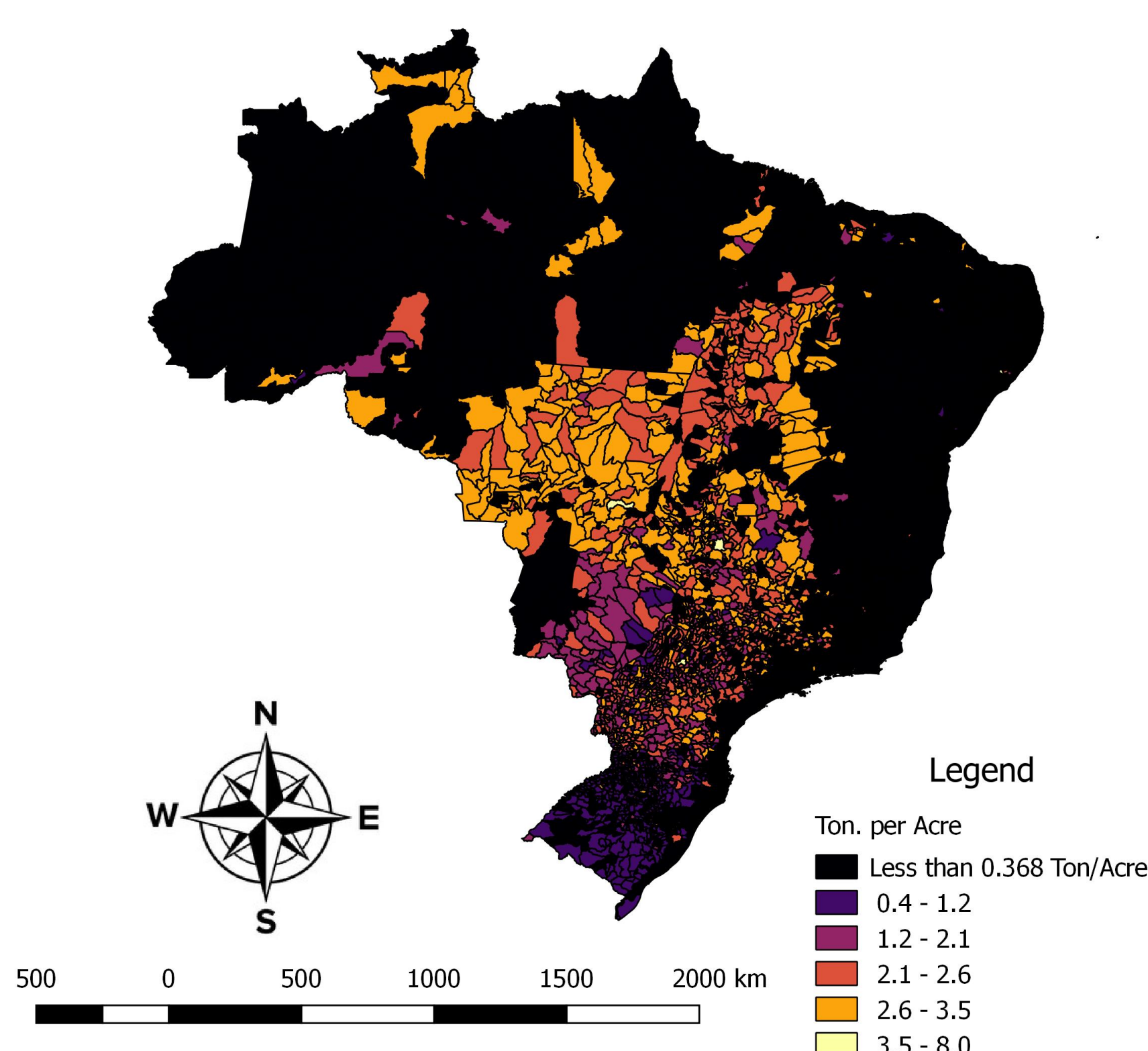


4 - The Soybean Case

Soybean productivity (ton. per acre) - 1985



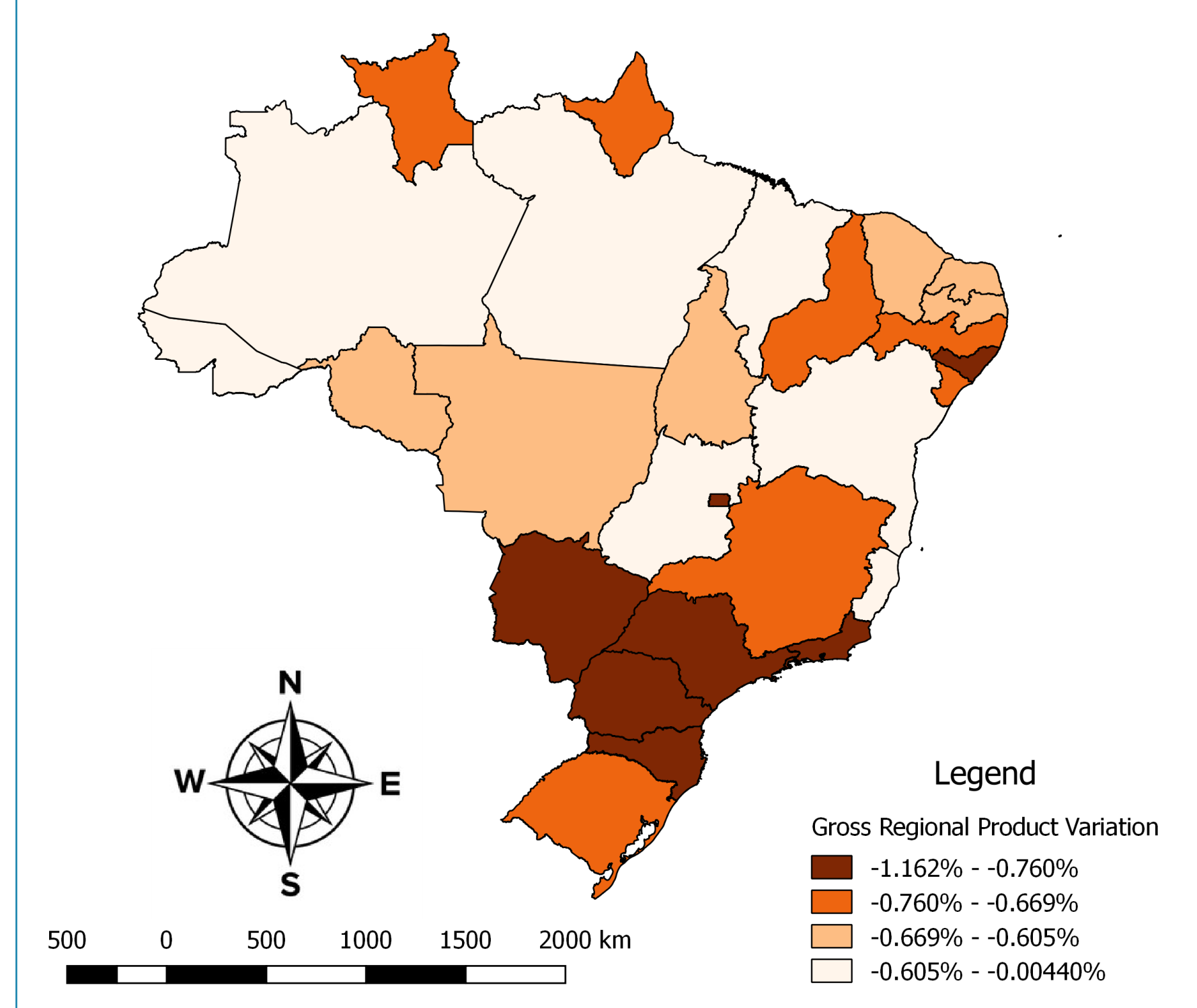
Soybean productivity (ton. per acre) - 2005



5 - A Simulation

Simulation of a drought in the state of São Paulo that reduces the productivity of the agricultural sector by 10%.

Simulation of a Drought in São Paulo



6 - Conclusion

That said, it is intended to estimate the effect that the projected climatic changes may have on agricultural productivity in the future and, given these changes, analyze the potential effects on the Brazilian economy and in its different sectors and regions.

Contact

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References

1. www.escolhas.org/en/
2. Haddad (1999).

Support



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