NITROGEN CYCLING IN LATIN AMERICA: DRIVERS, IMPACTS AND VULNERABILITIES (Nnet)

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Nnet: strategic objectives

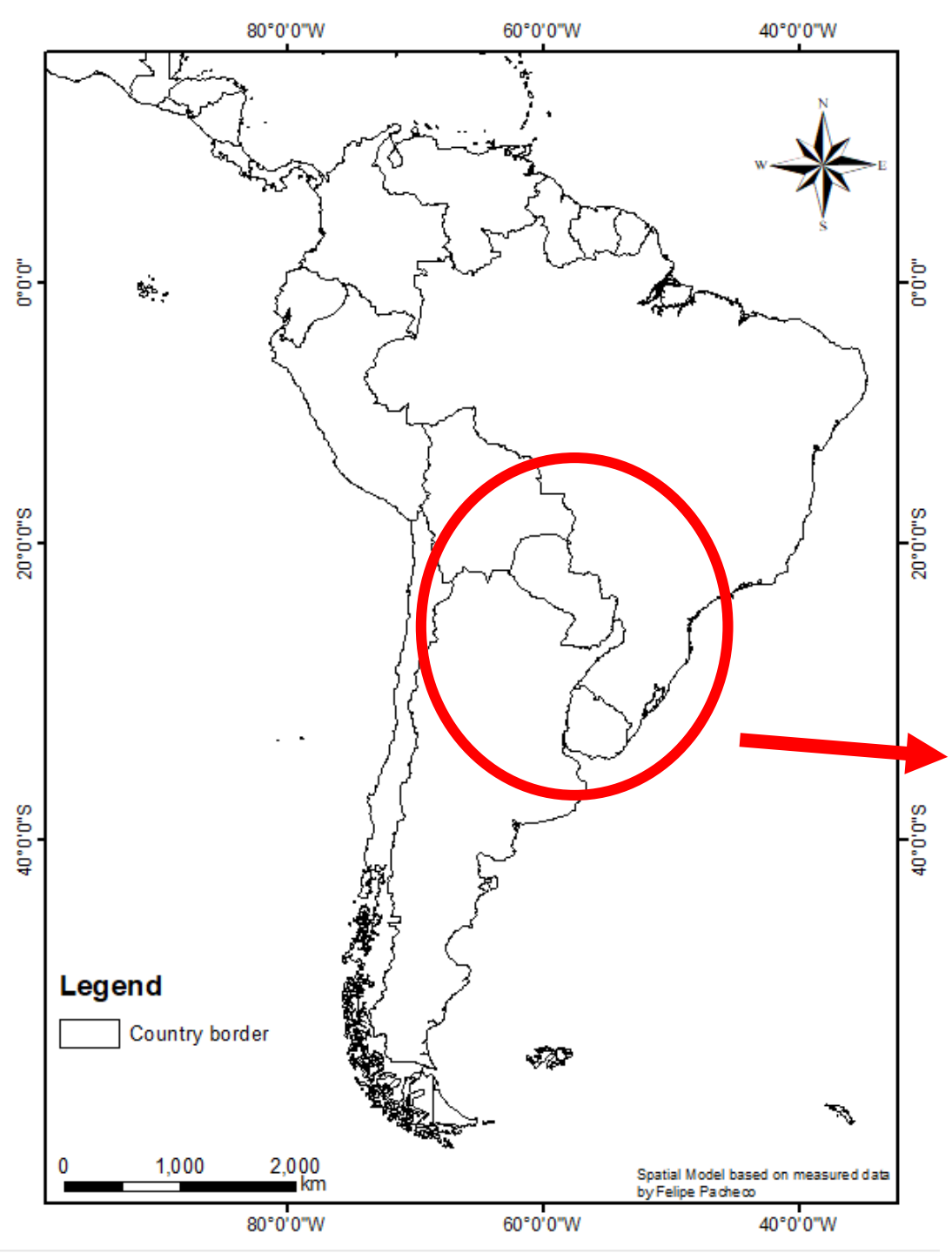
A scientific cooperation network across Latin American countries to investigate the processes that modify different aspects of the nitrogen cycle through an integrated approach

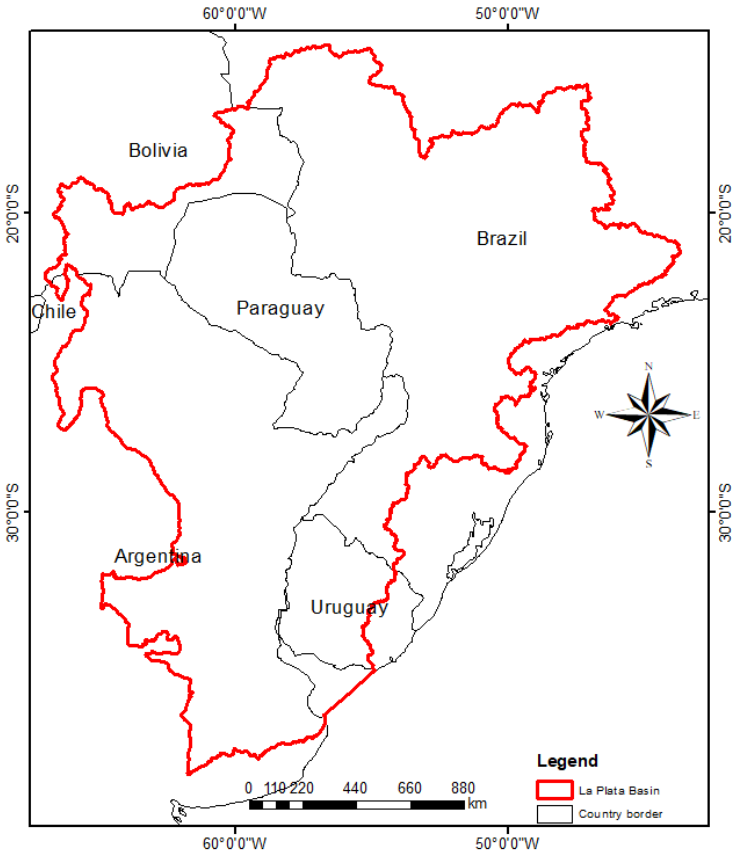
Latin America and SA Demo site: Geographic Area and Context

- Lack of (little) information - The impacts of land use and land cover changes, urbanization and climate extremes in the nitrogen cycle, are issues still demanding deeper understanding in Brazil and Latin America.
- In general, only 20% of the domestic wastewater in the region is treated and about 17% of the population has no access to sanitation;
  - Sewage and poor management of watersheds lead to impoverishment of inland water resources at local scale, and leads to degradation of estuaries and coastal zones.
- *Non-sustainable* agricultural practices deplete natural riparian habitats resulting in high sediment and nutrient load in rivers and streams, often causing reduction of flow and eutrophication
- *Too much and too little nitrogen* - Relevant social/economic questions: pollution, agriculture (fertilizer use, food / biomass production), ecosystem services.

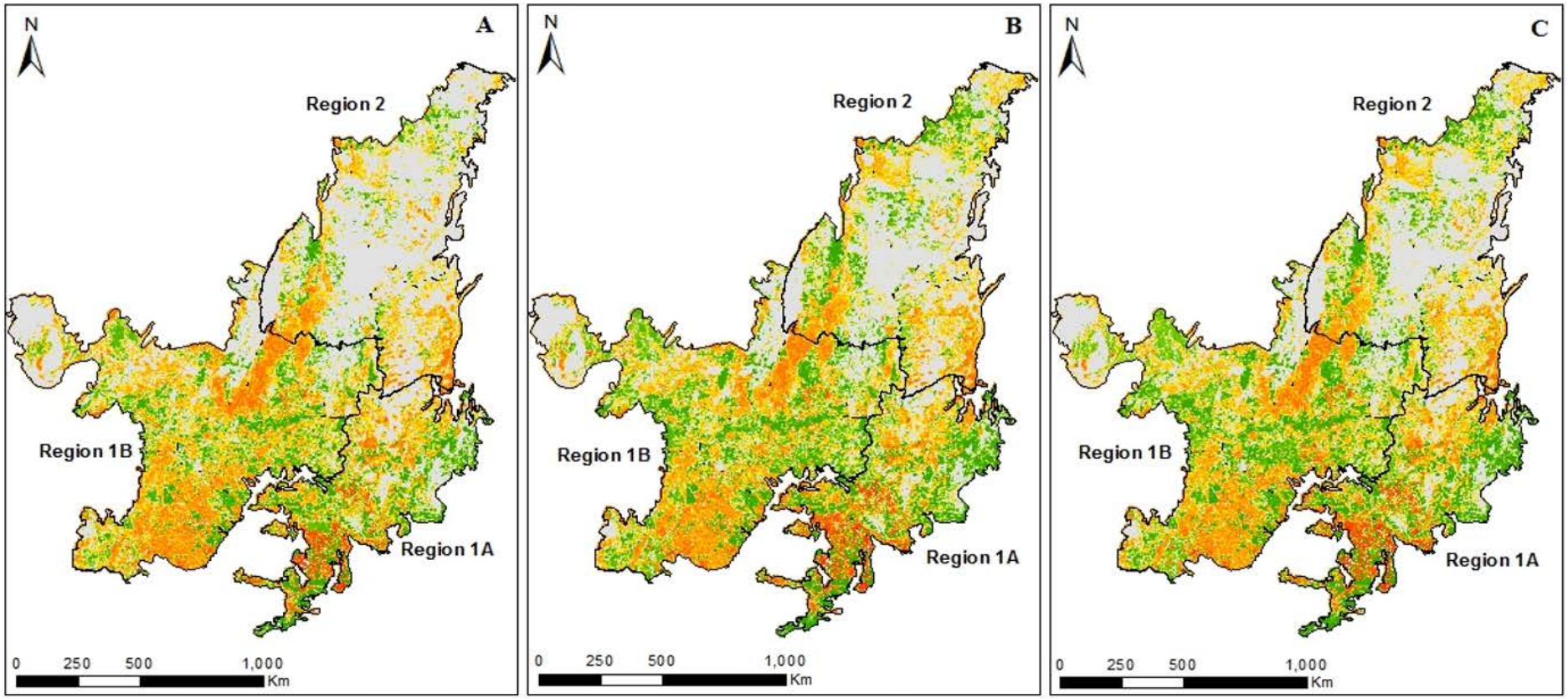
- Wet deposition map of Nr in kg/ha/yr, for South America and Central America estimated from observation data.

SA INMS demo site





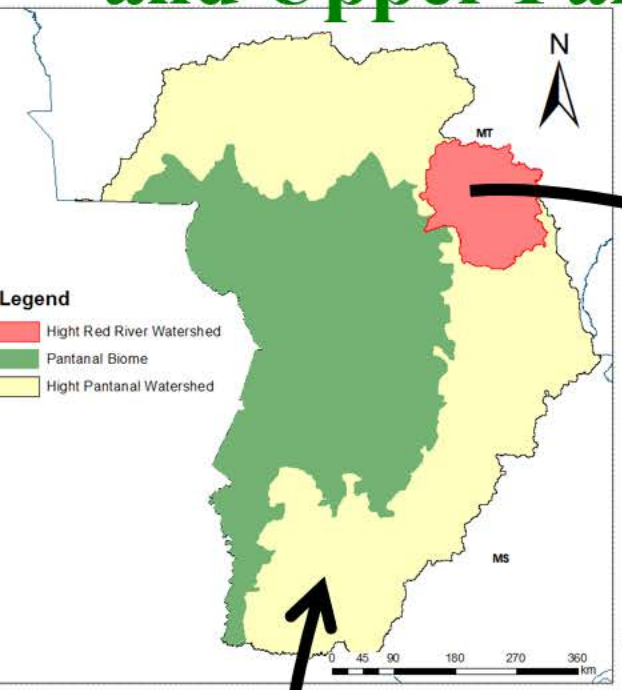
Scientific results: case study (Brazilian Cerrado and Upper Pantanal)

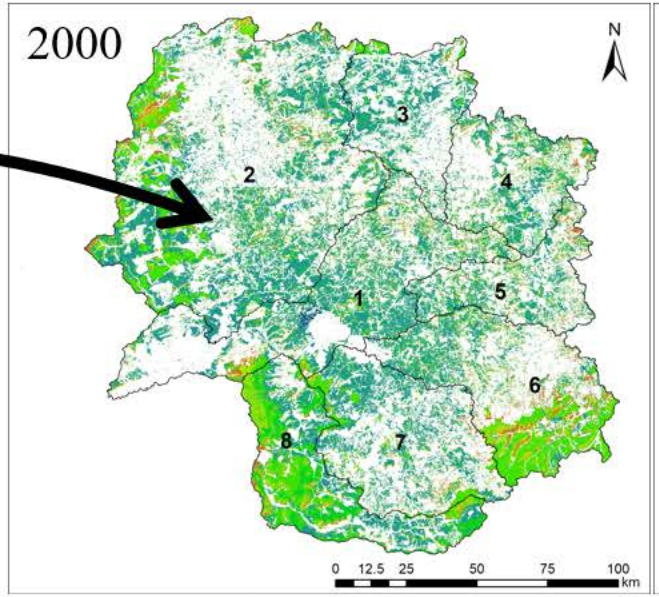


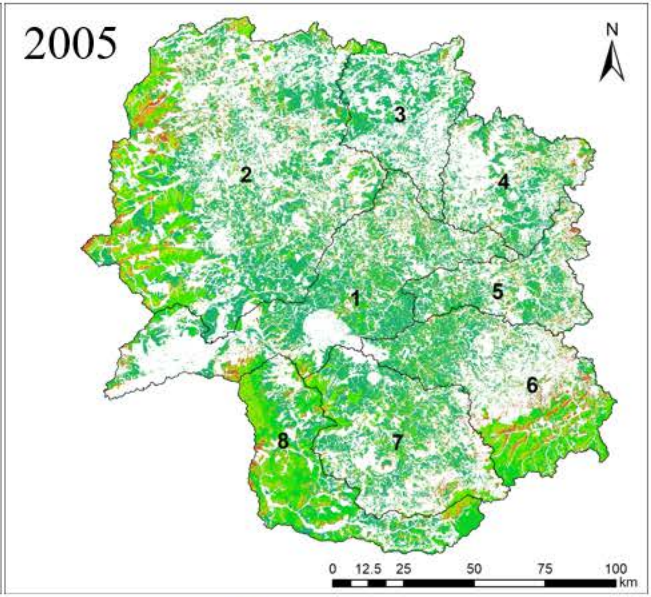
Soil nitrogen Balance in the Brazilian Cerrado region. Warm colors indicate loss of nitrogen and green colors gain, for the years 2000 (A), 2010 (B), and 2012 (C).

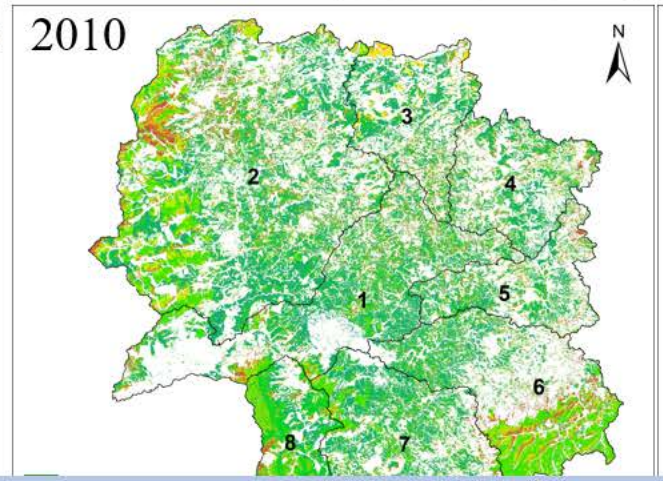
Gomes, L. et al, (2017)

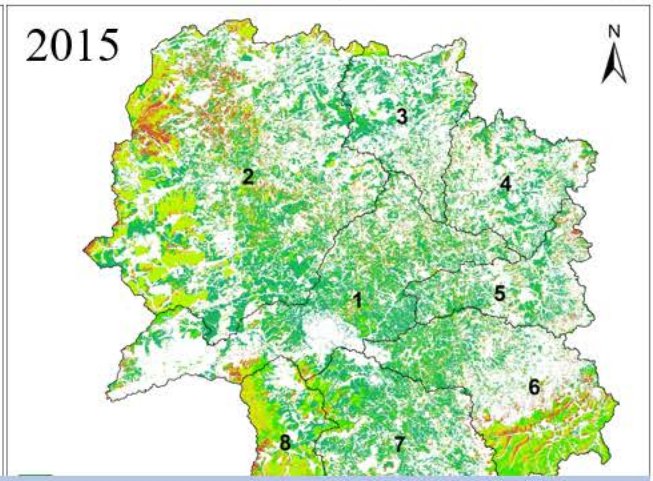
Scientific results: case study (Brazilian Cerrado and Upper Pantanal)



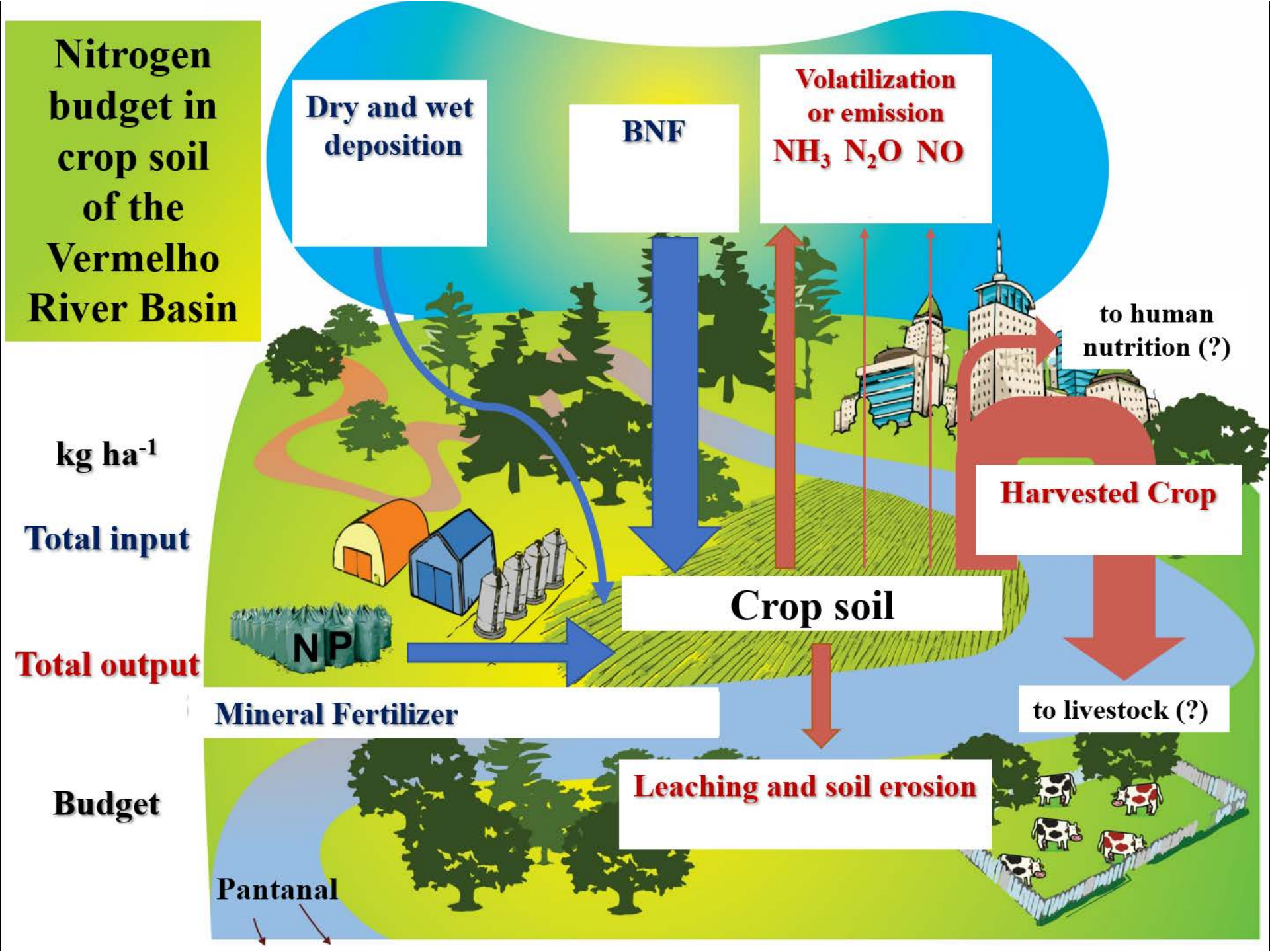








Case Study on nutrient management valuation in Rondonopolis municipality in the upper Pantanal Region of South America


Nitrogen budget in crop soil of the Vermelho River Basin
Dry and wet deposition
BNF
Volatilization or emission
NH_3 N_2O NO
to human nutrition (?)
kg ha^{-1}
Total input
Harvested Crop
Crop soil
NP
Total output
Mineral Fertilizer
to livestock (?)
Budget
Leaching and soil erosion
Pantanal

Social dimension: drivers and policies

- The number of policy instruments specific for nitrogen is actually limited worldwide, in contrast with the huge diversity in Nr emission sources and pathways. Existing policies are generally focused on individual compounds from specific sectors.

- A survey was performed, indicating that there is no nitrogen specific policies in the Latin American region, neither a common directive nor a framework in which nations can create their own regulations, as is observed in Europe.

- A potential solution for policy integration would be adherence and commitment of Latin American countries to the “Policy Arena on Nitrogen”, proposed by the International Nitrogen Management System (INMS).

Social dimension: drivers and policies

MAJOR CHALLENGES

- How to communicate scientific results to non-specialists? How to engage stakeholders and government institutions to discuss a proper baseline for a sustainable land management?

- How the food system can best be managed at the local level to reduce the negative impacts related to the nitrogen cycle? Is it possible to find reliable data for countries other than Brazil in Latin America?

- How to promote the adherence of Nnet results to the “Policy Arena on Nitrogen”?

Nnet: Nitrogen budget in Latin America











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THANK YOU