Leibniz Centre for **Agricultural Landscape Research** (ZALF)

Research Area 2 "Land Use and Governance"

The role of protected areas in conserving lowland grassland and savannah ecosystems in Latin America

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Introduction

- Grasslands and savannahs are among the most biodiverse ecosystems on Earth, supporting both human livelihoods and unique wildlife across continents.

In Latin America, regions such as the Pampas, Llanos, and Cerrado hold exceptional ecological and cultural value, yet face increasing pressure from agricultural expansion, overgrazing, and land-use change. Advances in monitoring tools, including spectral indices and species distribution models, now offer new opportunities to assess their health and guide conservation strategies within protected and private lands.

Objective

- To analyze the conservation status of Latin American grasslands and savannahs, in Colombia and Argentina, comparing protected areas (PAs) including Private Protected Areas (PPAs) with their surroundings.

Methodology

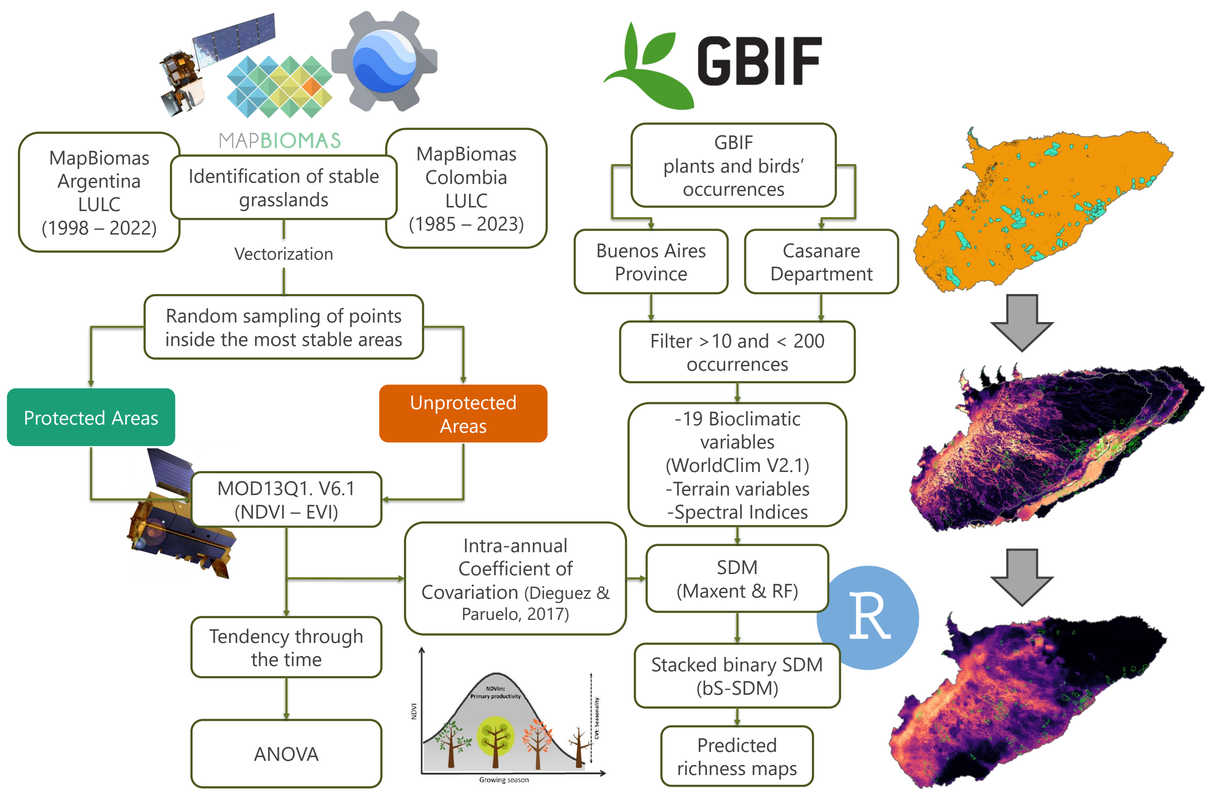

Fig 1. Workflow to retrieve data from different sources, process and compare between inside and outside PAs.

Results

NDVI – EVI through the time

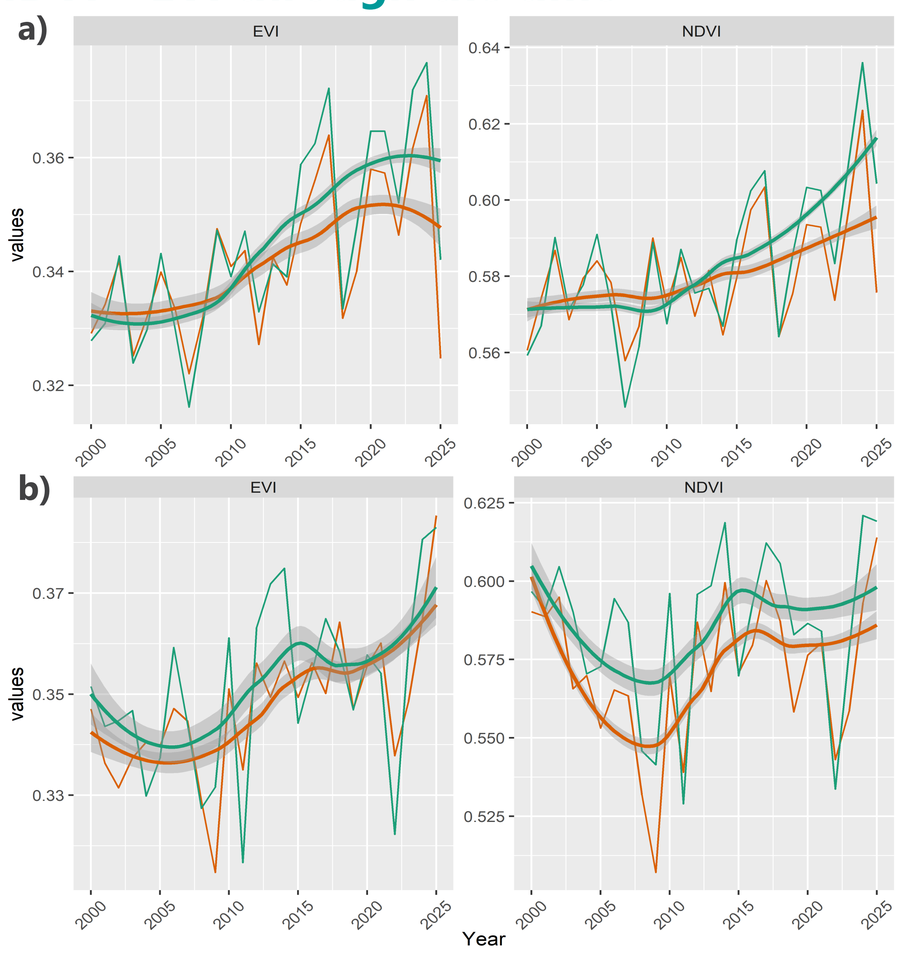

Fig 2. NDVI and EVI values averaged and confidence intervals yearly, inside (green line) and outside Pas (orange line), the a) Colombian case, b) Argentinian case.

Species occurrences

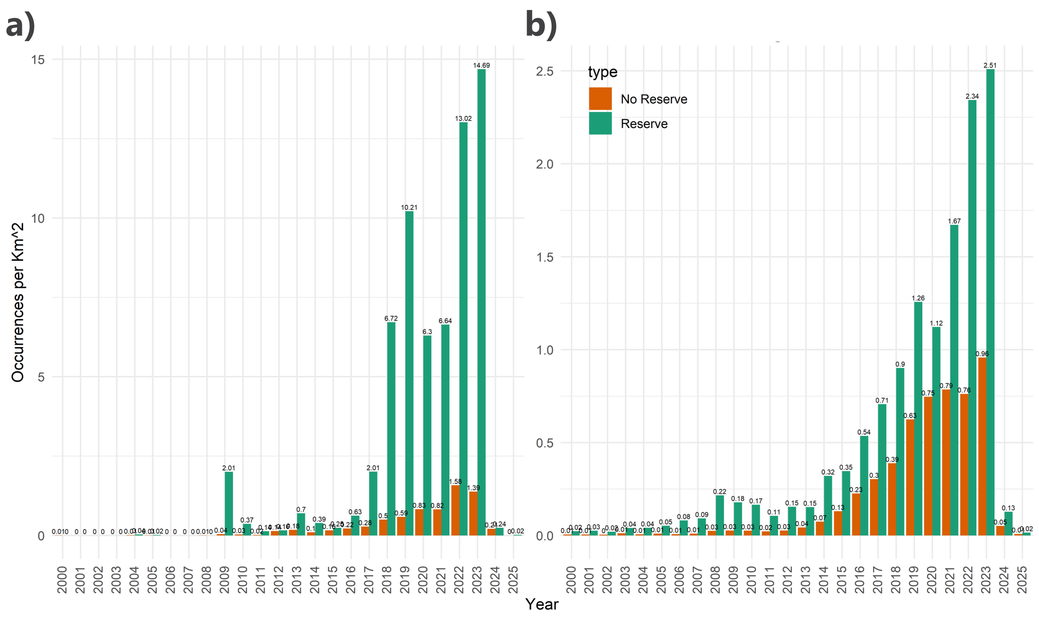

Fig 3. Number of birds occurrences per area inside and outside reserves. a) Colombia b) Argentina.

Predicted richness based on bS-SDM

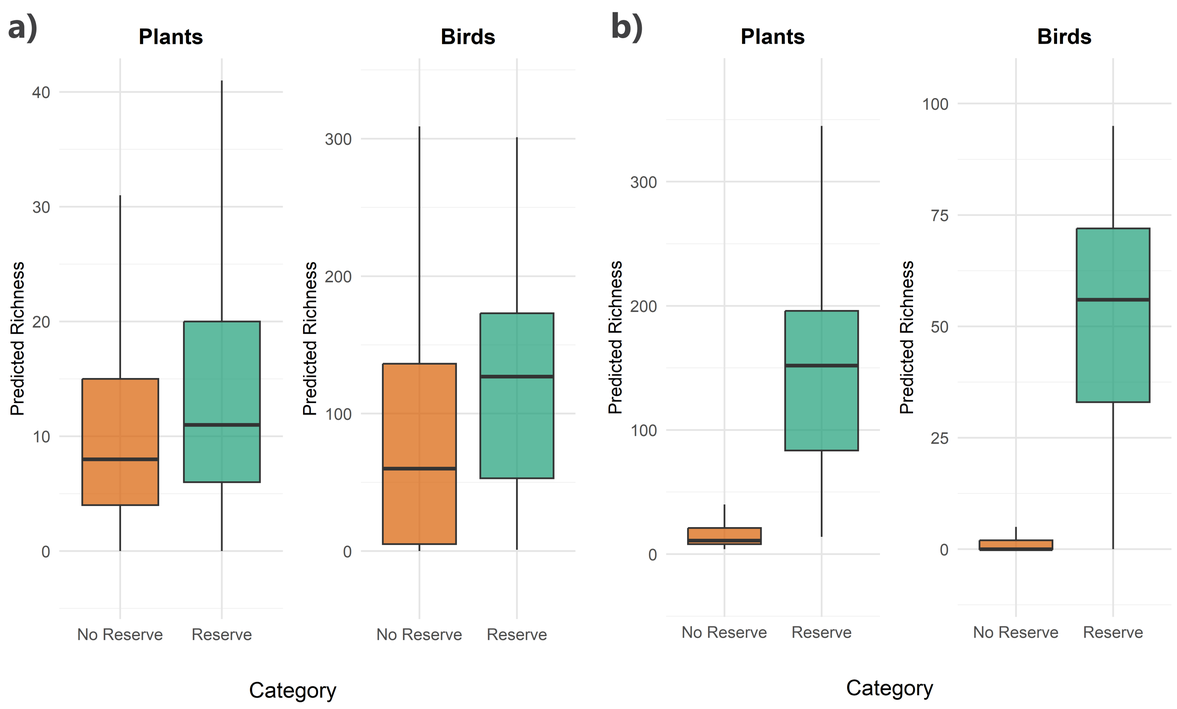

Fig 4. Number of predicted species richness for plants and birds in a) Colombia and b) Argentina.

Discussion

- Although a clear identification of natural or semi-natural grasslands is difficult especially backwards. Using LULC products generated yearly by MapBiomas we could identify the most stable grasslands areas (without transitions).
- Reserves have shown higher values of NDVI and EVI, particularly from 2015 onward in Colombia. Moreover, the number of birds and plants' occurrences per square kilometre has been higher inside reserves compared to land without a protection status.
- Based on the predicted richness of plants and birds generated through the binary stack of SDMs, reserves show higher richness of birds and plants specially in Argentina.

References:

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