

Integrating Indigenous and Local Burning Knowledge in Fire Management Strategies for the Conservation of Overlooked Ecosystems (Grasslands and Savannahs) in Paraguay

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Introduction

- Fire has been fundamental in shaping Paraguay's grasslands and savannahs for millennia.
- Traditionally, Indigenous communities and farmers have employed controlled burns as a land management tool. These practices are deeply rooted in **Indigenous and local knowledge systems**.
- However, recent shifts in land use, particularly the transition from small-scale subsistence farming to large-scale cattle ranching and crop production, have led to increased fire frequency and intensity, posing a significant threat to biodiversity and rural livelihoods.
- Despite regulatory restrictions on burning, fire occurrence has not declined, underscoring the **limitations of current fire mitigation strategies**.



Burned grassland in the Humid Chaco, Paraguay, in 2024.

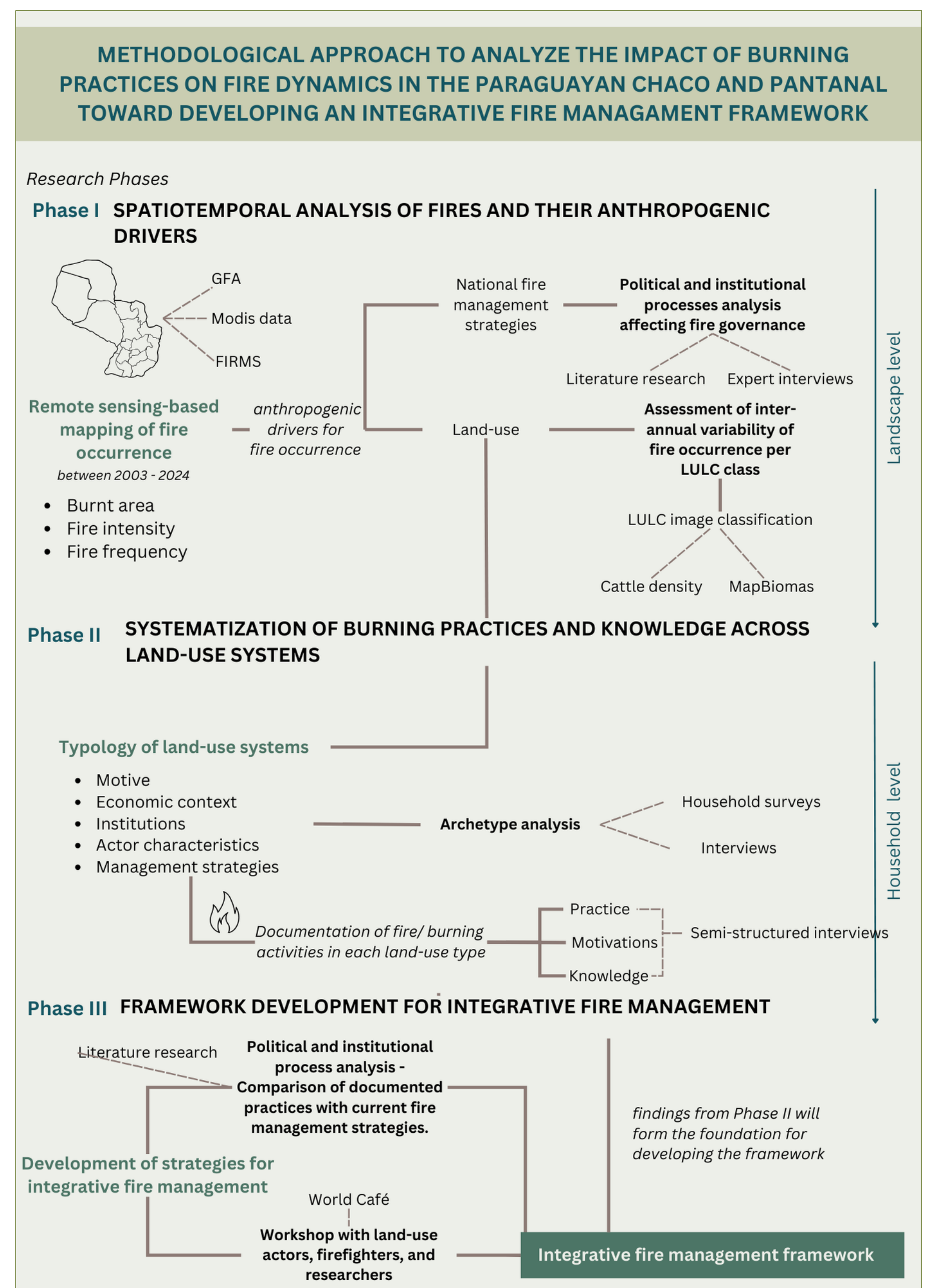
Author's own contribution

Research Objective

This study set out to investigate the role of Indigenous and local burning practices in shaping fire regimes across Paraguay's grasslands and savannahs. It aims to advance the understanding of the social dimensions of fire dynamics and contribute to the development of an integrative fire management framework that incorporates local practices and knowledge.

Methodology

- The **Gran Chaco and Pantanal ecoregions** serve as case studies
- This study employs a multi-phase, mixed-methods approach integrating qualitative, quantitative, and spatial analyses.
 - Analysis of **spatial and temporal fire patterns** using remote sensing techniques.
 - Cross-case comparison of burning practices** across diverse land-use systems through the formulation of a typology
 - Development of an **integrative fire management framework**



Methodological Design

Author's own contribution

First Insights

In November 2024, fieldwork was conducted in Paraguay to adapt the research framework to local reality. We conducted semi-structured interviews with stakeholders from academia, government, and Indigenous and farmer organizations.

Key observations on fire management:

- Paraguay currently lacks a comprehensive fire management strategy. Fire response relies on **volunteer firefighters**. However, the number of personnel is insufficient to address the increasing fire occurrence
 - In some regions, such as the Pantanal, **fire departments lack**, necessitating that firefighters travel from the capital, Asunción, to address fire in remote areas
- The **high penalties** for burning has led farmers to adopt alternative land management strategies, including mechanized land clearing and the increased use of pesticides.