Assessing Cropland-Driven Deforestation: Insights from GFW and MapBiomas Data (Part2)

A. Methodology

The analysis of total and cropland-driven deforestation relies on data from Global Forest Watch (GFW) and MapBiomas. Both datasets use satellite imagery and land-cover classifications but differ in their methodologies.

Total deforestation was calculated by identifying vegetation loss over a defined period (2010-2023). For GFW, deforestation detection is based on global forest change algorithms, which identify tree cover loss. MapBiomas, on the other hand, leverages a finer-scale approach tailored to Brazilian land-use contexts using annual classification maps.

Cropland-driven deforestation, a subset of total deforestation, was estimated by intersecting deforestation areas with cropland land-cover classes. Cropland classes were defined by specific classifications unique to Mapbiomas (MB) land use and land cover. The overlapping regions were quantified using pixel-level calculations to determine the cropland-driven deforestation area.

B. Key Comparisons and Findings

1. **Total Deforestation**:
   - **Amazon Biome**: GFW recorded approximately 39.8 million hectares, significantly higher than MapBiomas' estimate of 14.8 million hectares.
   - **Cerrado Biome**: MapBiomas estimated 11.3 million hectares, lower than GFW's 21.4 million hectares.
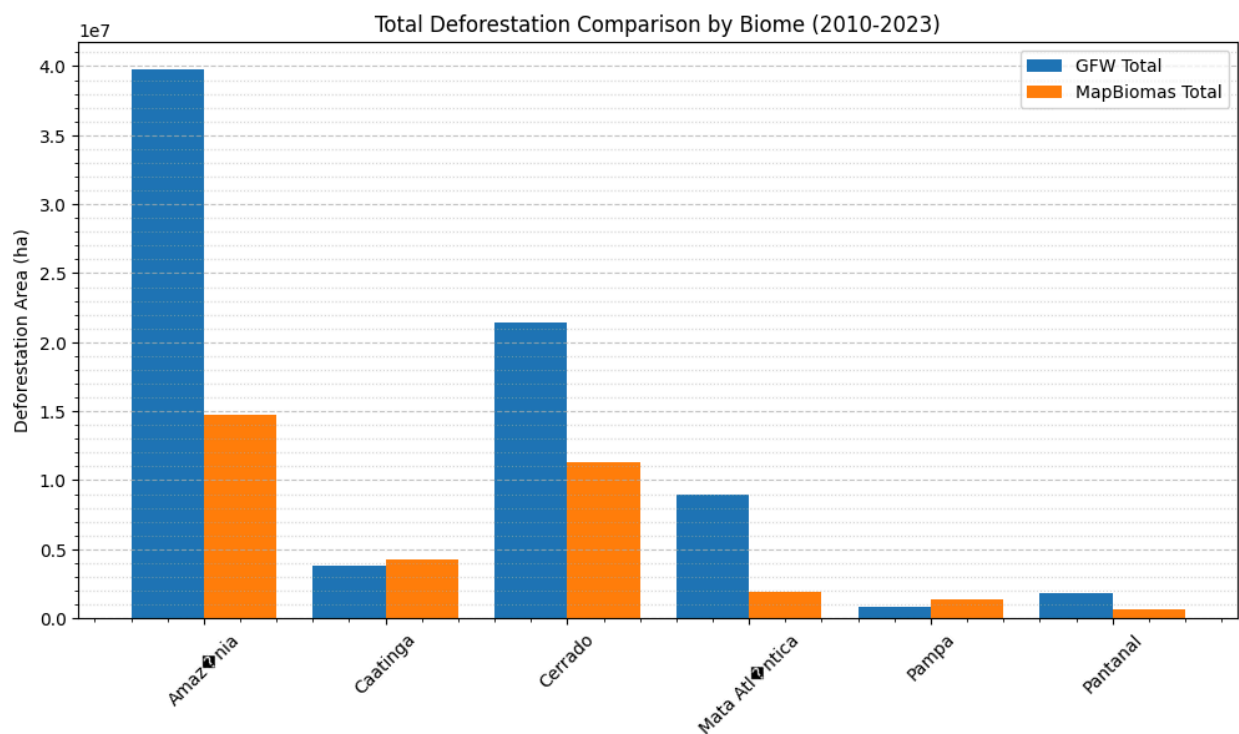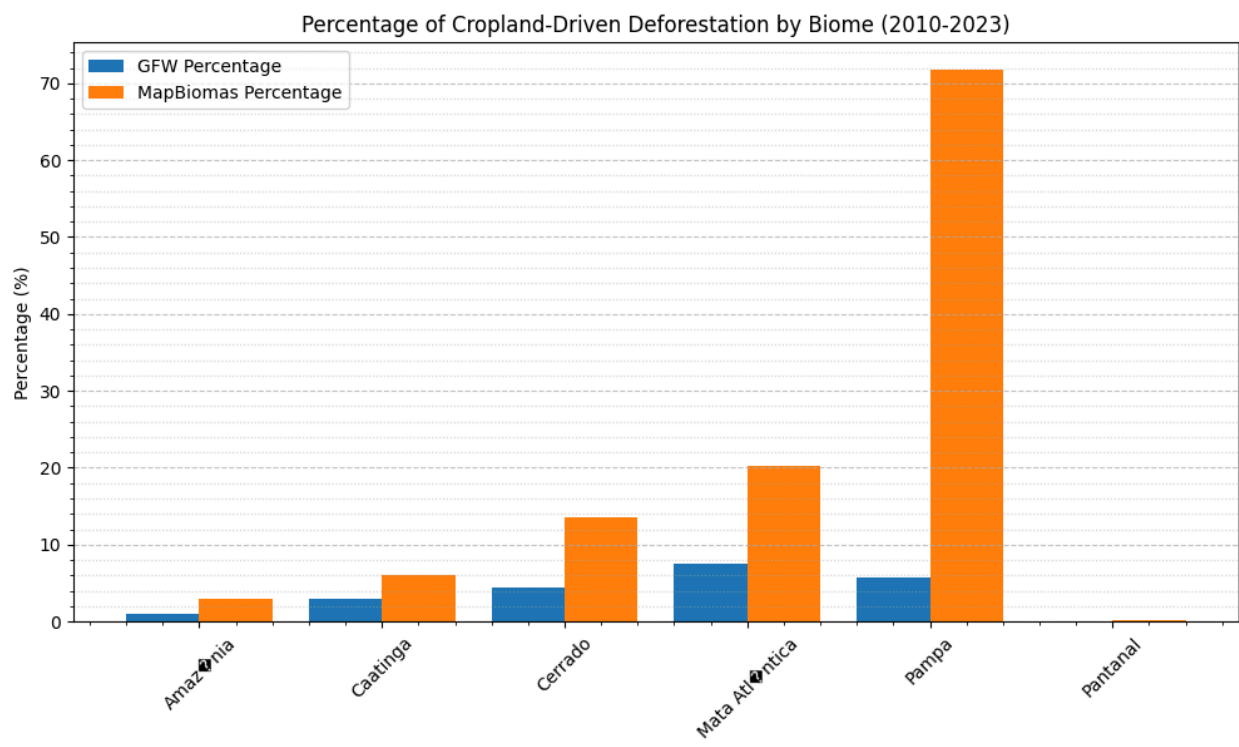
2. **Cropland-Driven Deforestation**:
   ○ **Amazon Biome**: MapBiomas attributed 16,356 hectares to cropland activities, compared to GFW's 32,136 hectares.
   ○ **Cerrado Biome**: GFW estimated 134,011 hectares, while MapBiomas recorded 169,007 hectares.

Cropland-Driven Deforestation Comparison by Biome (2010-2023)
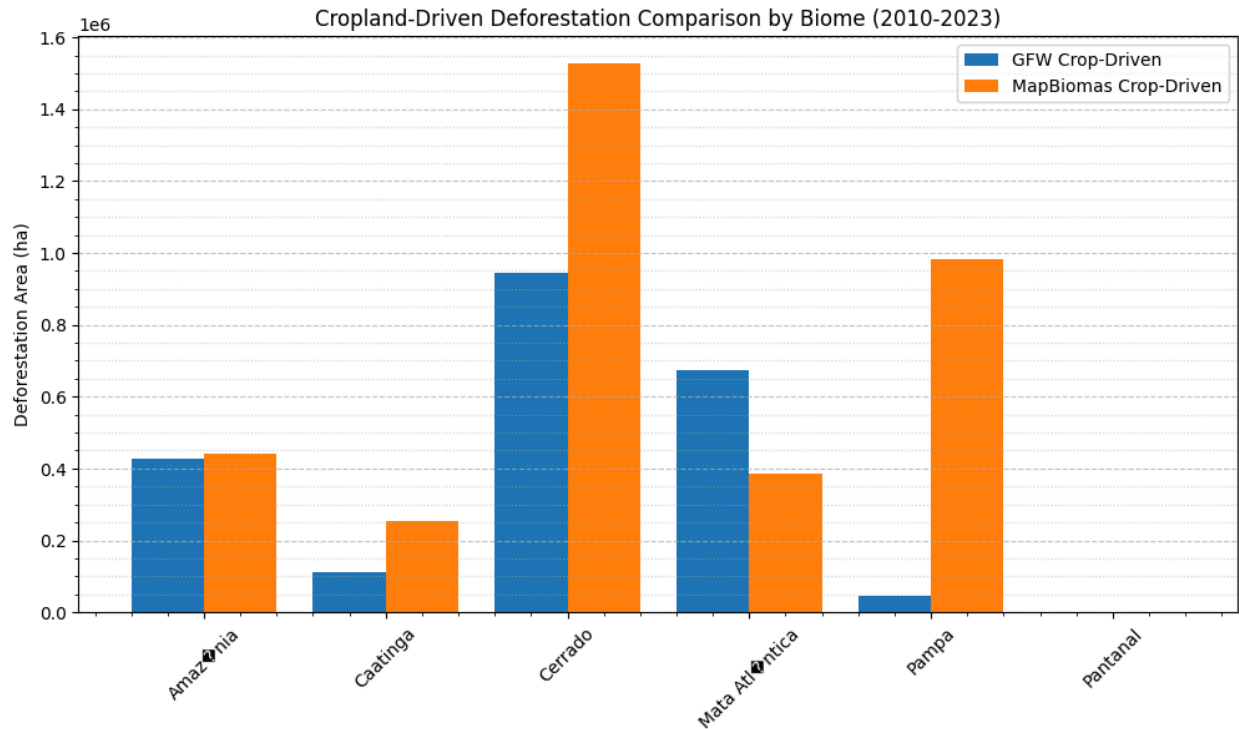
3. **Percentage Contribution**:
   ○ Cropland-driven deforestation accounted for 0.08% to 0.13% of total deforestation in the Amazon, according to GFW and MapBiomas, respectively. In the Cerrado, this ranged from 0.62% (MapBiomas) to 0.63% (GFW).

Percentage of Cropland-Driven Deforestation by Biome (2010-2023)

The figures show significant differences between the datasets, especially in the Amazon Cerrado biome, where MapBiomas typically reports lower total deforestation but, in some cases, shows a higher percentage of cropland activity.

C. Causes of Discrepancies

The observed differences between the datasets are due to several factors:

1. **Data sources and classification:**
   - GFW relies on global methods, which may be overestimated due to the extent of deforestation. MapBiomas integrates local base knowledge and provides fine-grained classifications tailored to the Brazilian context.
2. **Temporal Resolution**:
   - GFW provides aggregated forest loss data, whereas MapBiomas offers annual deforestation monitoring. These differences in temporal granularity also affect the accuracy of year-to-year variability.
3. **Spatial Resolution**:
   - MapBiomas uses high spatial resolution in specific Brazilian contexts to capture fine-grained land-use changes, while GFW uses a global approach with coarse resolution.

D. Conclusion

This comparative analysis highlights the key issue faced,i.e., data limitation when interpreting deforestation. The differences in overall forest degradation of cropland emphasize the importance of collaborative approaches, especially in regional policy development. The stakeholders can ensure accurate and actionable insights by integrating local knowledge with global databases.