

Mitigating Extinction Risk: The Crucial Role of Agriculture in Guatemala

J. Andrés Rodríguez Z.¹, Randall Jiménez¹, Nicholas Macfarlane¹, Thomas Brooks¹ & Guillermo Putzeys¹



¹International Union for Conservation of Nature, IUCN; andres.rodriquez@iucn.org

Introduction

The Kunming-Montreal Global Biodiversity Framework (GBF) states:

- Goal A is to reduce the species extinction rate tenfold.
- Target 4 urges management actions to halt and significantly reduce human-induced extinction of threatened species.

As a major threat driving species extinction risk, agriculture presents an opportunity to act. However, quantifying, mapping, and reporting the impacts of conservation actions remains a challenge^{1,2}.

Results: Land uses

Agricultural land use categories³ accounted for 39% of the country’s extent. Pasture and herbaceous crops comprise 78% of all agricultural land uses and 30% of the national extent. Shrub and arboreous crops represent 12 and 7% of the agricultural landscape in Guatemala. Agroforestry systems in Guatemala corresponded to 3% of all agricultural land (1% of the national extent) (Figure 2).

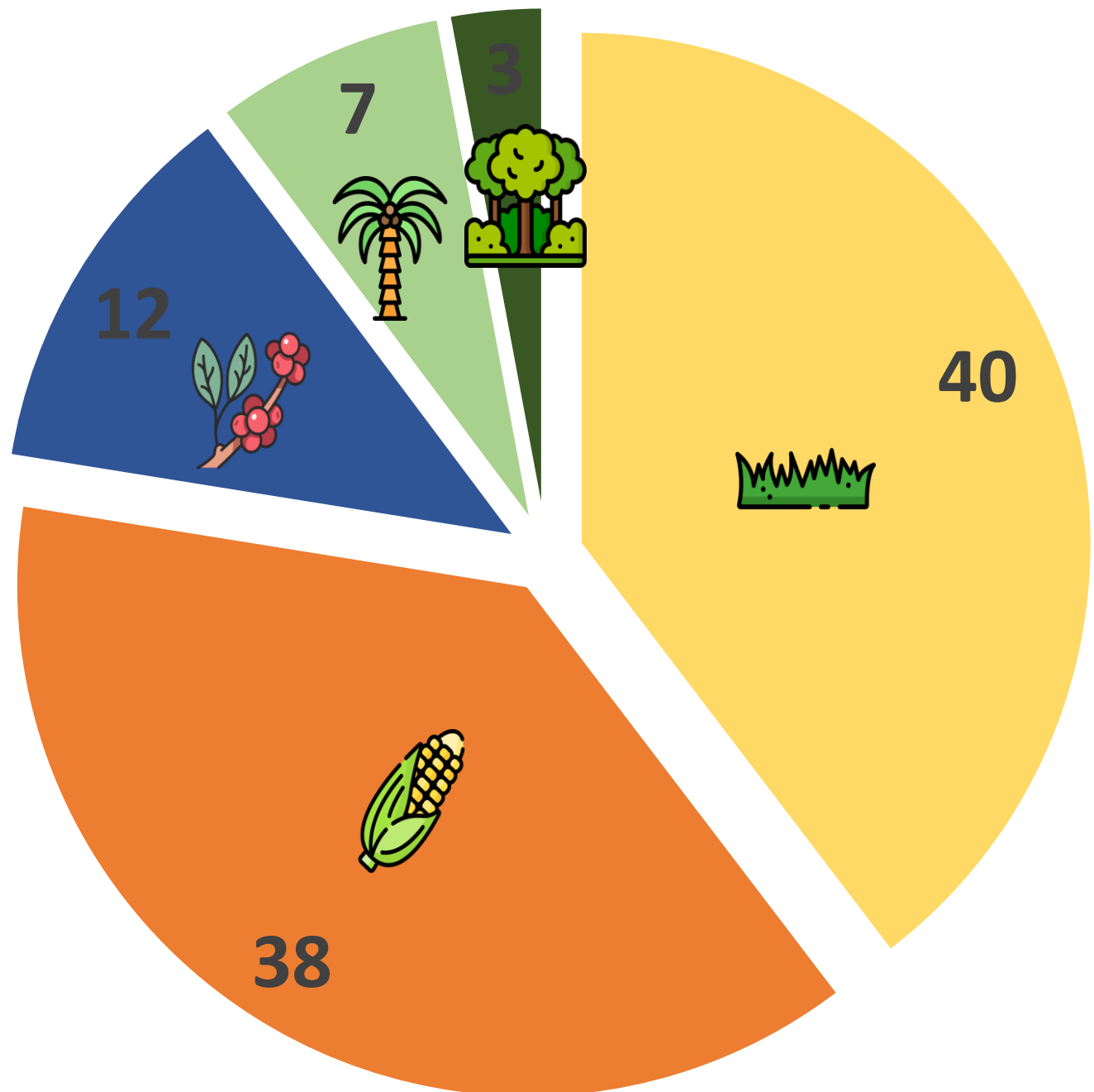


Figure 2: Proportion of agricultural land use categories in Guatemala. Source: MAGA 2020².

Total STAR threat abatement score (STAR_T score) for Guatemala was 16,478.69. Guatemala’s STAR_T score as a proportion of Americas’ total STAR_T score represents 3.02%. Departments in the south and along the pacific coast showed lower scores, whereas departments in the centre of the country presented the highest scores (coincidentally with the Altiplano). The department of Petén showed intermediate to low STAR scores (lowlands) (Figure 3).

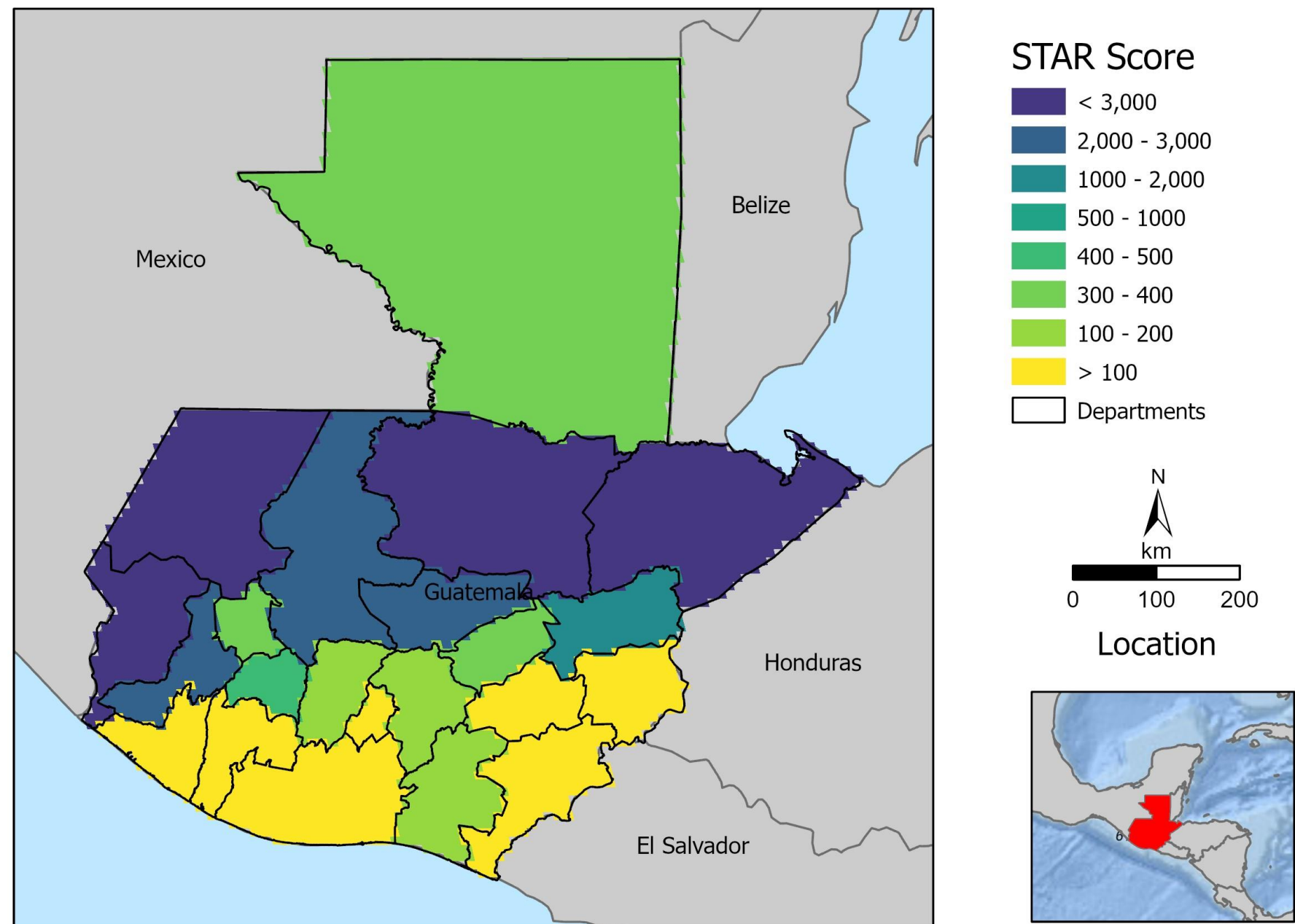
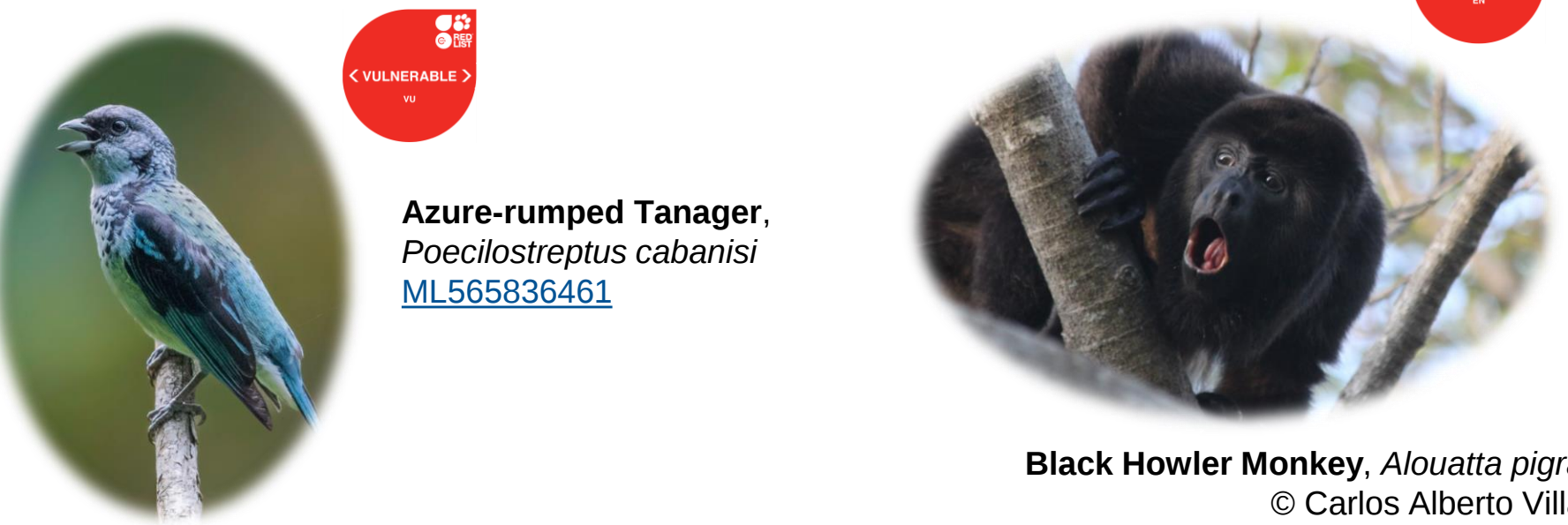


Figure 3: Total STAR_T score obtained for each department in Guatemala. Source: IUCN STAR metric.



References

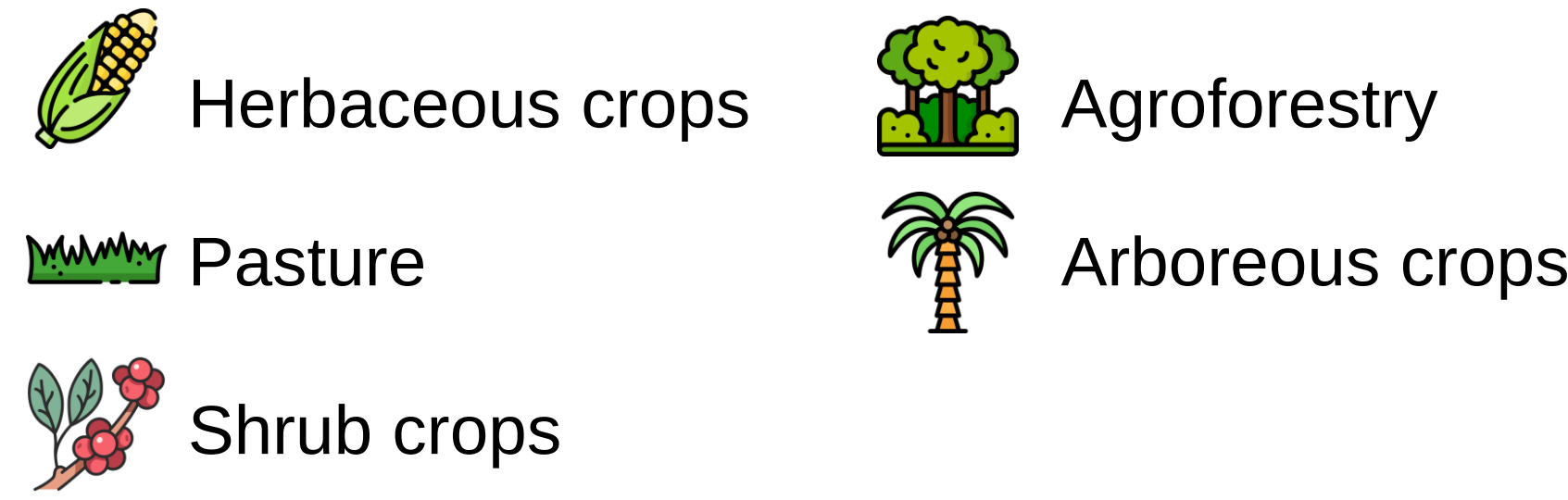
[1] IPBES. 2019. Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services (IPBES, 2019).

[2] Mair, L., Bennun, L. A., Brooks, T. M., Butchart, S. H., Bolam, F. C., Burgess, N. D., ... & McGowan, P. J. (2021). A metric for spatially explicit contributions to science-based species targets. *Nature Ecology & Evolution*, 5(6), 836-844.

[3] MAGA. 2020. Mapa de Cobertura Vegetal y Uso de la Tierra, a escala 1: 50,000 de la República de Guatemala. Año 2020. Ministerio de Agricultura, Ganadería y Alimentación. Guatemala.

Methods

Agricultural land use categories:



IUCN Species Threat Abatement and Restoration metric:

STAR

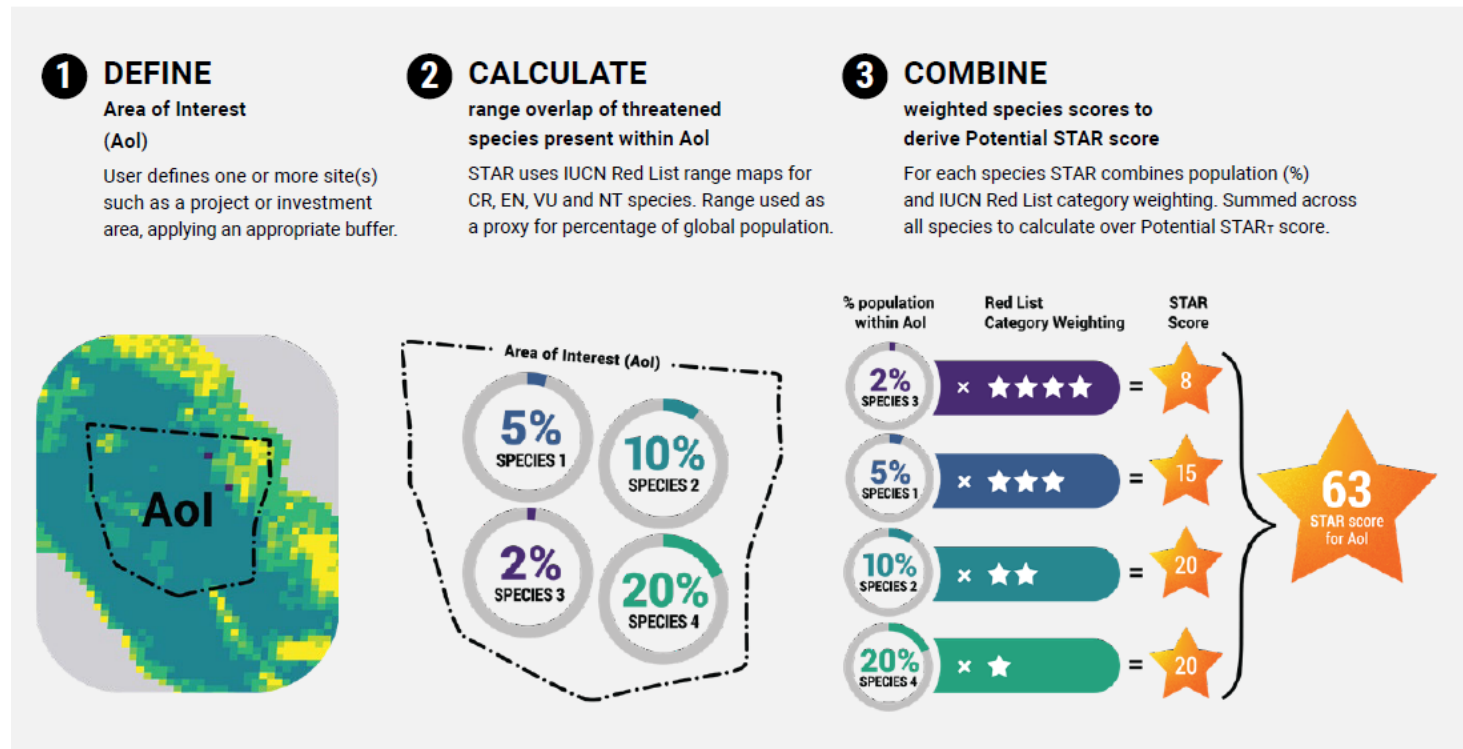


Figure 1: IUCN STAR metric calculation process for an area of interest (Aoi). Scores are calculated using proportion of species range within the Aoi and a Red List category weighting factor.

Results: STAR_T Scores

Herbaceous and shrub crops contributed with the largest proportion of STAR_T score at the national level (Figure 4).

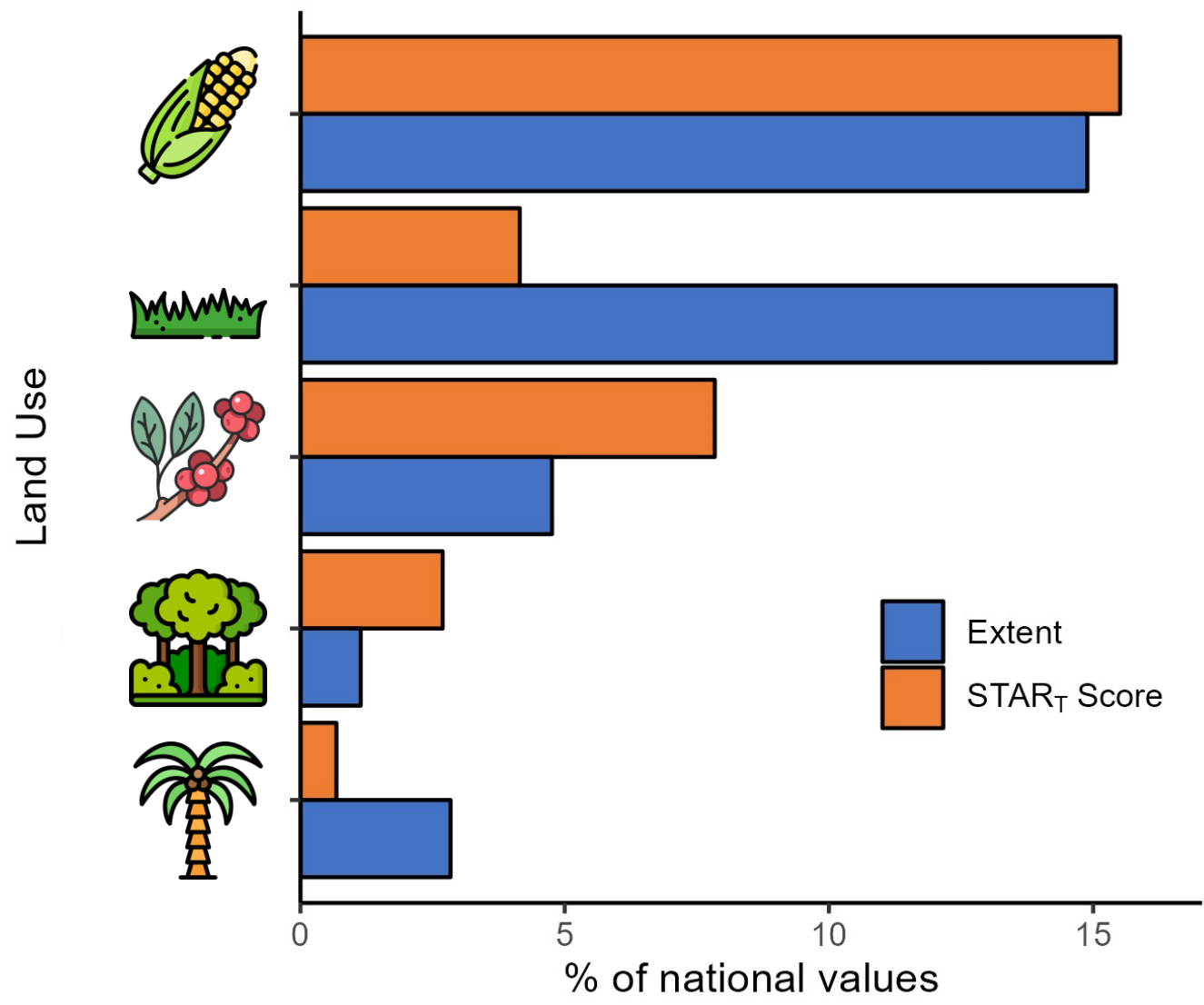


Figure 4: Proportional STAR_T scores and extent for different land use categories relative to national values in the agricultural landscape of Guatemala

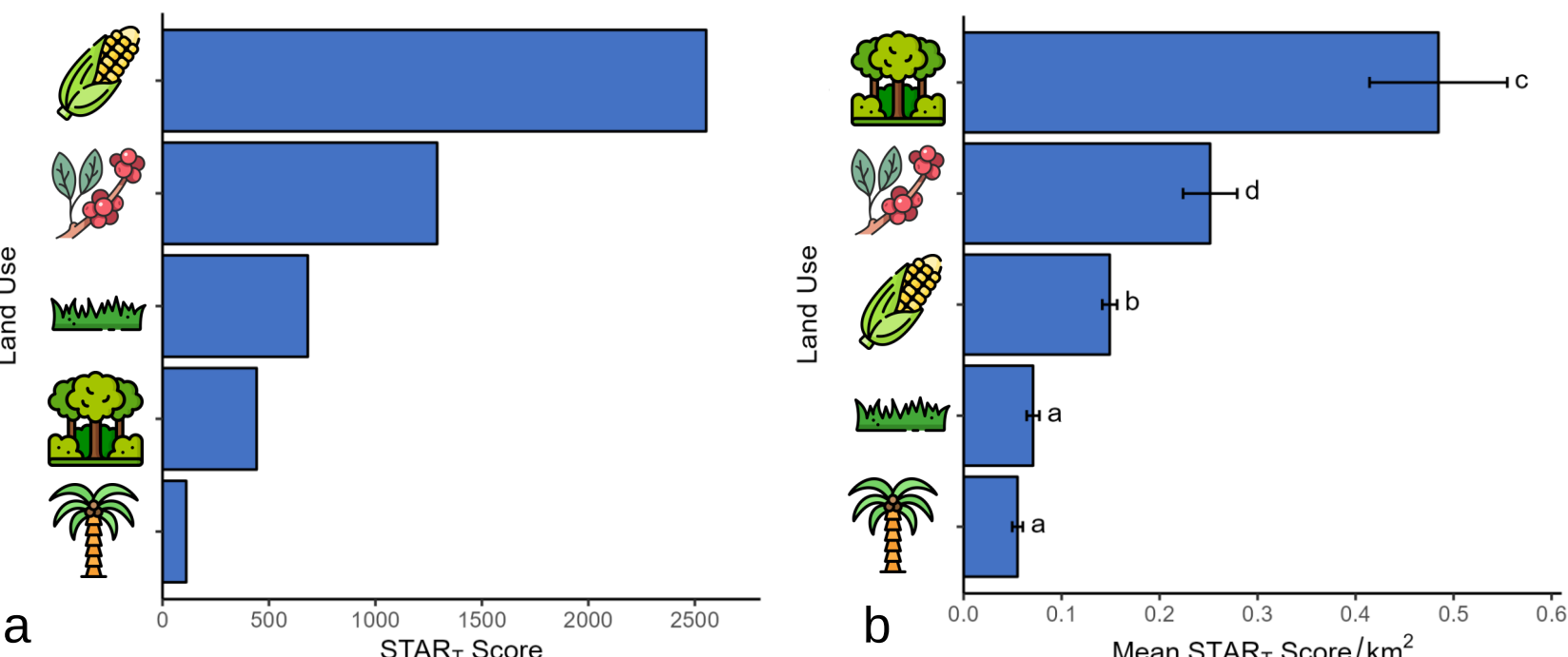


Figure 5: a) Total STAR_T scores and b) mean STAR_T scores per km² for agricultural land use categories in Guatemala. In b) different letters mean statistically significant differences in mean values ± standard error (p<0.05). Source: IUCN STAR metric.

Total STAR_T score for agricultural land uses was 5,065.3 (30.8% of Guatemala’s score). Herbaceous crops showed the highest STAR_T score, followed by shrub type crops, pasture, agroforestry and arboreous crops (Figure 5a). STAR_T scores standardized by area unit showed agroforestry systems had the highest mean STAR_T score per km², followed by shrub and herbaceous crops. Pasture and arboreous crops showed the lowest scores (Figure 5b).

Key messages

- 30.8% of the potential contribution to reducing species extinction risk in Guatemala can be achieved by acting in the agricultural landscape.
- Management actions in crops like corn, beans, coffee and pastures could significantly contribute to reducing extinction risk of threatened species in Guatemala.
- The STAR metric contributes to identify priority areas for conservation actions by spatially mapping the risk of extinction.
- 70% of the potential contribution to reducing species extinction risk in Guatemala can be achieved by tackling threats from agriculture, logging, and urbanization.

Results: Spatial distribution

The spatial identification of high STAR_T scores signals areas within crop systems where management actions could have greater impacts to reducing extinction risk of threatened species (Figure 6).

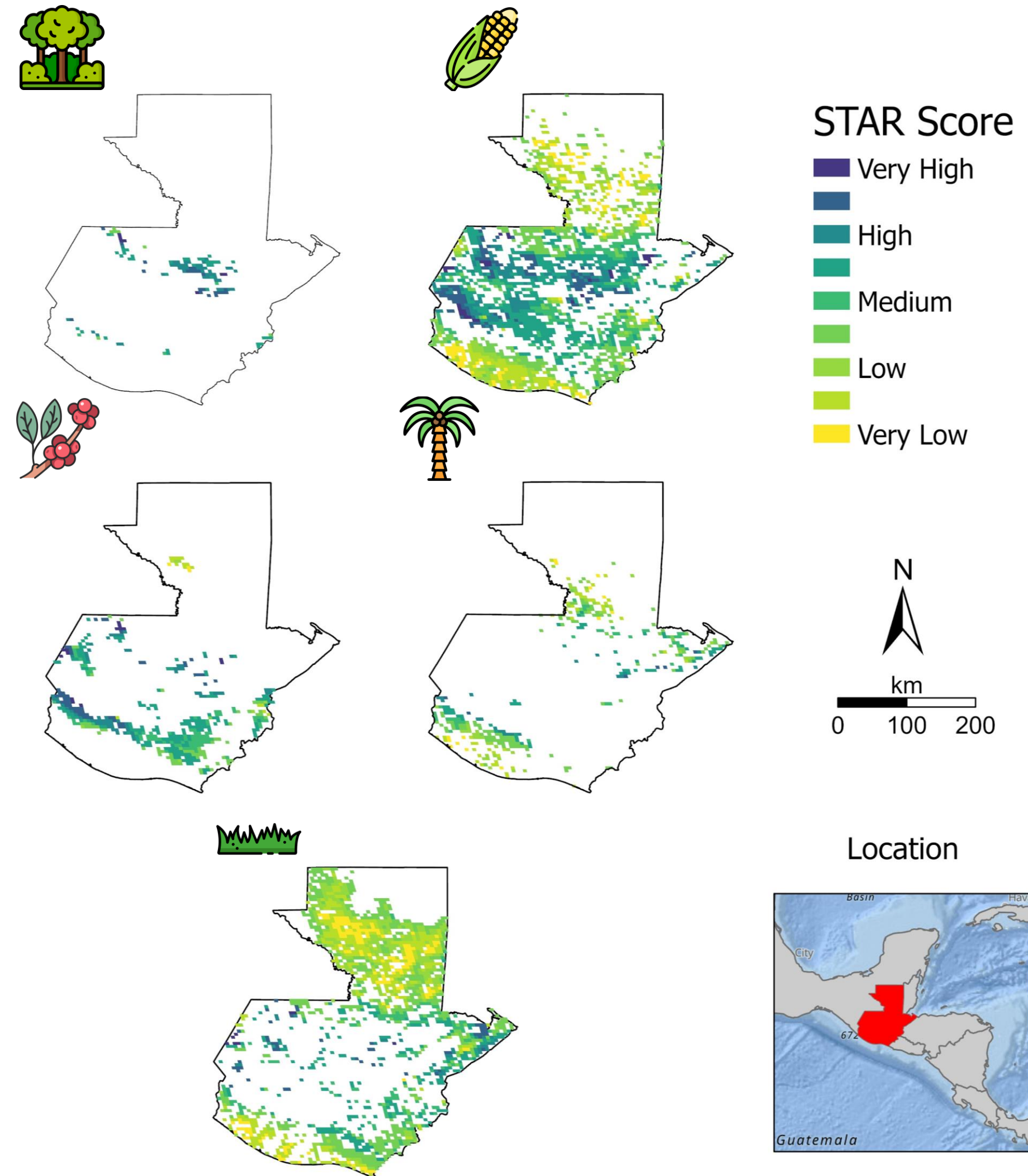


Figure 6: Spatial distribution of STAR_T scores from agricultural land uses in Guatemala.

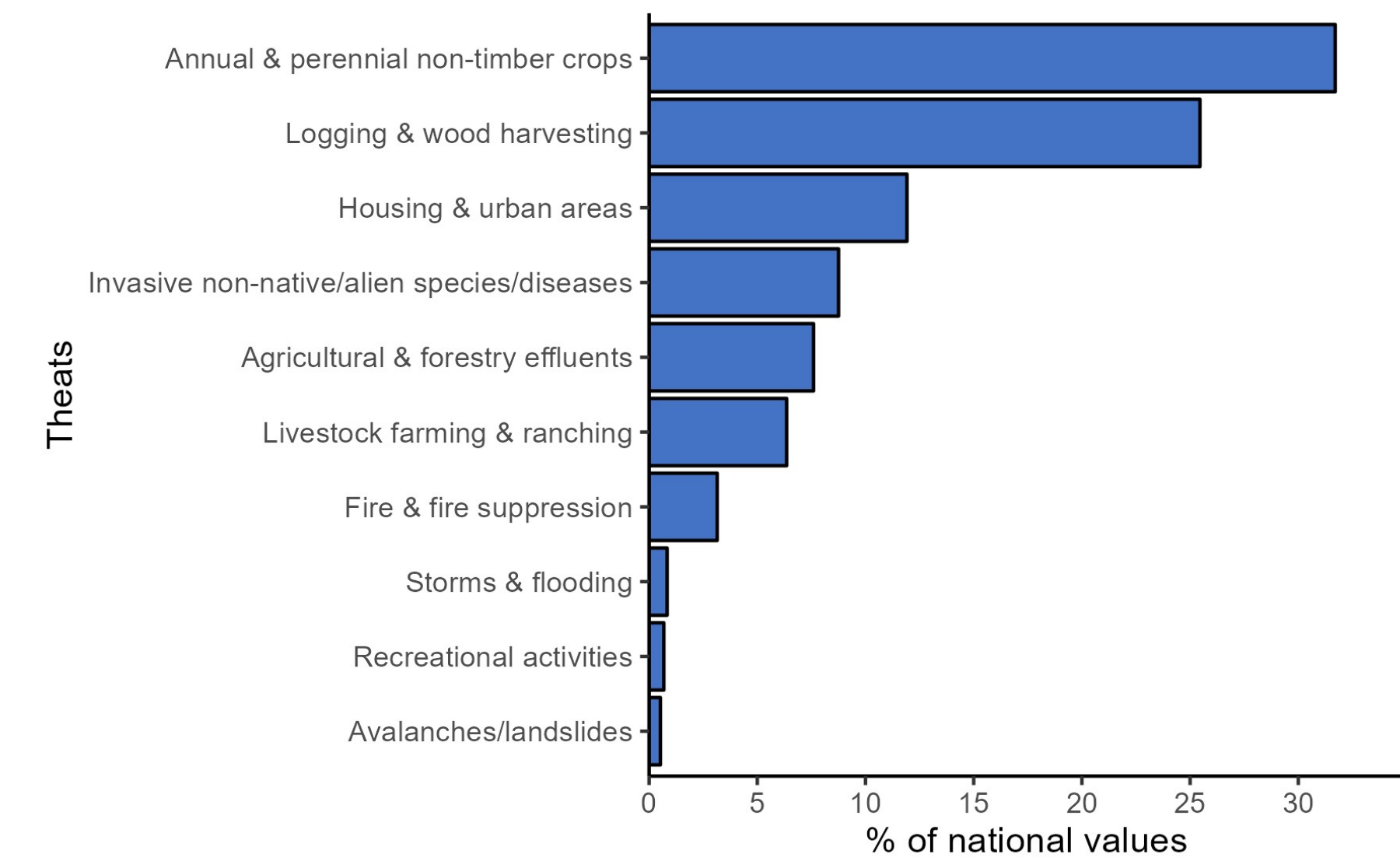


Figure 7: Major threats driving species extinction risk in Guatemala given by higher STAR_T scores relative to national values.

Amphibians accounted for 90% of the total STAR_T score in Guatemala, followed by mammals (7%) and birds (3%). Three major threats driving species extinction risk in Guatemala accounted for almost 70% of the national STAR_T scores: annual and perennial non-timber crops, logging and wood harvesting, and housing and urban areas. (Figure 7).

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