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Agricultural spatial expansion in Ecuador through Intensity Analysis

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The expansion of the agricultural frontier is a process that has been affecting natural ecosystems, driving landscape fragmentation, and promoting habitat loss from 1990 in the Ecuadorian Amazon. Characterizing spatial patterns of the expansion of agricultural frontier can provide valuable data to take forward trade-offs in areas with exacerbated expansion rates and habitat loss (Urgilez-Clavijo et al., 2020). The aim of this work is to identify and characterize the spatial patterns of the expansion of the agricultural frontier in Ecuador and provide an alternative to setting the priority areas.

With this purpose, an image analysis approach was applied to identify process patterns using classified images from 1990 to 2020. A statistical analysis of the agricultural expansion dynamics is performed in the Amazon region accumulating the land use information. Complementary to this, we used a soil map to detect a correlation of the process to soil types. Then the Intensity Analysis (IA) was implemented to characterize and visualize the spatio-temporal rates of the expansion process. This method allows identifying areas in which the process is faster and active.

The results show distinct patterns of agricultural expansion in the Amazon region, especially from Andean hill slopes to the primary forest. These processes are in part explained by soil type suitability, transportation network development, and urban expansion. The spatial priorities of the expansion of the agricultural frontier are identified from two sources, i) from intensity analysis graphs and ii) from regional maps. The spatial characteristics and identification of spatial priorities of the expansion of the agricultural frontier will bring valuable information to policymakers to achieve SDG 15th of the 2030 Agenda in Ecuador.

Keywords: expansion of agricultural frontier, Intensity Analysis, priority areas, image analysis, patterns

Reference

Urgilez-Clavijo, A., J. de la Riva, D. Rivas-Tabares and A.M. Tarquis. Linking deforestation patterns to soil types: A multifractal approach. European Journal of Soil Science, https://doi.org/10.1111/ejss.13032

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