Tropentag, September 16-18, 2026, hybrid conference

"Towards multi-functional agro-ecosystems
promoting climate resilient futures"

Expansion of invasive plant cover in the rural highlands of Galapagos

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Abstract

Invasive plant species pose a major threat to biodiversity and ecosystem integrity in the Galapagos Islands. At the same time, they are a threat to rural livelihoods, as controlling them represents an investment of around 30 % to 40 % of their income. While efforts to track and control these invasives have focused on protected areas, the rural highlands need more attention, since they harbor many endemic species, and are essential for a sustainable local economy. To close this knowledge gap, we produced an updated high-resolution land cover map and a land cover change analysis (2018–2024) across the rural highlands of Santa Cruz, San Cristobal, Isabela, and Floreana. Using object-oriented and machine learning classification, we mapped canopy-level vegetation changes with an overall accuracy of 97,13 %. Results show a net increase of approximately 6800 hectares (+43 %) of invasive vegetation in the rural highlands, primarily driven by the expansion of "mixed forest" cover, which often includes the invasive *Cedrela odorata* and *Psidium guajava*. Despite the overall expansion, we observed localised contractions in the cover of these two species, in many cases likely caused by wood harvest, land-use change and canopy succession. Model limitations, such as spectral confusion and misclassification in complex vegetation zones, may have resulted in a slight overestimation of the invasive vegetation cover. Overall, the findings highlight continued expansion of invasive vegetation, particularly in Santa Cruz, and signal an ongoing transformation of highland ecosystems. These results underscore the need for continued land cover monitoring to inform invasive species management the archipelago. Information derived from this study is also important for ecological research to be able to refine conservation strategies for endangered plant and animal species being threatened by invasive plant species.

Keywords: Conservation, Galapagos, invasive species, land cover change, machine learning, threatened species

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