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“Towards multi-functional agro-ecosystems
promoting climate resilient futures”

Integrating agrobiodiversity with area-based conservation strategies to deliver effective multifunctional landscapes

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Abstract

Protected areas are among the most extensively applied tools to tackle global biodiversity loss, but agro-ecosystems are largely absent from area-based conservation frameworks. This under-values and overlooks agrobiodiversity - the diversity of plants and animals that we use for food – currently maintained by millions of small-holder farmers and the foundation of future food system resilience. Here, adapting tools from wild biodiversity conservation and applying them to agro-ecosystems, we identify spatial hotspots of threatened agrobiodiversity across the Ethiopian Highlands. We integrate multiple empirical data sources, including >20,000 species records from thousands of farm surveys, crops origins, multi-decade production time-series, *ex situ* germplasm collections, and the distributions of co-occurring crop wild relatives and wild edible plants. We produce an expert-validated map, identifying regions rich in threatened indigenous crops that are declining and poorly conserved *ex situ*. These areas are priorities for host countries to sustainably manage locally evolved agricultural natural capital alongside traditional protected areas for a coherent biodiversity conservation network. We show that area-based agrobiodiversity conservation provides substantial co-benefits for the conservation of indigenous knowledge and provides spatial prioritisation for the targeting of agricultural support measures by host countries. Where monitoring can evidence effective area-based agrobiodiversity conservation, we show that these sites meet criteria for ‘Other Effective Area-based Conservation Measures’, supporting high agrobiodiversity countries in meeting Target 3 (30 × 30) of the Global Biodiversity Framework. Community managed high-agrobiodiversity landscapes, together with traditional protected areas and productivity focused landscapes can result in socially just multifunctional landscapes, that maximise food and biodiversity, while tackling development and conservation goals equitably and in unison.

Keywords: Agrobiodiversity hotspots, crop diversity, crop domestication, Ethiopia, indigenous knowledge, protected areas

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