Tropentag, September 16-18, 2026, hybrid conference

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

Integrated farmers' perceptions and field evidence of land degradation and soil fertility decline in southwest Ethiopia

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Abstract

Land degradation and soil fertility decline pose critical threats to agricultural sustainability in southwestern Ethiopia, yet few studies integrate local farmers' indigenous knowledge with empirical data. This research bridges that gap by combining farmers' perceptions with rigorous field-based assessments in Omo Nada district, Jimma Zone, Oromia Regional State. This study integrates farmers' perceptions with field-based evidence to assess land degradation and soil fertility status in Omo Nada district, Jimma Zone, southwestern Ethiopia. During the 2021 cropping season (October–November), we conducted reconnaissance surveys across four kebeles, interviewing 82 households via semi-structured questionnaires, personal observations, and open-ended discussions. Complementary soil sampling yielded 56 composite samples (0–30 cm depth) from cultivated lands, analysed for key fertility parameters. Nearly all farmers (99 %) attributed degradation to anthropogenic drivers, including continuous cropping, overgrazing, deforestation, and poor management. Red soils dominated perceptions (43–62 % across sites), followed by brown soils (20–36 %), with fields classified into four productivity categories – productive, moderately productive, degraded, and severely degraded – based on weed species, soil colour, and crop yields. Laboratory analyses corroborated these views: soils were strongly acidic (pH 4.8–5.4), with low CEC (12–18 cmol(+) kg^{-1}), TN (0.12–0.18 %), available P (3.5–7.2 mg kg^{-1}, limited by fixation and erosion), and exchangeable bases. OC and TN were medium (1.2–2.1 %) but insufficient for optimal yields. This synergy of perceptions and data underscores severe degradation, with acidity as the dominant constraint. We recommend site-specific interventions: liming to neutralize acidity, organic amendments for nutrient replenishment, and balanced fertilisers tailored to soil tests. Strengthening farmer-researcher linkages will foster scalable, participatory solutions for resilient agroecosystems in Ethiopia's highlands.

Keywords: Farmers' perceptions, integrated assessment, land degradation, soil acidity, soil fertility, Southwest Ethiopia

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