Tropentag, September 16-18, 2026, hybrid conference

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

Analysing the drivers of land use change from forest to agriculture in Ethiopia

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Abstract

Land use and land cover (LULC) change is a major driver of environmental degradation and climate vulnerability in many developing countries, including Ethiopia. Understanding the underlying causes and consequences of these changes is critical for designing sustainable land management strategies. However, despite the rapid pace and complexity of LULC transformations, their socioeconomic and environmental drivers and impacts remain insufficiently examined and poorly articulated across diverse local contexts. This study analyses the drivers and impacts of LULC change, particularly the conversion of forests to agricultural land, in seven districts of Ethiopia: Jawi, Burie Zuria, Adami Tulu, Shebe Sembo, Gera, Gursum, and Shabeeley, using the Driver–Pressure–State–Impact–Response (DPSIR) framework. A mixed-methods approach was employed, combining data from 1,098 randomly selected household surveys, 14 focus group discussions, 28 key informant interviews, and a review of relevant literature. Participants in qualitative components were purposively selected based on their knowledge and experience with land use practices. Data were analysed using descriptive statistics and the DPSIR framework to examine linkages among drivers, pressures, environmental states, impacts, and responses. The results reveal that small-scale agriculture, charcoal production, and firewood collection are the primary direct drivers of LULC change, while poverty, weak enforcement of forest regulations, and settlement expansion act as key indirect drivers. District-level analysis highlights important spatial variations: large-scale agriculture and energy demand dominate in Adami Tulu; biomass dependence drives deforestation in Shebe Sembo and Gera; climate stress and unsustainable land use are critical in Shabeeley and Gursum; and smallholder expansion and fuelwood demand are prominent in Jawi and Burie Zuria. Across all districts, increasing demand for farmland (82.7 %), competition over communal resources (76.5 %), and reliance on forest-based energy (72.6 %) exert significant pressure on ecosystems. These pressures have resulted in widespread soil degradation, biodiversity loss, declining agricultural productivity, and increased vulnerability to climate variability and extremes. The study recommends context-specific interventions, including strengthening land tenure security and regulatory enforcement, expanding access to renewable energy, promoting agroforestry and reforestation, and supporting climate-resilient agricultural systems. Enhanced institutional coordination and community-based natural resource management are essential to achieving sustainable and inclusive land use outcomes.

Keywords: Deforestation, DPSIR, Ethiopia, land use change, sustainable land management

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