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T14 Thematic working group sessions

Changes in Regulating Ecosystem Services following Establishing Exclosures on Communal Grazing Lands in Ethiopia: A Synthesis

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In four separate studies undertaken in the northern highlands of Ethiopia, changes in regulating ecosystem services, economic viability, and the perception of local communities following establishing exclosures on communal grazing lands were investigated. Replicated ($n = 3$) 5-, 10-, 15-, and 20-year-old exclosures were selected and paired each exclosure with an adjacent grazing land. All exclosures displayed higher ecosystem services than communal grazing lands. Differences between exclosures and grazing lands varied between 29 (±4.9) and 61 (± 6.7) Mg C ha-1 for ecosystem carbon stock (ECS), 2.4 (±0.6) and 6.9 (±1.8) Mg ha-1 for total soil N stock, and 17 (±3) to 39 (±7) Kg ha-1 for the available P stock, and all differences increased with exclosure duration. Differences in plant species richness and biomass between an exclosure age and communal grazing land were higher in oldest than in youngest exclosures. Over a period of 30 years, sequestered carbon dioxide was 246 Mg ha-1, total soil nitrogen increased by 7.9 Mg ha-1, and additional available phosphorous stocks amounted to 40 kg ha-1. The Net Present Value of exclosures ecosystem services under consideration was about 28% (837US$) higher than alternative wheat production indicating that exclosures are competitive to alternative land uses. There are substantial opportunities to mobilize the local communities in efforts to establish exclosures, given that more than 75% had a positive view on exclosures effectiveness to restore degraded ecosystems. Establishing exclosures on communal grazing lands can be effective for restoring degraded ecosystems and the services that they provide.

Keywords: Restoration, carbon sequestration, soil nutrient, NPV, perception