SMITH DUMONT, EMILIE [S18-P76]

Increasing the resilience of the Virunga landscape through matching agroforestry options to fine scale variation in socio-ecological context

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The importance of integrated landscape mosaics for conserving biodiversity beyond protected area boundaries is increasingly recognized. Much attention is given to promoting agroforestry to increase the provision of ecosystem services from trees on farmland that can simultaneously reduce pressure on natural forest resources and enhance livelihoods. The predominant model for promoting agroforestry has involved prioritizing a few, generally exotic, tree species in specific technology packages. This has led to restricted uptake by only very specific sets of socially differentiated actors across the landscape, largely benefiting men in households that already have substantial livelihood assets. Here, we explore a new diversified approach to designing agroforestry options, that marries an inclusive participatory process with scientific evaluation of agroecological niches for different tree species. We tried this out in Eastern DRC, where armed conflict, erratic governance and poverty, over the past few decades have resulted in severe pressure on forests in the Virunga National Park. This is a global biodiversity hotspot threatened by encroachment, poaching and wood extraction for illegal charcoal production. Outside the park, natural forests have almost disappeared whilst reforestation interventions have focused largely on exotic monocultures dominated by Eucalyptus species. With declining agricultural productivity, market disruption and looting of crops, the conversion of arable land into tree plantations has become very attractive to those with sufficient land and tenure security. These land use changes have caused the simplification and fragmentation of the landscape with decreasing provisioning and regulating ecosystem services. Restoring ecosystem function requires us to develop diverse agroforestry options suitable to the range of ecological conditions in the landscape and that also meet the needs of different groups of people living there. We document the participatory identification of options by combining facilitated stakeholder groups, local knowledge acquisition, market surveys and natural vegetation analysis. This has resulted in a profound change to development interventions with NGO's now promoting up to 113 exotic and native trees species, combined in a suite of practices that suit different people and places. This diversity of options takes into account gender, ethnicity and socio-economic differences leading to a far more inclusive set of beneficiaries, as well as matching the heterogeneity of conditions in the agricultural and pastoral landscapes surrounding the National Park. This shift from reliance on a few priority tree species to promoting diversity is a crucial step in building resilient livelihoods and landscapes around Virunga and holds lessons relevant for scaling up agroforestry more generally.