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Farmers’ and academia’s views”

Carbon storage potential in savannah woody vegetation

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Abstract

Global drylands have been highlighted as a possible carbon sink and roughly 36% of current worldwide carbon stocks are stored in drylands. While the carbon storage per unit area is low compared to other ecosystems, the large area in question gives dryland carbon sequestration a global significance. Aside from their carbon sink potential, drylands are increasingly being recognised as productive and important ecosystems, with their inhabitants largely relying on agroforestry and cattle husbandry.

In rural Africa, land-use changes often occur along two divergent pathways of land conversion, thereby turning non-utilised savannah into either agroforestry sites or nature conservation areas. Both transformation pathways are driven by aspirations to harness ecosystem services, be it food security and feed production on the one hand, or biodiversity conservation and tourism income on the other. What both pathways have in common, though, is the expected reduction of woody aboveground biomass and hence carbon storage potential, be it through wood clearing and fires or megafauna browsing impacts.

To estimate current and future land-use change impacts on carbon storage in African savannahs we conducted tree inventories along both land-use change pathways and analysed carbon losses to various disturbance agents. The chronic disturbance regime and diverse modes of land-use first required us to develop a new protocol for tree inventories in order to reflect the disturbance impacts. Results indicate that a majority of growth forms and individuals in savannah vegetation could only be assessed if measurement protocols were adapted to the conditions of a disturbance-prone ecosystem and contained a damage assessment for trees and shrubs. Furthermore, our damage assessment demonstrated that one third to half of all woody aboveground biomass (and carbon stored therein) was lost to disturbances. Still, carbon certificates should be explored as a possible third income source for local livelihoods in addition to agroforestry and nature conservation.

Keywords: Carbon storage, disturbance ecology, savannahs, woody aboveground biomass