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"Reconcile land system changes
with planetary health"

Virtual fencing: An advanced solution for sustainable livestock-grazing systems in sub-saharan africa?

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Abstract

The fast-growing population in Sub-Saharan Africa (SSA), coupled with an increasing preference for meat-based diets, demands rapid action to enhance grazing systems for sustainable livestock production. However, climate change and intensifying land use are depleting natural rangelands, threatening the sustainability of livestock production. A critical challenge is the overexploitation of communal grazing resources, which exacerbates resource degradation.

To mitigate climate risks and resource overuse, cross-border pastoralism, particularly in many parts of SSA, is an important strategy. Yet, it often faces mismanagement and conflicts. Traditional fencing to manage and conserve rangelands has had limited success due to its labor-intensive nature and high costs. Consequently, there is a pressing need for technology-driven solutions that address the ecological, social, and economic complexities of SSA's grazing systems.

An innovative but unpopular approach in SSA's livestock-rangeland context is smart livestock farming technology, specifically virtual fencing (VF) (e.g., Monil: https://monil.co.uk). In VF, the animals are fitted with collars that are equipped with sound and mild electrical stimuli. The collar is connected to a smartphone, which enables the user to identify a virtual border for grazing. These collars also monitor animal behaviours—such as walking, resting, and grazing—along with health and welfare parameters, and, to some extent, pasture intake. This IT-based solution could enable flexible, precise, and sustainable communal grazing, offering a framework to improve livestock-rangeland systems in SSA.

Currently, there is little to no research explicitly testing VF in SSA's rangeland-grazing systems. The objectives considered in this study include reviewing results from experiments and experiences from temperate climates, and discussing the potential opportunities and limitations of VF utilisation in SSA rangeland-grazing systems. This method is useful to design urgently needed VF-based grazing studies for SSA.

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