

Seasonality of livestock feed increases with climate change

Introduction

The five countries in the extended Lake Victoria Basin, Uganda, Kenya, Tanzania, Rwanda and Burundi will be experiencing significant demographic and economic growth in the coming decades leading to substantive increases in demand for livestock products. To meet this demand locally, sufficient livestock feed will be required. A central challenge of livestock keepers in many areas is the seasonality of feed, which seriously hampers productivity of livestock production. This is particularly important for grazing ruminants, which are the focus of this study, as they may contribute to resource conflicts over land and water. Cultivation and storage of fodder crops can be a viable and sustainable option to feed current and future cattle, goats and sheep. A benefit of fodder crops is the possibility to conserve them for periods where no or little pasture is available for grazing of livestock. As these periods are likely to increase with climate change the potential of conserved fodder to supply livestock production systems in dry spells becomes increasingly important.

Our approach

A crop modeling study combined with external data is used to assess demand and potential production of fodder crops quantitatively. In the scaleWAYS project, this is complemented with a detailed scoping study and a political economy analysis which are not part of this policy brief. This brief focusses on the quantitative study on scaling out sustainable intensification of fodder production for addressing seasonality is the basis for this policy brief.

ScaleWAYS researchers analyzed demand and supply of livestock feed for current and projected future numbers of animals. Using spatially detailed biophysical modelling, the study first assesses the potential production of pasture grasses and forage legumes. This grazing potential was used to assess the feed balance of pasture in its growing season. Using a seasonal approach, demand for feeding livestock at levels needed to rear them productively was calculated. Cultivation opportunities of four promising fodder crops - alfalfa, Napier grass, brachiaria and dual-purpose sorghum

About ScaleWAYS

The project 'Scaling out resilient water and agricultural systems (scaleWAYS) in East Africa' is being implemented jointly by IIASA, the Lake Victoria Basin Commission (LVBC) and the International Crops Research Institute for Semi-Arid Tropics (ICRISAT). The research for development project analyses scaling options for water and land management practices for resilient and sustainable agricultural intensification in the extended Lake Victoria Basin. Informed by local stakeholder's rice and fodder production systems are chosen for gaining an improved understanding of up-scaling and out-scaling of such sustainable practices through model simulations and integrated analysis of political economy aspects, governance, and social and gender dimensions.

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– was then assessed. Each of these has their own agronomic properties which are an integral part for calculating potential harvest.

Only grassland in non-protected areas such as national parks, wetlands or key biodiversity areas is included as potential area for brachiaria, Napier grass and alfalfa cultivation. This ensures no competition with crops for human consumption. The amounts harvestable on these areas and on cropland for dual-purpose sorghum are analyzed and are a main outcome to derive the opportunities presented in this policy brief.

Opportunities

For providing sufficient feed in the future, it will be essential to assess and manage grasslands. In most regions, meeting future demand locally would lead to overgrazing. A limited number of regions in contrast are not yet and would not be overgrazed in the future if they are used by farmers for meeting local demand while respecting protected areas and ecologically important key biodiversity land. In this small number of regions, there is some potential for increases in grazing-based livestock production.

Pasture availability is increasingly volatile with ever increasing climate change. Fodder production and conservation are suitable methods for providing feed in years with unusually low pasture grass productivity. Even at regular levels of production, fodder crops can help increase productivity. This is because, in their conserved form they are available year-round and often offer high nutritional content.

Fodder trade within and across countries can be an effective means of ensuring sustainable production and

intensification of livestock products. If products are produced in the most productive areas of the extended Lake Victoria Basin without encroaching protected areas or cropland, productivity could be raised.



POLICY RECOMMENDATIONS

Continuous local monitoring of grazing potential

A local assessment of stocking rates is necessary to avoid overstocking and assess the needs for additional fodder.

Adapt production to local capabilities

Adaption of stocking rates and increases of fodder production can help make livestock production more sustainable.

Extension services for fodder crop cultivation and conservation

Private and public partners, as well as NGOs and farmer organizations can help provide farmers with knowledge needed to leverage fodder crops for mitigation of seasonality.

Support a conducive environment for trade of livestock products

This will help allocate livestock production to most productive areas and close to locally available feed source.

Modelling feed seasonality

Feed balance of pasture is calculated in the rainy season and dry seasons separately, as the sum of feed available from grazing minus the demand for ruminant feed in the region. In regions with sufficient grasslands outside protected areas, there is some room for additional grazing (green areas in the left map). Overstocking already takes places in some regions where demand exceeds grazing supply (red and orange regions in both maps). Here additional fodder crops are most needed and we calculate demand for fodder crops as regional gaps in the pasture feed balance.

Background information on the underlying study can be found in the “ScaleWAYS working paper - Sustainable intensification potentials of fodder crops for mitigation of seasonality”.

Surplus and shortfalls of pasture determining fodder crop demand

