Modeling livestock production under climate constraint in the African drylands to identify interventions for adaptation

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In the African drylands, livestock is the main source of food, income and livelihood for millions of pastoralists and agro-pastoralists who are very vulnerable and exposed to climate change. Our understanding of livestock contribution to food security and rural development as well as climate change adaptation issues in these areas is still quite poor and limits our capacity to guide interventions for building resilience.

This paper presents a modelling framework for livestock productivity under climate constraints. It is the result of a collaboration between FAO, CIRAD, IFPRI and Action contre la Faim (ACF), for a contribution to the World Bank study on the economics of resilience in the African drylands. The methodology relies on the integration of four models and a participative interaction with local livestock experts: biomass availability under various climate scenarios (baseline, mild drought, severe drought) for the period 2012-2030 was computed by Biogenerator (ACF); livestock population dynamics and feed requirements for different interventions (baseline, animal health improvements, male cattle early offtake) were extracted from MMAGE (CIRAD); feed rations and balances were calculated by GLEAM (FAO) and levels of demand, supply and prices were analysed with IMPACT (IFPRI).

Results show that interventions can significantly increase the output of livestock products (5% to 20% in meat production) if accessibility to feed is improved. This can be achieved through enhancing livestock mobility, developing feed processing and transport and supporting market integration. Livestock systems have the potential to buffer climatic variability through consecutive filters and management decisions: mobility, animal physiology, feeding practices, herd management and eventually milk production and offtake rates. Livestock proves to be a significant asset for adaptation to climate change and interventions should be designed to fully take advantage of this potential.