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Screening for innovations that address sustainability trade-offs in Kenyan livestock systems

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Abstract

The consumption of livestock products in Africa is soaring in response to population growth, urbanisation and rising incomes, which will trigger a livestock revolution leading to the intensification and up-scaling of livestock systems. While this creates economic opportunities for livestock keepers and could alleviate pervasive nutritional deficiencies, it may come with a “long shadow”, causing challenges such as rising greenhouse gas emissions, zoonotic diseases, land-use changes, marginalisation of smallholders and environmental pollution. Innovations that minimise trade-offs and foster synergies between sustainability dimensions could help to harness the potentials of a livestock revolution while minimising its long shadow. Yet, little is known to which extent existing innovations address these sustainability trade-offs.

Taking Kenya as a case study, we explored sustainability trade-offs of typical poultry, dairy and beef livestock systems. Then, we screened for available innovations and assessed their potential to address trade-offs. Data was collected in 11 expert focus group discussions comprising 49 key informants from livestock-related research and advisory institutions using participatory matrix scoring and listing.

Matrix scoring results underscore that small-scale beef and dairy systems are highly relevant for nutrition and local livelihoods but associated with trade-offs like land degradation, land use change and vulnerability to climate change. Key trade-offs in poultry systems are low economic resilience, overuse of antibiotics and food safety risks. In total we identified 47 innovations of which most (75 %) are narrowly geared to enhance productivity through intensification. These innovations often implicitly improve local livelihoods (49 %) but leave environmental trade-offs such as land use change, environmental pollution and GHG-emissions as well as issues like food safety and animal welfare largely unaddressed (5–10 %). Only very few innovations, for example biodigesters and insect-based feeds, are explicitly trade-off minimising while others such as chicken cages or pure breeds further exacerbate existing trade-offs. We recommend further examination of the livestock innovation systems to identify obstacles for trade-off minimising innovations.

Keywords: Innovation, livestock revolution, livestock systems, livestock’s long shadow, trade-off analysis