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Tracing the origin of external feed inputs to assess the circularity of livestock farming systems in Kenya

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Abstract

The consumption of animal-source food (ASF) is expected to increase in developing countries. However, ASF production negatively affects the environment (e.g., via greenhouse gas emissions, land use change, loss of biodiversity), and therefore should be produced in a more sustainable manner. A circular food system is seen as a promising way to use resources effectively and to reduce the impact on the environment. In circular food systems, losses of resources should be prevented and otherwise recovered for reuse. A backbone of circular food systems is avoiding feed-food competition by letting livestock only utilise low-opportunity cost feed (LCF; i.e. by-products, waste-products, grass from land unsuited for food crop production). Livestock can turn these LCF products into nutritious food, manure, and other ecosystem services. However, policymakers often focus on increasing livestock production through intensification practices that increase the need for high quality inputs such as maize and concentrate as detriment of LCF. Hence, intensification will increase feed-food competition and sourcing of products from neighbouring countries, and consequently interrupt nutrient cycling and circularity. We characterised the diet composition and identified input suppliers of small- and large-scale pig, poultry, and dairy farms in Njoro Ward located in Nakuru County in Kenya via in-dept interviews with livestock farmers. Subsequently, input suppliers (e.g. agrovets, wholesalers, feed processing factories,) were interviewed to trace the origin of external inputs. As a result, we assessed circularity of livestock farming systems at ward level and identified opportunities and challenges to implement circular systems at the system production level. Results showed a high dependency on imported ingredients to produce compound feed (e.g., dairy meal, pig finisher meal, layer mash). Protein rich ingredients (i.e. soybean meal, sunflower seed cake, rapeseed cake) were often supplied from other East-African countries, while feed additives (minerals, DCP, toxin binder) were often supplied from global market.

Keywords: Circularity, feed-food competition, food system, intensification, livestock