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## Sustainable Sheep Breeding Programmes in the Tropics: a Framework for Ethiopia

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### Abstract

Improvement programmes for small ruminants in the tropics face several constraints that have hampered the establishment and sustainability of such programmes. One major shortfall has been weak planning, particularly poor involvement of livestock owners and stakeholders in the design and implementation of the programmes. In sub-Saharan Africa, low productivity, high density of animals in relation to grazing capacity, unreliable rainfall, increasing human population, small landholding, and declining land productivity are all major concerns. Studies in Ethiopia show substantial within and between breed variations, and hence genetic improvement is feasible among indigenous sheep breeds. Different breeding alternatives to maximise production (e.g. lamb growth and survival) per animal while culling less productive animals to reduce flock sizes, and re-allocating of resources (e.g. feed and health management) as a means of upgrading management levels for the genetically superior flocks are suggested. Breeding programmes are proposed to be based on open-nucleus flocks utilising government ranches at the top of a three tier system of flocks. Selection schemes allow an in-flow of high potential breeding ewes from sub-nucleus herds for pure-breeding to nucleus flocks in the ranches. The selected superior rams from the ranches will be distributed to participating farmers in the sub-nucleus flocks for mating. Subsequently village flocks receive selected superior rams from the sub-nucleus herds. The programme is proposed to be managed by a nationally mandated Animal Genetic Resources Institution, which collaborates with research institutions and oversees all activities related to this programme. Such a participatory programme is believed to ensure not only long-term genetic improvement and livelihood improvement, but also conservation of the indigenous genetic diversity as well as eco-system health.

**Keywords:** Ethiopia, genetic improvement, indigenous sheep, open-nucleus breeding scheme