



Ministry of Agriculture and Livestock Development
State Department for Livestock Development
P.O. Box 30028 Nairobi



Emergency Locust Response Program
P.O. Box 30028,
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Kenya Agricultural & Livestock Research Organization
P.O. Box 57811-00200,
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Kenya Climate Smart Agriculture Project
P.O. Box 8073 00200,
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Sustainable Agricultural Livelihood Restoration, Rehabilitation and Resilience in Kenya

Guidelines on Sustainable Ruminant Feeds and Nutrition Security for Kenya

CHAPTER 4 STRATEGIC INTERVENTIONS TO ADDRESS RUMINANT FEED AND NUTRITION INSECURITY

4.1 Pillar 1. Feed availability

Feed availability is influenced by production, feed reserves, markets, and transport system, among other factors. The following are the interventions to address issues in feed shortage or unavailability:

4.1.1 Intervention 1. Strategies to increase feed production

4.1.1.1 Increased forage seeds and planting material availability

- i. Facilitate seed production and multiplication - create an enabling environment for Public-private Partnerships (PPPs) on forage seed multiplication and distribution to thrive at the County level.
- ii. Create efficient functional partnerships between KALRO, universities on the one hand, and seed companies and other private seed multiplication and distribution enterprises to promote the commercialisation of forage seed production.
- iii. Organise seed fairs and field days at County and community levels to create awareness and establish linkages for feed planting material access.
- iv. Establish strategic community and County seed banks
- v. Review existing laws and policies concerning the certification of institutions to produce and sell seeds and other planting materials (reduce the long bureaucracy) and exempt indigenous seed systems from the bureaucracy. Also, minimise bureaucracy on forage seed and planting material importation
- vi. Develop new promising forage varieties with better nutrient profiles through innovative plant breeding technologies (to seek and establish partnerships with research institutions)
- vii. Introduce science in seed development, e.g. biotechnology
- viii. Increased availability of necessary machinery, equipment, implements and ICT technologies (feed mixers, forage harvesters, hay balers, mowers, silage balers, etc.) (Photos 4.1, 4.2, 4.3 and 4.4)



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- ix. Incentivise the domestic “jua kali” sector and equipment distributors to innovate on simple locally manufactured feed implements suitable for small-scale operations



Photo 4 1. Hand held tractor



Photo 4 2. Hay baler



Photo 4 3. Hay baler



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Photo 4 4. Electric feed chopper (Source KALRO- Kiboko)

- i. Tax exemption on importation of feed value chain machinery, equipment and implements
- ii. Develop organised service provider groups to support the livestock feed value chain by hiring out of services, developing forage producer groups, and advocating for synchronised value chain activity rollout.
- iii. Update, out-scale, and promote KALRO crop suitability advisory maps (Available at Android Apps on Google Play and website: <https://selector.kalro.org/>)
- iv. Minimise regulatory requirements for the importation of forage seeds and planting materials.
- v. Certified seed vendors to decentralise the services

4.1.1.2 Increase investment in feed production and commercialisation efforts

- i. Enhance agribusiness practices in feed commercialisation (record keeping, minimum efficient scale)
- ii. Incubation for startup feed agribusinesses and funding
- iii. Increase availability of feed ingredients (local production)
- iv. Encourage microfinance institutions to focus on the feed sub-sector
- v. Develop strategies to attract private sector investment in the feed value chain
- vi. Encourage private-public sector investment (participation)
- vii. Establishment/strengthening of feed and pasture seed aggregation centres



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viii. Establishment/strengthening of farmer producer organisations for marketing and market linkages

4.1.1.3 Control of excessive expansion of invasive plant species

The species include (*Prosopis juliflora* [Mathenge], *Lantana camara* [wild sage], *catcaceae* [cactus] and other species with similar effects in identified local situations

- i. Promote control of invasive species through sustainable utilisation (Utilisation of woody species for biomass production - charcoal briquettes, wood carvings, utensils- wooden spoons, construction poles/posts, utilisation of pods and seeds as feeds and feed ingredients, utilisation for human food, utilisation for human herbal medicine, e.g. Cactaceae species
- ii. Improve early detection and rapid response to identify invasive species early and take immediate action to control their spread. Early species detection can be done through regular monitoring and surveillance programs, which trained personnel or citizen scientists can do.
- iii. Enhance biological control using natural enemies of invasive species, such as predators, parasites, and diseases, to control their populations. This method can be an effective and sustainable control method, but it requires careful selection of the biological control agents to ensure they do not harm native species.
- iv. Enhance cultural control by modifying human activities and land-use practices to reduce the spread of invasive species. This method can include changes in farming practices, such as crop rotation and weed management, or changes in recreation practices, such as limiting the transportation of plant materials between different areas.
- v. Improved physical control involves using mechanical or manual methods to remove invasive species, such as pulling or cutting plants or using barriers to prevent their spread. This method can be effective for small-scale infestations but challenging for larger or more established populations.
- vi. Improved chemical control involves using herbicides to control invasive species. This method can be effective but can have negative impacts on non-target species and the environment, so it should only be used as a last resort and with careful consideration.
- vii. Citizen science (community engagement): This involves engaging and empowering local communities to help monitor and control invasive species. This method can effectively



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raise awareness and mobilise action against invasive species and gather data on their distribution and impacts.

- viii. Enhance education and outreach by raising awareness and educating about invasive species, their impacts, and how to prevent their spread. This method uses various channels, including schools, community events, and social media.

4.1.1.4 Reduced incidents of diseases and pests - diseases, e.g. rusts, head smut, maize lethal necrosis; pests, e.g. locusts and fall armyworm

- i. Promote Integrated Pest Management (IPM holistic approach that combines different pest control methods, including biological, cultural, physical, and chemical methods). Combining techniques reduces reliance on one, leading to more sustainable and effective pest management.
- ii. Crop rotation involves alternating crops to break the pest cycle. This practice helps reduce pest populations and diseases specific to a particular crop.
- iii. Biological control: Biological control involves using natural enemies of pests, such as predators, parasites, and pathogens, to control pest populations. This approach is sustainable, environmentally friendly, and has long- lasting effects.
- iv. Use of resistant varieties: Plant breeders can develop crops resistant to pests and diseases. These pest and disease-resistant varieties can reduce the need for chemical pesticides and the incidence of pest and disease outbreaks.
- v. Improved sanitation involves removing sources of pest infestations, such as pulling weeds and debris that harbour pests and cleaning tools and equipment that may spread diseases.
- vi. Enhance capacity building to prevent and manage pest and disease outbreaks. Farmers, gardeners, and the public should be educated on the importance of pest and disease management, integrated pest management, and the proper use of pesticides.
- vii. Develop early detection and warning methods to prevent spreading of pests and diseases. Regular monitoring and surveillance can detect outbreaks early, and quick action can prevent the spread of pests and diseases.



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- viii. Pheromone traps are to control pest populations by using synthetic pheromones to attract pests to a trap. This approach is an environmentally friendly and effective way of controlling pests.

4.1.1.5 Mitigate conflict insecurity which disrupts feed production and supply chains

- i. Encourage community peace-building efforts through activities that build community integration - for example, peace caravans, building schools, sporting activities, and other social amenities at the common border of conflicting communities and clans
- ii. Promote affirmative actions and programs to uplift the marginalised
- iii. Strengthen inter-community dialogue and negotiations to mitigate potential resource-based conflict
- iv. Disarming of the local communities to reduce proliferation of illegal small arms.
- v. Encourage integration measures among different communities through intermarriages and participation in common activities

4.1.1.6 Restore community governance over land tenure systems and utilisation

- i. Integration of community governance into national and County government decision-making and policy processes.
- ii. Lease out idle private land for feed production
- iii. Establish range management committees and community dialogues
- iv. Establish/strengthen range management committees
- v. Develop and implement the range management bill/act and regulations at the county level

4.1.1.7 Increase feed productivity

- i. Timely feed harvesting at optimum quantity and quality (at 50% flowering)
- ii. Promote intercropping of fodder with legumes. For example, Maasai love grass (*Eragrostis superba*) intercropped with green leaf desmodium (*Desmodium intortum*), Rhodes grass



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- (*Chloris gayana*) intercropped with Lucerne grass (*Medicago sativa*) or purple vetch (*Vicia americana*) in the ASAL areas, and Napier grass (*Pennisetum purpureum*) intercropped with green leaf desmodium in the non-ASAL areas.
- iii. Promote Good Agricultural Practices (GAPs) s and intensification
 - iv. Increase area under multipurpose trees (MPTs), multipurpose shrubs (MPSs), and agroforestry. Readers are referred to Nair et al. (2021).for further information.
 - v. Improve soil fertility and structure using fertilisers, manure, and compost.
 - vi. Promote SLM (sustainable land management) systems of the rangelands, rangeland reseeded & natural land regeneration
 - vii. Promotion of community grazing plans and patterns

4.1.1.8 Address adverse effects of climate variability and environmental shocks on fragile ecosystems

- i. Identify, select, disseminate and upscale locally adapted drought-tolerant forage varieties taking into consideration the KEPHIS regulations and guidelines
- ii. Intercrop grasses with legumes or fodder trees
- iii. Develop agrosilvopastoral systems in both rangelands and non-ASALs
- iv. Promote co-production and dissemination of traditional and scientific early warning systems
- v. Promote the use of both traditional and scientific early warning systems that monitor weather patterns and provide farmers with information on how to adapt to changes in weather patterns (reserving feeds timely)
- vi. Promote climate-smart ruminant farming practices, including drought-tolerant feed crops (brachiaria, cobra, and sorghum species).
- vii. Enhance conservation agriculture and water harvesting technologies.
- viii. Enhance water availability in all seasons for use during the dry season by encouraging farmers to form fodder production cooperatives for effective harvesting of water from various sources (rain, surface, underground) storage and harvesting infracture (boreholes, dams, pans, farm gate water harvesting equipment) and use (irrigation)
- ix. Identify, select and disseminate forage varieties that can withstand flooding and water logging conditions and reduce soil erosion. Planting cover crops (cowpeas- M66 (*Vigna unguiculata*), dolichos lablab (*Lablab purpureus*), mung bean or Njahe (*Vigna radiata*),



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desmodium species, mukuna (*Mukuna pruriens*), crotalaria (*Crotalaria retusa*) will also Enhance land degradation mitigation measures, including community-driven sustainable rangeland rehabilitation and management and practices (re-afforestation, agroforestry, silvo-pastoralism, natural forest conservation, community forest management, boundary plantings)

- x. Promote activities that enhance control and eradication of invasive species through sustainable utilisation
- xi. Incentivise communities to implement community land restoration, including soil and water conservation, under the Participatory Integrated Community Development (PCID) model
- xii. Promote proper animal mix for improved grazing management (cattle, sheep, goats and camels)
- xiii. Re-engineer community governance structures to promote participatory rangeland management and sustainable grazing regimes; enforce sustainable stocking rates and recommended carrying capacity management; and promote investment in research and development for local production of diversified alternative high protein and high energy rich feeds in the long term

4.1.1.9 Proper feed planning and budgeting (County, farmer cooperatives/organisations, individual farmers, pastoralists)

- i. Establish the ruminant population by species and herd structure (census)
- ii. Establish/determine feed requirements for the species and classes in quantity and quality (DM, ME, CP, Stocking rate/ carrying capacity)
- iii. Establish the feed resource available (roughages, concentrates, minerals, premixes)
- iv. Establish the feed balance (surpluses, deficits)
- v. Develop a national/ County ruminant feed action plan