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Natural Pasture Improvement for Enhanced Livestock Productivity in Makueni County, Kenya

A Guide for Livestock Farmers, Pastoralists and Extension Agents



Degraded pastureland



Biodiversity rich pastureland after reseeding

1. Introduction

Makueni County is classified as arid and semi-arid land, and is characterized by low rainfall of about 150 - 650 mm per year and high temperatures that range from a minimum of 12°C to a maximum of 28°C. Much of the County has suffered environmental degradation mainly due to poor land use systems. The key drivers of land degradation in the County include: land fragmentation, land use change, overexploitation of woodlands, overstocking of livestock, soil erosion, loss of biodiversity, and spread of invasive plant species. As an adaptation strategy, farmers in Makueni County are now adopting technologies that can improve productivity of both land and livestock through growing of natural pasture grasses. One such farmer is Mr.

Jeremiah Ngaya, who adopted pasture improvement technology in 2008.

The farmer's intervention involves growing a range of natural pasture grasses adapted to semi-arid climatic conditions.

2. Objectives of growing improved pasture grasses

- Ensure livestock pasture availability throughout the year.
- Improve livestock productivity.
- Increase farmers income.
- Increase livestock carrying capacity of land.

3. Approach

3.1 Grass selection

Natural pasture grass farming was introduced in Makueni after several years of crop failure and environmental degradation within the County. The practice was identified, and promoted after consultation between relevant research institutions within Makueni County and the local community. The community was instrumental in identifying indigenous pasture grass species that originally grew in the County. The four main grass species identified and selected for re-introduction were; Maasai love grass (*Eragrostis superba*), Horsetail grass (*Chloris roxburghiana*), African foxtail grass (*Cenchrus ciliaris*) and Bush rye (*Enteropogon macrostachyus*). The grasses were selected based on their resilience and ability to provide high quality feed even in the dry season. Grass seeds were then supplied by Kenya Agricultural and Livestock Research Organization (KALRO).

Main grasses planted in pasture land in Makueni County



Eragrostis superba
(Maasai love grass)



Cenchrus ciliaris
(African foxtail grass)



Chloris roxburghiana
(Horsetail grass)



Enteropogon macrostachyus
(Bush rye)

3.2 Pasture grass establishment and harvesting

To establish the pasture grasses, land is prepared using oxen-plough before the on-set of rains. The different grass seeds are mixed in an equal ratio and broadcast or planted in furrows at a rate of 3-5 kg per ha after which they are thinly covered with a layer of soil. Grass can also be planted in pure stands.

The grass crop can be managed for either seed or hay production. Seed is harvested when over 60% of the seed heads of a given grass type have turned golden brown. Harvesting is done during the dry season.

High quality hay is derived from harvesting grass before it produces seeds. For hay harvesting, grass is cut at about six inches above the ground. Hay is dried under shade and then stored in a dry cool place. About 300 bales of hay can be harvested from one hectare under pasture grass annually. Re-planting of the grass is done after 6 to 7 years.



Ox-ploughed land creating furrows which act as microcatchments for water harvesting and reducing runoff



A farmer in Makueni, Mr. Ngaya demonstrates seed sowing in furrows created by ox-plough



Pasture grass ready for harvesting



Hay stored on raised beds under shade

4. Impact

- The farmer has diversified sources of income through sale of grass seeds, hay, and livestock products such as milk.
- The farmer harvests 150 - 200 kg of seed from 1 acre (0.404 ha) of land. The seed sells at about Ksh 400 - 800 per kilogram fetching a minimum of Ksh 60,000 from 1 acre, an area which initially yielded Ksh 10,000 from sale of maize crop annually.
- The farmer now has healthy animals that fetch high prices in the market, leading to increased income.
- Other land users have gained knowledge on pasture growing from Mr. Ngaya leading to social cohesion.
- Land use conflict has reduced after introduction of grass growing since other farmers have access to pasture and hay.
- As pasture is available on-farm, farm families save time for use in other activities.
- The practice has created employment opportunities from harvesting of grass for seed and baling hay.
- Reduced soil erosion as land is now covered by grasses.
- Use of land that was previously idle and

neglected due to degradation.

- There is a general improvement in aesthetics as the area is now greener due to grass cover.

5. Sustainability

- Mr. Ngaya is able to sustain pasture production on his land and build capacity of local community on the good practice without external support.
- The local community has adopted the practice which is coordinated through a pasture farming group.

6. Innovations and Success Factors

- The farmer has formed a grass pasture farming group to ensure production and multiplication of quality seed and hay in quantities that can meet local and external markets
- The farmer introduced cut-off drains on his land to enhance water harvesting and water infiltration into the soil
- The farmer leases sections of his pastureland to other farmers for grazing during the dry season, therefore increasing his income base and providing the other farmers with animal feed
- There is continuous learning by the farmer from relevant institutions, therefore improving knowledge on pasture management
- The farmer gets links to market through institutions and individuals who visit the farm

7. Constraints & Solutions

7.1 Constraints

The challenges encountered in applying the good practice include:

- Termite damage to grass.
- Prolonged drought that leads to pasture drying up.
- Demanding and lengthy process of obtaining permit to export grass seed.

7.2 Solutions

The farmer counters the challenges by;

- Terminating queen termites.
- Constructing water harvesting structures.
- Creating awareness and lobbying for export market, respectively.

8. Lessons Learnt

- Drylands have potential to produce improved natural pastures, grass seeds and hay to sustain livestock productivity throughout the year as well as generate income to improve farmers livelihood.
- Sharing knowledge through community sensitization, farm visits and training - of - trainers offers a good learning platform for farmers.
- Adoption of improved natural pasture growing on-farm reduces conflict over communal grazing land.

9. Conclusion

Adoption of improved natural pasture growing in the drylands enhances pasture availability, livestock productivity and improves farmers livelihood as well as resilience to climate change.

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