



## RANGE REHABILITATION FOR WILDLIFE CONSERVATION AND PASTORAL LIVESTOCK PRODUCTION

POLICY BRIEF 1

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### Introduction

More than half of the wildlife habitat in Kenya is located outside protected areas, dispersed in private and community grazing lands. The traditional pastoral approach to livestock husbandry is considered compatible with and complementary to wildlife. However, these areas have undergone increasing land use pressure within the past decades, leading to land degradation largely due to climatic factors, notably recurrent droughts and low and declining amounts of rainfall, increasing human and livestock population and unsustainable land uses. Pastoralists range has become too restricted for traditional livestock grazing practices forcing them to diversify livestock-based economies and agriculture. As the pressure on land intensifies, there is potential for conflict between wildlife and people over grazing land, characterised by competition for key resources, predation on domestic livestock, and disease transmission. Wildlife populations and their habitats have been adversely affected by these changes. Restoration of degraded arid environments is critically needed as a mitigation measure against land degradation, biodiversity loss, climate change (Lal, 2009) and for enhancing the adaptive capacity of the local agro-pastoral communities.

### Key Questions

1. How can pasture scarcity in the livestock-wildlife interface be alleviated to promote wildlife conservation and livestock production?
2. How can range rehabilitation be up-scaled from site (enclosure) to landscape scale?
3. Besides provision of pasture and reduction of soil erosion, can range rehabilitation offer diversified income and benefits?
4. In what ways can the local communities' capacities be empowered in decision making on resources use in order to allow sustainable use of rangelands?
5. What are the emergent issues following rehabilitation of degraded grazing land in community ranches?

### **A: Extent of land degradation at the livestock wildlife interface in the Ewaso ecosystem**

Most of the community grazing areas in Ewaso ecosystem is very poor rangeland condition, characterised by low or no herbaceous vegetation cover. This high rate of land degradation in the community grazing land present a growing need to promote ecosystem-wide and integrated landscape practices that combine rangeland restoration, livestock production and community-based conservation measures. High resolution satellite imageries coupled with visual assessments on the ground along fence-lines show good range condition in the private ranches owing to focussed management and range improvement practices.

In the adjacent community ranches on the contrary, the interaction of human activity, heavy grazing and exacerbating effects of climatic variability has caused dramatic ecological degradation. Most areas exhibit poor range condition, with extensive areas of bare and eroded areas characterised by smooth surface crust (Kinyua et al., 2009; Oguge et al., 2006).

Passive restoration of such degraded areas (e.g. by removal of livestock) is usually insufficient, due to absence of perennials that would recolonize via stolons or rhizomes. Seeds too, if present, are inhibited from germinating on the smooth soil surface crusts prior to scratching or ripping (Kinyua et al., 2009; Opiyo et al., 2011).

However despite past habitat loss to land degradation, the community areas in Ewaso ecosystem still hold significant populations of diverse wildlife.

## **B: Restoration of degraded land at site and ecosystem scale**

In an effort to prevent further habitat loss, landscape scale conservation strategy has been implemented in several community wildlife conservancies and their constituent ranches through partnering with conservation agents like the Northern Rangeland Trust and AWF among others. Key to the success of this conservation strategy is to develop natural resource management plans (NRMPs) (Henson et al., 2009).

The NRMP process entail land use zoning (Fig. 1) to provide a framework for maintaining the integrity of the livestock wildlife interface environments while promoting wise use of the resources for sustainability and community benefit. Thus land is zoned according to its ecological capacity and the most beneficial economic activity of a particular zone. This generates three main zones in each ranch namely: core conservation, grazing and settlement zone.

Specific management strategies are laid down for each zone. For instance: withdrawal of livestock grazing and human traffic and developments in the core conservation area; range rehabilitation in the degraded grazing areas; random grass seed broadcast along stock routes; and destocking through regular livestock marketing. In the settlement zones, strategies include capacity building and alternative income generating activities for women like beadwork projects.

### **At site scale**

Range rehabilitation targeted severely degraded patches in the grazing and settlement zones in order to alleviate pasture scarcity and prevent further degradation. For instance, in three group ranches (Tiamamut, Kijabe and Nkiloriti) of the Naibung'a Wildlife Conservancy, range rehabilitation started with the communities demarcating the severely degraded sites within the grazing areas. Such sites were characterised by large bare areas with a smooth hard-surface crust and soil erosion gullies on the sloping sides (Mureithi, 2011).

The sites in Tiamamut were enclosed using cut thorn-bush of *Acacia mellifera* and *A. reficiens* and are owned and managed by Tiamamut Range Rehabilitation Women Group (TRRWG). The main goal was to increase alternative income generating activities for women, ranging from the sale of grass seed and fattened stock to beadwork project, enveloped in the wider goal of restoring degraded areas within the ranches.

The sites in Kijabe and Nkiloriti are under the custody of the grazing committees on behalf of the respective group ranches, and were not fenced. Following the demarcation of the boundaries and trimming of *Acacia mellifera* branches, the sites were reseeded with grass seed mixtures of *Cenchrus ciliaris*, *Eragrostis superba* and *Entropogon macrostachyus* using 'rip-after-broadcast' method (Mureithi, 2011). This followed observations that when grass seed is broadcasted after the ripping, the risk of being blown-off by wind, eaten by ants and graminivores, and displaced by flood water is high. However, much of the grass seed is covered by soil and the grass regeneration is better when seed is broadcast prior to the ripping.

The ripping breaks the surface crust and increases plant establishment by increasing seed retention, water infiltration and the presence of favourable micro sites (van der Berg and Kellner, 2005; Opiyo et al., 2011). The umbrella-shaped under-canopies of *Acacia tortilis* were neither ripped nor reseeded since they are usually habited by *Cynodon dactylon* (Kahi et al., 2009), a perennial grass species in the East African semi-arid rangelands. Following regeneration of vegetation in reseeded areas (see Fig. 2 – 8; the status of the rehabilitated sites in TKN group ranches), these under-canopy patches enhance heterogeneity of the rehabilitated sites.

## At landscape scale

The withdrawal of livestock grazing and human traffic and developments in the core conservation areas leads to natural (passive) rehabilitation of the rangeland. For instance, ten years after the NRM planning began in Naibung'a wildlife conservancy, herbaceous vegetation (mainly grasses) has fully recovered in Kijabe conservation areas, to the extent that the management is weighing options to open up the area for guided high intensity grazing of livestock (Mureithi et al., *submitted*).

The Kijabe conservation zone is hilly and rugged and is not preferred by zebra for grazing as the plains. Zebra is an avid grazer that opens up grass, enhancing further regeneration. Small game such as the Grant's and Thomson's Gazelles are observed to have moved out of the conservation zone due to the tall vegetation, a behavioural change to protect against predation. They are now commonly found on the open plains of the Kijabe grazing zones. Other options like mowing and burning are least desirable in the conservation area setting.

If left unattended, the range condition would decline due to the growth of shrubs and bush replacing the grasses in absence of grazers. *Themeda triandra*, an important forage species that had locally disappeared is presently abundant in Kijabe conservation area indicating the NRM planning effectiveness in restoring biodiversity.

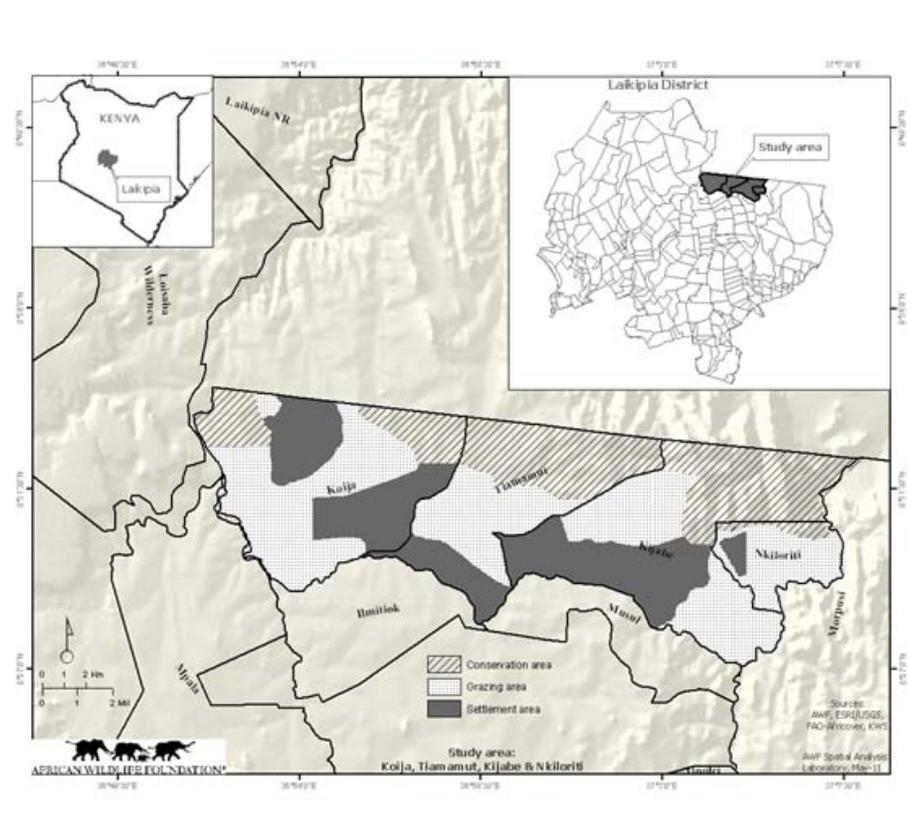


Fig. 1 Land use zones for Koiya, Tiamamut Kijabe and Nkiloriti community ranches (Courtesy of AWF)



a)



b)

**Fig. 2** a) Wet season photo showing grass recovery and b) a gully filled up with thorn bush to control soil erosion in Tiamamut Nursery Site (Photos by S. Mureithi)



a)



b)

**Fig. 3** a) Dry season photo showing accumulation of litter and b) elephant dung disintegrated by termites in Tiamamut Site A. Litter and dung plays important role in restoring soil quality (Photos by S. Mureithi)



a)



b)

**Fig. 4** a) Dry and b) wet season photos showing grass recovery at Tiamamut Site B (Photos by S. Mureithi)



a)



b)

**Fig. 5** a) The 'Kijabe' site shortly after first rains following reseeding; b) a dry season photo showing remnants of grass. Grass cover in both sites in Kijabe is not yet fully established (Photos by S. Mureithi).



a)



b)

**Fig. 6** a) One of the rehabilitated areas in Nkiloriti done by community members using hand tools. b) Placing cut thorn branches on reseeded patches protects seeds from being blown off by wind (Photo by B. Lengalen)



a)



b)

**Fig. 8** a) Grazing Scouts with a Consultant during a training session on range monitoring; b) a heap of *Sansevieria intermida* removed through uprooting by women and scouts. This practice should be encouraged all over Mukogodo rangelands to get rid of the noxious weed (Photos by S. Mureithi).

### **C: Emergent issues and recommendations following range rehabilitation at the livestock-wildlife interface**

In the light of the achievements and positive impact of the range rehabilitation activities on the community ranch members and the environment, the identified unfulfilled needs and emergent issues, the following actions are recommended:

- i. Strengthen the capacity of the group ranches to embrace the concept of multiple use of the range that promotes sustainable NRM practices for improved livelihoods. Rehabilitated rangeland can be a source of many ecosystem services and products as already outlined in this brief, and should therefore be encouraged in all the community ranches.
- ii. Continued capacity building of the ranch, conservation and grazing committees, in leadership and governance, conservation and grazing management, financial management and book keeping among others. It is expected that this will guarantee future success and sustainability of project benefits and outcomes.
- iii. The improvement of livelihoods through income generating activities is not realized within project time-frames as most of the activities have to follow successful range restoration. Thus range rehabilitation projects' donors and implementing partners should review this with a view of further supporting the ranches to initiate the income generating activities to tap economic benefits of rehabilitation.
- iv. Rehabilitated areas have attracted high numbers of wildlife due to feed availability. There is need to secure areas under rehabilitation from invasion by wildlife which would reverse the gains made so far. For instance the feeding habit of the elephant may result to destruction of reseeded areas. However, permanent or electric fences are discouraged as they can inhibit the free movement of wildlife in the long run. Besides this, increased human-wildlife conflicts should be anticipated (Fig. 9).
- v. There is need to promote and support peer-learning exchanges among the committees of KTKN, Naibung'a Wildlife Conservancy and other conservancies in the region to bridge awareness gaps. The participants in such exchanges can then share the knowledge gained with the other group ranch members.
- vi. The attraction of wildlife to the rehabilitated sites due to feed availability is an emergent issue that AWF and other conservation partners can consider exploring. For instance, how range rehabilitation can supplement conservation work which is a significant source of group ranch income. Can it be used as a strategy to control where the wild animals go?
- vii. Encourage deliberate management effort to control increaser plants population in the rehabilitated areas. Major ones include *Sansevieria intermida* (should be completely removed, put in gullies and monitored); *Acacia reficiens* and *A. melliferra* (regular control measures should include uprooting seedlings and pruning of shrubs). The negative aspect of *Opuntia* sp. for both humans and livestock is also a concern to communities.
- viii. Establish a long-term ecological and socioeconomic monitoring and evaluation (M&E) system of the project areas in order to gain understanding of the processes and emergent issues (for instance, the attraction of wildlife to the rehabilitated sites), and achieve increased restoration capability in the future, as well as constantly informing management strategies. Such M&E could also help us gain understanding of the restoration process, and learn lessons that can be used in out scaling programmes.
- ix. Continue to explore new and strengthen the existing livestock marketing channels, for example the AWF - OI Pejeta Conservancy (OPC) community livestock outreach that purchased livestock from the community group ranches. The outreach reduces the stock density on the ranches while increasing income to the households and hastening range recovery. This has had a positive impact as the communities now have an assured market for their livestock.



**Fig. 9** a) and b) Elephants and human beings sharing water in Lobo Soit dam near the two rehabilitated site A and B in Tiamamut group ranch. From the dam the animals concentrate in the rehabilitated sites. This potentiality of human-wildlife conflict may arise due to water scarcity (Courtesy of AWF).

**D: Policy issues in sustainable resource management at the interface include:**

1. Wildlife conservation and management: All the legal requirements of CAP 376 on community conservation must be fulfilled and the conservancies to be aligned with the Kenya Wildlife Service policy framework.
2. Land use development in the proposed development zones must be compatible with conservation. Strict adherence to the relevant existing laws and policies such as Environmental Management Coordination Act (EMCA) must be ensured.
3. Zonation programmes need to be incorporated into the Conservancy management plans so that the conservancy managers and community committees work in harmony.
4. Conservancy and zonation by-laws need to be gazetted to improve compliance and empower the various compliance committees.
5. Increased investment is required in development of livestock marketing facilities in order to increase livestock off-take and absorb the surplus gains made from improved range management.
6. Government to increase support to community disease monitoring and control committees, and improve delivery of veterinary services.
7. Community based eco-tourism initiatives be supported and community capacities to manage such enterprises be enhanced.
8. Harmonisation of regional zonation programmes to reduce conflicts related to outsiders grazing on zoned community conservation land when owners are conserving such land.

**E: Long-term Monitoring and Evaluation (M&E) Framework**

The need for effective habitat restoration is growing, but we must move beyond simply drawing lines on maps and calling the spaces “*restored habitat*”—we need to give much greater consideration to how we actually fill in these spaces to achieve the goals that are set. A lot of issues needs to be considered in planning and implementation of range rehabilitation projects if they are to realise their goal. Keeping in mind that the enclosed and the un-enclosed areas are parts of a unified whole, the management and socioeconomic concerns need to be geared towards environmental sustainability of both sides of the fence. This calls for long-term ecological and socioeconomic monitoring and evaluation (M&E) of the project areas in order to gain understanding of the processes and emergent

issues in effort to achieve increased restoration capability in the future. Such and M&E can for example use the Millennium Ecosystem Framework that gives a set of both ecological and socioeconomic indicators.

Such long-term M & E need to also include a climatic data collection program. Long-term climatic data at local level will enhance understanding of: the functioning of ecological systems; the dynamics of water resources in springs, streams and seasonal flows; and effects of climate on the development of land use patterns and their impacts on soil and water conservation. The climate data will also facilitate the evolution of appropriate NRM systems, including use of drought tolerant plant species in appropriate areas. The climate monitoring program is therefore, essential for accurate interpretation of ecological changes within project sites. A better understanding of the interplay between climate variability and anthropological activities hinges largely on our understanding of the analysis of ecosystem changes, which can accurately be attributed to climate and human activity driving variables.

## Summary

One of the key ecological constraints in the coexistence of livestock and wildlife at the livestock-wildlife interface environments is pasture scarcity. Since the pastoral economy is pinned on livestock keeping, land degradation has led to depletion of livelihoods base, leading to poverty, food insecurity and resource conflicts which pose a serious conservation challenge. Implementation of NRM plans including land use zoning within the community wildlife conservancies is a step towards finding the right solution. Range rehabilitation and improved grazing management present an avenue to address land degradation, habitat and biodiversity loss. Rehabilitation through ripping, reseeding, and random grass seed broadcasts could increase overall graminoid cover and pasture availability. It could also be integrated as a management strategy to influence the distribution of herbivores within the community ranches and their conservancies.

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