SCOPING STUDY ON PARTICIPATORY RANGELAND MANAGEMENT (PRM) IN WAJIR

RECONCILE October 2022

Table of Contents

LIST OF TABLES

List of Figures

1. INTRODUCTION

1.1. Background

This report is a contribution to ILRI's RECONCILE project *Livestock, Climate and System Resilience (LCSR)*, a research program that aims to improve participatory rangeland management (PRM) uptake by establishing a stronger technical base. The three-year project builds on the gains and lessons learned in the implementation of PRM in Baringo implemented under similar collaborative arrangements and promoted PRM both as a concept for rangelands management and restoration and as a process that promotes sustainable land use, policy and governance of rangelands and pastoral livelihoods systems. PRM was conceived as a regional project also piloted in Tanzania to complement the legal land use tenure security the Joint Village Land Use Planning. A similar intervention has been successfully implemented through a pilot phase in Ethiopia where it was confirmed as an important concept in addressing rangelands degradation and other rangelands-based challenges where, over the years, rangelands have experienced pressure from a number of threats.

PRM therefore presented and continues to be both a tool and a process for communities and governments to recognize the realities and impacts of land subdivision, population growth, climate change, droughts, land degradation and unsustainable land-use practices as real threats to productivity of rangelands. PRM demonstrated increased community awareness and participation in the conservation of rangelands sustainability. PRM, is a step-by-step process for improving management, governance, and investment in rangelands, led by communities, and supported by NGOs, researchers and development partners.

The pilot phase of PRM envisaged a component to promote action research to help document the experience and define potential avenues for next-level research areas and issues. RECONCILE, a collaborative program with the International Livestock Research Institute (ILRI), established a three-year research program under the Livestock, Climate and System Resilience (LCSR) Project that builds on the gains and lessons learned in the implementation of PRM in Baringo and executed within the PRM framework recognizing the three stages and steps eight steps. The major activities envisaged under the project include:

- A scoping study to identify locations for new PRM initiaitves,
- Piloting PRM in new sites,
- Strengthening PRM in already established sites,
- Piloting participatory land use planning and
- Facilitation of baseline and landscape studies in PRM sites and research on conflict and land.

The project is part of a 10-year global research program under the Consultative Group for International Agricultural Research (CGIAR) with ILRI as lead. In Kenya, the project is being implemented in Baringo and Wajir Counties. It is expected there will be other components of the project that may also include other initiatives such as research around land conflict, land-use planning and climate security. In response to the terms of reference for this study (Annex 1), the major activities carried out as part of the scoping study in Wajir are:

- Assessment of the current status of the rangelands and their management.
- Identification of existing rangeland management structures and institutions, including the county and national government, local and community-based institutions, and traditional systems.
- Identification of strategic stakeholders and their possible roles in rangelands management.
- Identification of two subcounties or rangelands units within Wajir County as potential project sites.
- Identification of opportunities for collaboration in the management of rangelands.
- Consolidation of available information, documents, maps etcetera to inform decision-making and synergies.

The overall objective of the scoping study in Wajir County was to help identify status, drivers and constraints to effective rangeland management.

2. METHODOLOGY

The scoping study was guided by an established framework for rangeland assessment.

2.1. Methodological Framework for Land Degradation Assessment

Pastoral production systems are the backbone of land use and an economic mainstay of communities in arid and semi-arid regions (ASALs) where annual precipitation is less than 500 mm. Adaptive land use entails elaborate seasonal mobility to track moisture and nutrient fluxes across diverse landscapes. Pastoral land use practices are managed with traditional customary land-use and management practices that help regulate livestock populations in a given area over a period of time. Managed as common resources, rangeland conditions affect livestock health and productivity and is thus closely assessed and monitored by communities whose livelihoods depend directly on the ecosystem (Wario et al. 2015). The spate of land degradation in diverse landscape has affected resilience and livelihoods of community in northern Kenya.

In the recent years, there have been growing concerns about the rapid rates of land degradation in ASALs of northern Kenya as result of multiple causes including climate change and increased human and livestock populations (Lutta et al. 2020). Degradation has also been closely associated with dysfunctional traditional governance. Customary institutions are facing challenges from community-level dynamics and government officials who doubt its efficacy. Customary institutions remain active and relevant for resource governance among pastoralists on northern Kenya and southern Ethiopia.

The causes and effects of land degradation in landscapes characterized by high levels of variability have proved too complex to be measured using conventional ecological assessments of biological parameters. Over the years some have observed that human decisions and management practices of land users play significant roles in shaping land degradation. This observation has led to the recognition of more integrated and participatory methodologies to gain better perspectives on the drivers of change which can be due to either natural variation or increasing anthropogenic effects on range resources. Participatory rangeland management tools have evolved as an inclusive approach that considers both the complex nature of range resources and multiple actors and institutions involved in management.

2.2 Participatory Rangeland Management

Communities have developed sophisticated systemd of range resource management relying on their customary institutions (Tari and Pattison 2014). PRM recognizes the role of the local knowledge of land users, the environmental history, and context-oriented resource management practices. PRM is an inclusive and collaborative multistage process to help fully understand land degradation (Flintan 2010). PRM has been tested in Ethiopia, Kenya and Tanzania and has proved to be sufficiently robust to capture complex spatial-temporal dynamics in a social ecological system (Flintan and Cullis 2010; Robisson et al. 2018). The phases in the process in of PRM, popularly described as 'legs' (Table 1) paint a panoramic view of the main activities involved in a comprehensive rangeland assessment.

Table 1. Four legs in participatory rangeland management and outcomes

The 'legs' of PRM	**Intermediate outcome**
First leg – establishment and governance of the rangeland unit	A governance structure for the rangeland unit that belongs to the community and is responsive to it and that is capable of effective planning for, and management of, the rangeland unit.
Second leg – management of the rangeland unit	A rangeland management plan developed by the community which guides the actions of the rangeland management institution.
Third leg – using a landscape approach	A set of plans and negotiated agreements with communities beyond the rangeland unit addressing how pastures and other rangeland resources will and will not be shared and how ecosystem and resources will be managed at a landscape scale.
Fourth leg – relations with government and customary institutions	Recognition by government and, where applicable, customary institutions, of the rangeland management institution and the rangeland management plan.

Source: ILRI, 2018.

2.3 Wajir County

Wajir county is in northeastern Kenya. It covers an area of 56,685.9 km^2 and lies between latitude 30N and 60N and longitudes 39E and 41E. It borders Somalia to the east, Ethiopia to the north, Mandera County to the northeast, Isiolo County to the Southwest, Marsabit County to the west, and Garissa County to the south. Administratively, Wajir has eight subcounties (Wajir East, Tarbaj, Wajir West, Eldas, Wajir North, Buna, Habaswein and Wajir South Figure 1). It is further divided into 29 divisions, 142 locations and 172 sublocations (County CIDP 2013).

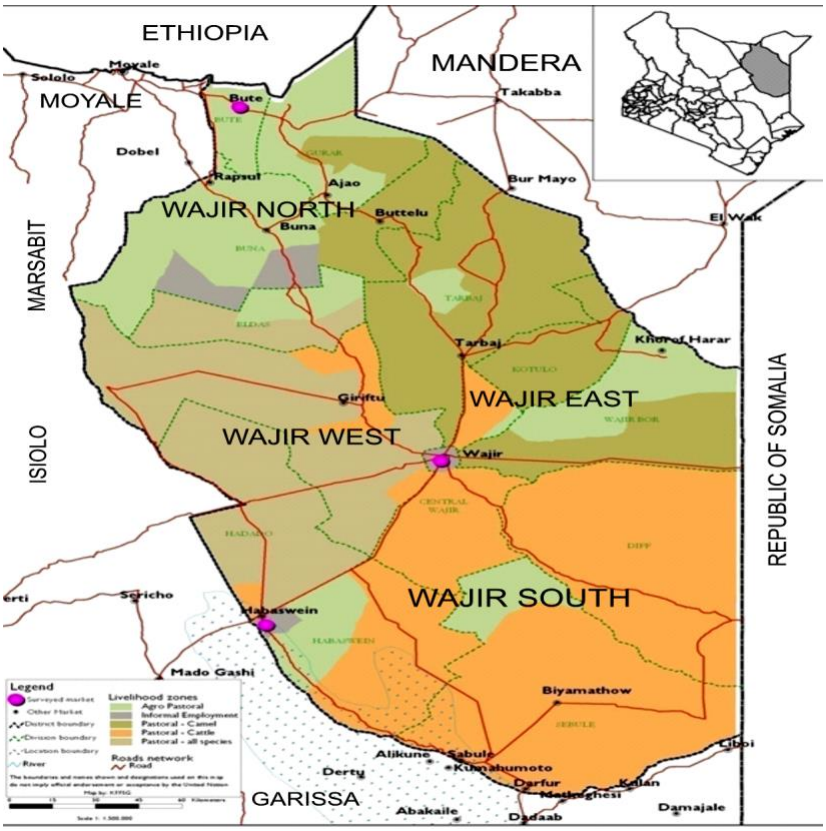

Figure 1. Location of Wajir Subcounties.

Wajir County is a typical rangeland ecosystem falling in ecological zone V-VI, with a complex land-use history dating back many years. The county is largely arid and semi-arid with average annual rainfall of about 300-400 mm. The vegetation cover si mainly low trees, shrubs and grasses.

The landform is characterized by a relatively featureless plain and a mosaic of stony and shallow soils that include *Waiyama, Bei guduud and Bei, Rama, Rama ad, Kunya, Boji* and *Adabla.* The vegetation is influenced by soil and precipitation classified into eight physiognomic classes based on dominant growth form, height and cover. Generally, shrubs and trees dominate the northeastern half of the district while dwarf shrubs and grasses dominate the southeastern half (Shaaban et al. 1992). Annual grasses dominate the herbaceous layer throughout most of the district.

Due to the low precipitation and the savanna ecosystem, the major land use is pastoralism with camels, goats, sheep and cattle being the main livestock reared. Most pastoralist communities are settled in major urban or peri urban settlements where people are attracted by opportunities for educating their children, formal or informal jobs, and can enjoy a relatively favorable, settled environment. Livestock remain mobile in distant pastures, which sometimes takes them outside the county boundary.

2.4 Field Methods

1. An assessment of the status of the rangeland was documented through a review of the literature and enriched with interviews with county officials, including county livestock development officers (Annex 1).
2. Collaborative mapping of stakeholders involved in rangeland management was conducted with the help of state and non-state actors to understand their roles and interests in rangeland management. The team also helped elaborate policies that the County Government of Wajir has developed or is developing to support livestock production.
3. Transect drives were conducted through Wajir-Giriftu Eldas Roa, and Wajir-Burder-Diif Road. Along each road, regular stops were made to assess degradation parameters including soil and vegetation conditions and the presence of important fauna (Annex 2).
4. With the help of staff from the livestock and veterinary departments, key informant interviews and focus group discussions were conducted in Kulaley, Burdher Eldas, and Giriftu. A guided research tool was employed to determine rangeland conditions. Focus group discussions were conducted with herders in several locations in Wajir West, Wajir South, and Eldas. The discussions were useful in understanding current conditions, past status, and how trends have evolved over the years.

3. MAIN FINDINGS

3.1. Overview of Land Degradation Status in Wajir County

Recently, rapid degradation of the rangelands in Wajir have been reported and blamed on the breakdown of traditional institutions for rangeland governance and uncoordinated development of water points and settlements across the fragile ecosystem (Nathalie and Gomes 2006). Water points across the county have attracted large numbers of livestock in selected landscapes that has affected the quality of vegetation and soil stability. Even with the increased rate of land degradation associated with water development, more water points continue to be developed due to the limited understanding by political decision-makers on rangeland functioning. For example, in Wajir, there was a significant increase in the number of boreholes and pans without proper plans for their placement (County Government of Wajir 2019).

In addition to the impacts associated with settlement around water points, other major concerns for land degradation in Wajir County include climate change shocks such as recurrent droughts, flash floods, and an upsurge of pests that have severely affected species biodiversity and increased cases of invasive species such as *Prosopis juliflora*. Inter-community conflict is also considered both a cause and a consequence of land degradation as its humpers free movement of communities between pastures in different seasons and landscapes, which helps reduce the pressure on the grazing resources. Increased poverty due to loss of livestock to drought has also forced many families to engage in charcoal burning that threatens the main multipurpose woody species such as *Acacia tortilis*

3.2. Stakeholders for Range Governance and Their Roles in Wajir County

Several key stakeholders in the county are involved in rangeland management. These stakeholders are engaged in distinct and sometimes overlapping roles regarding rangeland management. Thye can broadly be classified as state and non-non-state actors. The Department of Livestock is the sector leader and provides technical support backed by county policy for livestock development. Other stakeholders make their plans based on the overall county livestock and range management plan of the department. Other stakeholders on the government side are the Kenya Wildlife Service, Kenya Forestry Services and the National Drought Management Authority. Non-state actors collaborate with the livestock department to ensure the rangeland is managed for sustainable use.

Table 2. Stakeholders involved in range management in Wajir County

Resource	Stakeholder	Category	Roles
Rangeland	Department of Livestock & Veterinary Services	Government	Provide Technical and coordination support
Wildlife	Kenya Wildlife Service	Government	Concerned with protection of wildlife and their environment
Water	Department of Water Resources	Government	
Rangelands	National Drought Management Authority	Government	• Drought assessment, monitoring and support for pastoralists through resilience interventions • Monitoring drought severity using sets of rangeland and livestock indicators for early warning and response
Rangelands	Mercy Corps	Non-Governmental	• Training technical officers to facilitate participatory rangeland management projects (e.g., Mercy Corps PRM project where they conducted capacity building workshops to train stakeholders on the technique)
Rangelands	Rural Agency for Community Development and Assistance	Non - Governmental	Training and capacity building for pastoralists
Rangelands	World Vision Kenya through Kenya RAPID+	Non-Governmental	Training and capacity building for stakeholders including county staff
Rangelands	African Social Development Focus	Non-Governmental	Main thematic areas include climate change and rangeland management
Forest	Kenya Forest Service (KFS)	Non-Governmental	KFS protects rangelands through enforcement of policies related to natural resource management

These stakeholders involved in rangeland management, resilience building, humanitarian actions and other services in the county coordinate their programs and foster collaboration through the County Steering Group. There is a also a sector working group for each thematic area of focus with Drought Management Authority acting as the secretariat. The County Department of Livestock is the focal point for rangeland management programming at the county level. These

actors engage ward rangeland management committees and local rangeland management committees at the ward and location level respectively.

These stakeholders have collaborated on some major policy measures formulated by the county government such as:

1. Wajir Rangeland Management Bill (not yet enacted)
2. Wajir Sale Yard Bill (not yet enacted)
3. Participatory rangeland management
4. Creation of range units
5. Creation of a county rangeland management committee to oversee and promote sustainable range management practices
6. An executive order by the current county government administration to control the proliferation of new settlements through deliberately not implementing development projects in any new settlement

3.3. Status of Rangeland in Wajir South, Wajir West and Eldas

According to community members, three decades ago or more, the rangeland condition in the county was good and livestock herding was a viable livelihood. There was plenty of pasture and shrubs and tree species for browsing. However, in the last 10 years, the community began to see a worrying trend of degradation that has been continually worsening. The disappearance of natural perennial grasses that were good for livestock grazing serves as the key indicator of this gradual degradation.

The local names of indigenous grasses that have now disappeared include *Jebin, dharema, dabasaadle, Mertil* and *rufla*. Community members reported a gradual increase in invasive species such as *Prosopis juliflora* and *Acacia reficiens*, which further inhibits pasture growth. The community members also attributed the loss of these species to the devastating droughts that hve increased in frequency and severity over the last few years due to effects of climate change. For example, over the past four seasons there has been little or no rainfall in many parts of the county. This has greatly hampered natural pasture regeneration. An increased human population coupled with unplanned human settlements has further imposed significant stress on rangeland ecosystem health.

Additionally, an increase in livestock numbers and the current sedentary lifestyle adopted by pastoralists is to blame for the continual degradation. Historically, most communities in Wajir County did not follow a structured or organized grazing pattern because of the vastness of the land and the favorable range conditions. Unorganized grazing patterns are still in practice but in a much more limited space and is therefore blamed for the extreme degradation in places such as Wajir West Subcounty. Stakeholders identified three Subcounties of Wajir West, Wajir South and Eldas as experiencing severe rangeland degradation over the years.

3.3.1. Wajir West

In Wajir West, community representatives were engaged in a focus group discussion in Shantaabaq and Giriftu. The participants noted their historical grazing areas as Fatuma Nur, Jagahir, Hagarder, Jabi, Sabanslime and Komor Warabessa. The community had been living in these areas for over 70 years. The economic mainstay of the community is pastoralism and the community has been keeping livestock such as cattle, camels, sheep and goats. In the past, the rangeland was characterized by an abundance of pasture, natural grasses, and shrubs which were ideal for livestock grazing and browsing conditions were good too. Pasture and browsing resources have been depleted through overgrazing and the effects of recurrent droughts. Currently, the community relies on outmigration to neighboring subcounties and the counties of Isiolo and Marsabit to secure their livelihoods. This compounds the strain on the available scarce resources and thus triggers conflicts.

The rangeland management committees, in partnership with local administrators (ward and sub county administrators, deputy and assistant commissioners, chiefs and assistant chiefs and peace elders), are responsible for governing the rangelands. The Kenya Forest Service is also a key government agency responsible for rangeland governance. The rangeland management committees have been effective in their roles. For instance, the committee has been effective in controlling or managing the influx of livestock from neighboring subcounties through stakeholder and community engagement. The committees also guide the community on sustainable methods of rangeland and water resources use. When it rains, for instance, herders are advised to graze 10-15 km from settlements.

In Wajir West, major factors that inhibit rangeland and livestock production resilience include:

- Rainfall failure for the last four seasons has caused extreme drought.
- Overstocking and overgrazing.
- Conflicts that manifest within and between counties; conflicts are mostly resource-based.
- Livestock diseases compound the already existing threat of drought and resource scarcity.
- Mushrooming of unplanned settlements which further degrades the land and depletes strategic resources.
- Land fragmentation and land privatization as communities are gradually transitioning from a communal model of land ownership to privatization of land where individuals fence large tracts of land which, in some instances, are used for irrigated agriculture.

3.3.2. Wajir South

In Wajir South, focus group discussions were conducted in Kulaaley and Burder. The participants highlighted their historical grazing areas (Shimbire, Matetese, Aligole, Wellgaras and Guleddera). These communities had been living in the area for over 30 years. In the past, the pasture and browsing resources were abundant, communities were keeping a manageable number of livestock species (camels, goats, sheep and cows). Due to successive rainfall failures and increased human populations and settlements, livestock numbers have declined drastically. Livestock diseases have also claimed a good number of livestock, especially camels and cows. Now, the community mainly

keeps goats and sheep, which are more resilient and less demanding in terms of resources. Due to the ravaging drought, cattle are now fed on supplementary feeds such as range cubes and pellets, which are provided by civil society organizations and the county government. Responsibility for rangeland governance rests with existing community institutions such as the ward rangeland management committee which works with the chief as its ex-officio member to enforce bylaws and policies for rangeland use and management.

Before devolution, chiefs were powerful and community elders were respected. Community bylaws and resource management policies and practices were strictly adhered to by community members. However, chiefs now have less power and influence within the community and this greatly affects rangeland and resource management.

Communities identified several factors they considered critical barriers to rangeland and livestock production resilience:

- Drought. Successive rainfall failures over the past four years has greatly affected rangeland resources. Pastures and browsing resources have been depleted through overgrazing and shallow wells and dams have also dried up. Livestock numbers have drastically fallen due to diseases.
- Increase in human settlements. Communities have now settled in areas originally reserved for livestock grazing as the national government creates more locations and sublocations upon request by politicians. Human settlements also come with unplanned water developments. The availability of essential infrastructures attracts people to migrate to these locations with their large herds of livestock. Over time, the land becomes degraded and resources are depleted.
- Livestock diseases. The community had lost a good number of livestock to diseases.
- Deforestation. Loss of livestock has pushed some community members to adopt alternative livelihoods such as charcoal burning which is accelerating land degradation.

3.3.3. Eldas Subcounty

In Eldas, participants in the focus group discussion were drawn from the ward-level rangeland management committee. The participants identified their historical grazing areas as Lakoley, Wotey, Irdaharis, Alge and Baladawan. People have been living in these areas for over 50 years. In the past, the rangeland condition was suitable for livestock and there were plenty of natural grasses good for livestock productivity. Natural grass species no longer found are *dharema, jebin, qurdhu, qarma* and *bali.* Merer, a local shrub ideal for grazing and making mats for house construction, is also no longer available. The natural regeneration of pastures has been inhibited by rainfall failures and erratic rainfall patterns. The community has for many years been keeping cattle, camels, sheep and goats. However, keeping cattle and camels is becoming untenable because of the scarcity of pasture and browsing resources compounded by the lack of water for livestock and human use.

The rangeland management committee, in collaboration with the chiefs and other local administrators, are responsible for rangeland governance. The representatives affirm that the

committee is effective in its roles. The committee champions policies that guide the community in protecting and conserving the environment and they formulate bylaws to regulate resource use.

In this subcounty, the main impediments to rangeland and livestock production include:

- Conflicts. Conflicts within and between counties and are mostly resource-based.
- Overstocking and overgrazing in the face of ravaging drought and scarce resources.
- Increase in human population and unplanned human settlements, especially through the creation of locations and sublocations by the national government.
- Incidents of wildfires and bushfires destroy large areas of rangeland.
-

Figure 2. A degraded rangeland initially used by pastoralist in Fatuma Nur -Wajir West.

Figure 3. Wildlife in drought affected rangeland of Wajir.

Figure . Bones of livestock that succumbed to drought in Giriftu - Wajir West.

Figure 4. Early sand dune formation in degraded rangeland of Wajir .

Figure 5. Livestock at a watering pan in Abaqdere. Wajir South.

RECOMMENDATIONS

4.1 Partners and Resources

The study identified a web of partners in which to embed PRM work in the county. In addition to the strong leadership provided by the County Department of Livestock and Veterinary Services, government agencies dealing with forest and wildlife conservation are potential partners. While the contribution of these agencies cannot be underrated, it is worth pointing out that their perspective on rangelands is informed by the need for a healthy fauna and flora balance as opposed to increasing resilience in livestock production. There are also are a number of non-state actors in the county supporting aspects of range resources management.

The functioning of these partners has been facilitated by progressive policies developed by the county governments. Future collaboration could entail supporting the development of policies and legislation tailor-made for the county context. Other resources that could serve as a springboard for PRM in the county include:

- Baseline surveys including the work of Salim and Herlcoker (1992).
- A GIS laboratory is already established to develop accurate maps of the state of rangelands and satellite images that could help assess the historical dynamics of vegetation cover.

These resources, when integrated with the local knowledge of rangeland herders, will serve as an important foundation for PRM in Wajir.

4.2. Site Selection Criteria

Stakeholders and the field assessment team zeroed in on two subcounties, Wajir West and Wajir South, as potential project sites. Their consideration is informed by the availability of strong local and formal institutions, including the environmental management committees that are playing crucial roles in rangeland management. Communities in the region are well-informed about the impacts of rangeland degradation on their livelihoods and are fully aware of their roles and responsibilities in averting the negative impacts. The subcounties are also endowed with relatively good rangelands with adequate fauna and flora currently threatened by serious degradation.

In addition, Giriftu has a training institute for livestock management technicians and community members. The Livestock Training Institute in Wajir is a critical partner, especially in the provision of human resources and information on long-term rangeland dynamics.

In terms of logistical factors, the two subcounties are served by well-maintained roads. The two subcounties are relatively safe and PRM research can be conducted with little risk of interruption.

In addition to its suitability based on available partners and ease of access, the two subcounties are threatened by environmental degradation and thus require strengthening existing resource governance institutions and up-to-date information on the drivers of land degradation.

4.3. Increasing Resilience and Range Productivity Capacity

A set of recommendations were suggested by community members to enable sustainable rangeland management in the county. Their recommendations focused on how to make multistakeholder arrangements work.

1. Capacity building of communities and other stakeholders on fodder production, conservation and use. Communities need to be supported to conserve the existing natural grasslands and large-scale fodder production through fodder farming where applicable. This effort would include reseeding rangelands where serious denudation has occurred and led to the loss of seed bank material.
2. Community members recommended that the county government should accelerate the enactment and implementation of policies and legislation such as the Wajir County Rangeland Management Bill, Livestock Policy, and Wajir County Livestock Saleyard Bill.
3. Creation of awareness among the political class and executive members of the county. The members of the county assembly need to be sensitized about their roles regarding the policy formulation process and they should be urged to champion policies that will positively affect the community with a bias toward rangeland management.
4. Exploration of the commercial value of rangeland resources, for example, through the conservation of gum and resin trees for increased production and marketing.
5. Incentives for livestock production by supporting pastoralists through improved veterinary services and improved marketing.
6. Increased financial resources to support extension services to cover extensive rangeland areas.
7. Support and promotion for interdepartmental collaboration and partnerships between sectors that deal with rangelands and livestock development
8. Facilitation of livestock marketing that will promote offtakes and better prices for pastoralists.
9. There is a need for livestock population data, including livestock types, herd composition and seasonal distribution across rangelands that will help in planning and resource allocation.
10. Regular assessment and monitoring of rangelands would help advance timely mitigation measures in landscapes threatened by degradation.
11. Introduction of livestock insurance schemes by the private sector. This includes awareness creation and investment in asset protection initiatives.

4. CONCLUSION

This scoping study in Wajir for Participatory Range Management has established:

1. That there are strong networks and institutional frameworks to anchor the work of the Livestock, Climate and System Resilience (LCSR) Project. The County Department of Livestock is a reputable entity that has successfully served a coordination role for similar projects. Other stakeholders, both state and non-state, are all worthy partners for consideration when the project is initiated.
2. The traditional customary institutions for rangeland resource governance are in place but not effective because of the influence of government administration and societal dynamics involving indigenous values. It makes sense to revive these institutions by creating a hybrid with the officials from the county and national government to support the enforcement of rangeland management regulations**.**
3. Wajir has the necessary baseline data including an historical assessment of rangeland resources, research on water resource development, and resource mapping capacity to pilot participatory rangeland assessment**.**
4. Although community members have reported declines in the status of rangeland resources such as important pasture species, a scoping study is not adequate to make an informed conclusion on the actual status or trend in rangeland degradation. Due to the extended drought, the current state may be misleading. For a conclusive assessment, long-term monitoring, including satellite imaging is required. This may be supported by seasonal assessments corroborated by herders' environmental histories**.**
5. Several factors interact at multiple spatial and temporal scales including climate variability (drought), changes in land-use patterns (settlements), conflicts, and population changes that currently inform rangeland degradation. The project needs to apply PRM tools to weight these issues for practical mitigation efforts.
6. Considering all the parameters assessed, the most preferred subcounties for implementating a PRM project are Wajir South and West. The two subcounties, have rangeland resources, degradation issues, effective institutional arrangements, and existing community and government efforts that can be built on. Most important the two subcounties offer relatively safe working conditions for project officers.

References

Flintan, F. and Cullis A. (2010). Introductory Guidelines to Participatory Rangeland Management in Pastoral Areas

Flintan F. (ed). (2010). Learning by Doing: Working Towards Participatory Rangeland Management (PRM) in Pastoral Areas through ELMT/ ELSE

Lutta I.A., Wasonga V.O., Karanja R., Saalu F., Njiru J. (2020): Kenya Rangeland Study. Costs And Benefits Of Sustainable Rangeland Management Practices In Northern Kenya. An Economics of Land Degradation study carried out in the framework of the "Reversing Land Degradation in Africa through Scaling-up Evergreen Agriculture" project. ELD

Lance W Robinson,l. W., Flintan, F., Sarah Kasyoka, S. Irene N Nganga, I. N., Otieno, K. 2 and Sircely, J. (2018). Participatory rangeland management toolkit for Kenya (1st Ed). CGIAR

Tari D. and Pattison J. (2014). Evolving Customary Institutions in the Drylands An opportunity for devolved natural resource governance in Kenya? Iied Issue Paper, April 2014.

Wario, H. T., Roba, H.G. and Kauffman, B.A (2015): Shaping the herders 'mental maps': Understanding pastoralists grazing area characterization and differentiation; published in *Environmental Management.*

Nathaliem Gomes, (2006). Access to water, pastoral resource management and pastoralists' livelihoods Lessons learned from water development in selected areas of Eastern Africa (Kenya, Ethiopia, Somalia).

County Government of WAJIR (2019) Improving the governance of rural water points in Wajir County. Policy brief, February 2019.

International Livestock Research Institute (ILRI). 2018. Participatory rangeland management toolkit for Kenya. First edition. Nairobi, Kenya: ILRI.

Salim B. Shaabani S.B, Walsh, M, Herlocker D J and Walther, D. (eds.) (1992). Range Management Handbook of Kenya. Wajir District.

Appendices

Annex 1. Interview guide for FGD 1&2

(a). County official and wider stakeholders/institutions

1. Based on your experience of many years of working with communities in Wajir County, what is the current status of rangeland in the county
2. Is there any degradation indicator peculiar to Wajir County (e.g extreme soil loss, invasive species)
3. How has this trend evolved over the years?
4. What are the county level strategies/policies and approaches for sustainable rangeland use and management?
5. Who are the key stakeholders, institutions involved in rangeland management in Wajir County
6. What is the inter- stakeholder collaborative arrangement?
7. Which sub county/ward need participatory rangeland assessment?
8. What in your opinion need to be done to increase resilience of pastoral production system and by who?

(b) Herder focused FGD

1.Where is your historical grazing area (sub county/ward/location) and for how long have you lived that area?

2. What is the environmental history of your rangeland (what type of species of livestock raised and vegetation dynamics)?

3. Who oversees governance in your rangeland? Are they effective in their roles?

4. Has the governance responsibility changed over the years and if yes, how has it changed?

5. What are the biggest barrier in making rangeland and livestock production resilience?

Annex (II). Rangeland assessment datasheet

County and subcounty Name: _____

Assessment date: _____

Name of assessor/team:

_____

Site Name: _____ Plot ID/Ref: (e.g. Danyere_01)

_____

Site geo-reference (GPS in Decimal Degrees): _____

Photo no - (Plot ID_GPS coordinates): _____

Landscape context

Vegetation based landscape classification (shrubland, bushland, grassland, riverine, other)

_____

Predominant land use type: grazing, browsing, cropping, forestry, protected area, other: _____

Seasonal land-use type: wet season grazing areas, dry season grazing areas, other: _____

Slope (circle any present): flat, gentle, medium, steep and sharp

Shape (circle any present): convex (hill), concave (valley), straight, swamp

Land ownership (circle appropriately): communal, private and government

Soil type: clay, silt, sand, loam, rocky

The distance to water from the plot: 0-1km, 1-2km, 2-5km, 5-10km, 10+km

Soil indicators

Soil disturbance indicators	**High**	**Moderate**	**Slight/low**	**None**
Extent of rill				
Comments:				
Gullies and gully associated erosions				
Comments:				
Extent of sheet erosions				

Comments:				
Photo no_ plot ID, GPS coordinates and date				

Soil health indicators	**Presence/absence of earthworms and other living organism in first 10cm**		**Absence of earthworms and other living organism in first 10cm**
Soil life			
Observable salinity	**Yes**		**Comments:**
	No		
Visible organic litter	**High, moderate, low, none**		
Soil colour[1]			

Biotic condition indicators

Land cover type	**Current**			**10 years ago**		
	None	**Little**	**Dominating**	**None**	**Little**	**Dominating**
Bare ground						
Grass						
Woodland/forest						
Shrub						
Settlement/infrastructure						
Crop/tillage						
Other						
Photo no.						

[1] Can we anticipate a range of colours here and include them to facilitate consistence in responses and post processing of the data?