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WORKING PAPER

Green water and livestock mobility in Karamoja: Understanding the Karimojong phrase "We follow our water"

Benon B Nabaasa[1], Shuaib Lwasa[1]
[1]Makerere University Department of Geography Geoinformatics and Climatic Sciences

Presenter: Benon Nabaasa, email: **nabaasabenon@gmail.com**

ABSTRACT

The Karimojong of North Eastern Uganda are a nomadic pastoralist group largely dependent on livestock for a livelihood and have over time evolved a robust livestock system. Though pastoralism has proven to be a resilient system, the past few decades in the history of the planet have witnessed alterations in the earth's systems at scale of ecosystem. These shifts have in turn triggered responsive adaptation interventions among the pastoralists chief of which is frequent and longer livestock migrations in search of water and pasture. Pastoralism in Karamoja is heavily weather dependent and the dynamics of water and pasture are not only significant influences on the Karimojong socio-economic sphere but such dynamics also are key shapers of the Karimojong landscape. Although blue water is crucial for pastoralists and their livestock, Karimojong seasonal migrations and way of life are more often determined by green water in form of forage biomass spatial and temporal fluctuations which in turn depend on soil moisture. The Karimojong graze in a pattern that trails the receding soil moisture hence the local adage "We follow our water". By tracking both herder movements and the spatial and temporal variation of soil moisture, this study makes quantitative conclusions in line with that phrase. Preliminary results reveal that soil moisture variations are a precursor to pastoralist movements, which migrations in turn set in a cascade of slow onset landscape changes. The study underpins the significance of green water in influencing the Karimojong way of life and in shaping the landscape onto which they subsist.

Keywords: Green water, Migration, Resilience, Karamoja, Remote sensing, Soil moisture

1. Introduction

The semi-arid region of Karamoja in the Northeast of Uganda has some unique characteristics. The region is largely a pastoralist society with 80% of the population depending on Pastoralism and agro pastoralism (Egeru et al. 2014). The region has about 2,253,960 cattle (20% of Uganda`s cattle), 2,025,300 goats (16% of Uganda`s goats), 1,685,500 sheep (50% of Uganda's sheep) and all camels (UBOS 2003). During colonial times the area was seen as an extensive area of land devoted to conservation of wildlife and biodiversity, and over 95% of the land was gazetted for wildlife protection (Rugadya, Kamusiime, and Nsamba-gayiiya 2010). During the post-colonial period the development of Uganda bypassed the region and the different ethnic groups continued practicing pastoralism organized through a social hierarchical structure led by elders, kraal leaders and herders (ACF 2009). We conducted an extended mapping of grazing fields, water sources, conflicts and human settlements through participatory methods in the region of Karamoja, using land marks including mountains, main roads, rivers, resettlement centers and wild life reserves. Activity is also mapped by seasons of migration and water levels. The mapping is also accomplished for current and historical phenomenon and patterns with the definition of historical detailed under the methods and subsequent sections. The objectives of this paper are twofold; *a)* To identify, demarcate and document livestock grazing areas; *b)* to analyze how pastoralists manage water resources and migratory routes during temporal changes

2. Research design and methods

We used different methods in the mapping. The first is *General Mapping* that graphically visualized the different actors, identified their sphere of influence and relations between each other. Four focus issues were participatorily selected to analyse the actor roles and relations. These include *a)* access to grazing areas; *b)* access to water resources; *c)* conflict resolution and d) access to livestock services. A number of actor representatives were selected for this mapping and these include Herders, Kraal Leaders, Water User committees /Community, UPDF, Local, governments, NGOS, RDC and OPM. The results of the general mapping are summarized in subsequent sector. Satellite imagery processing and quantification of pasture was accomplished over a period of 30 years using Landsat imagery. We also used p*articipatory GIS mapping (PGIS)* that integrated participatory Learning Action (PLA) methods with Geographic Information Technologies (GIT). Participants were trained on how to draw maps basing on the thematic areas of access to grazing areas, access to water sources and conflict resolution. The same categories of representatives worked to map these thematic topics on a base map that they generated first. A two day training workshop provided the skills and insights to the enumerators to guide the participants in generating the maps. The sketch maps were georeferenced in a GIS environment and included in this report. In addition a sample of kraal leaders were given GPSs for logging while grazing to get insight into the patterns in the grazing fields. The method involved training and giving herders the GPS loggers to track herders' movements on a daily basis such that data can be downloaded and input into the GIS system for various analyses and visualization. This method generated the narratives to accompany the maps but also detail the various aspects of conflicts, historical accounts that could not be adequately represented on the maps.

3. Results

3.1. Spatial and temporal variation in pasture and water resources

Pasture quantity in Karamoja varies significantly in space and time from the analysis and as show on the map and figure below. In general, the pre-wet and wet seasons of Akiporo and Atieth registered the highest amounts in tonnes/ha of browse forage, in some areas as high as 139876 tonnes/ha while the dry and post-dry seasons of Akamu and Akiceret had the lowest browse forage biomass amounts, in some areas as little 0 tonnes/ha. The disparity in browse biomass has been captured by the maps. Across years, browse forage shows random variations but a slight pattern can be noticed in which browse forage biomass amounts dwindle across years from 1987 and 2016. Spatially, browse forage biomass amounts are predominant in the southern and eastern parts of the region while the north and west generally show dismal amounts. A compounded graph in figure 26 shows this pattern in detail. This variation affects the patterns of grazing and the performance of rains determine when where and migrate and how long the herds will remain out of their kraals.

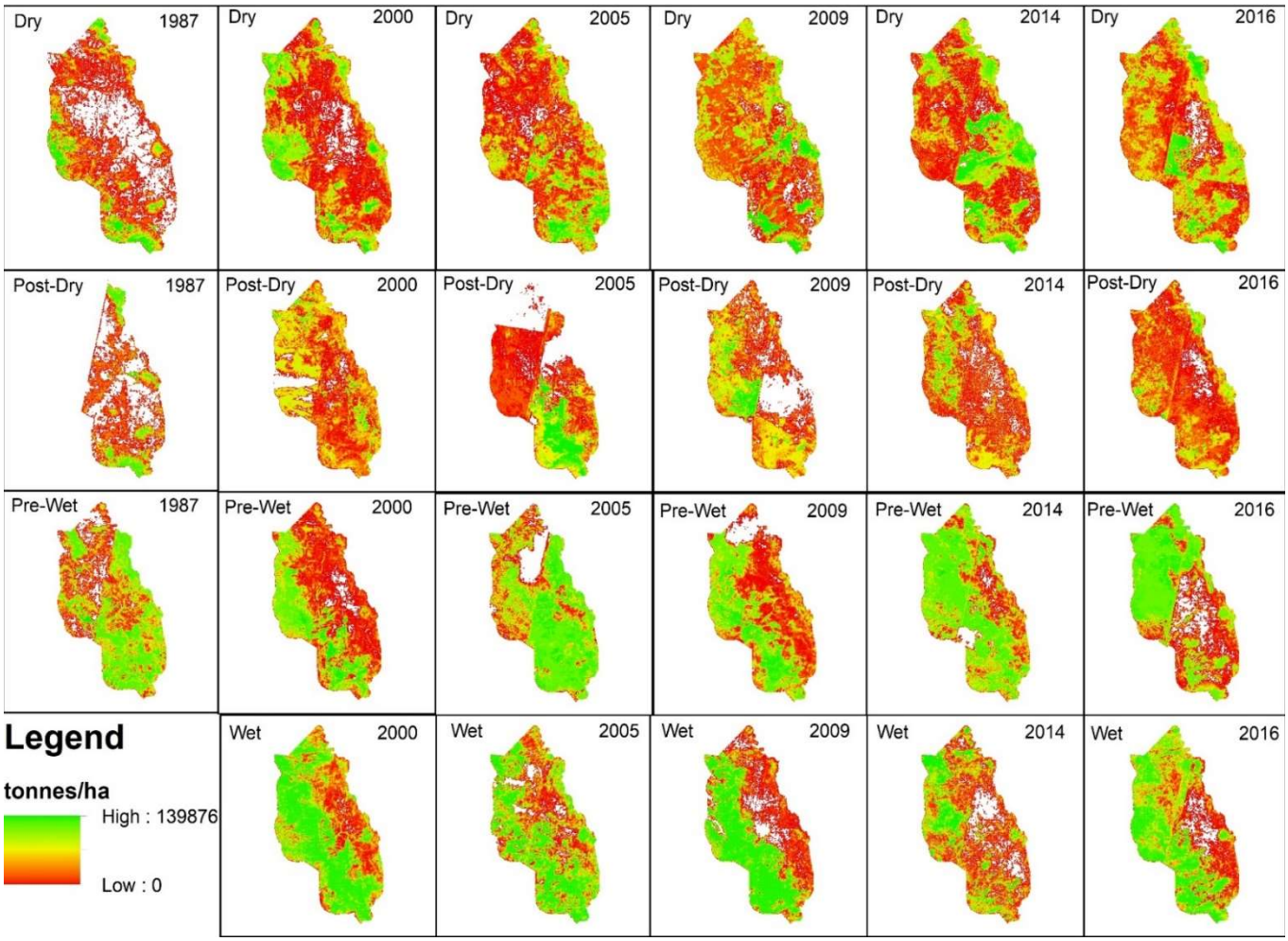

Figure 1; pasture variation across season and years

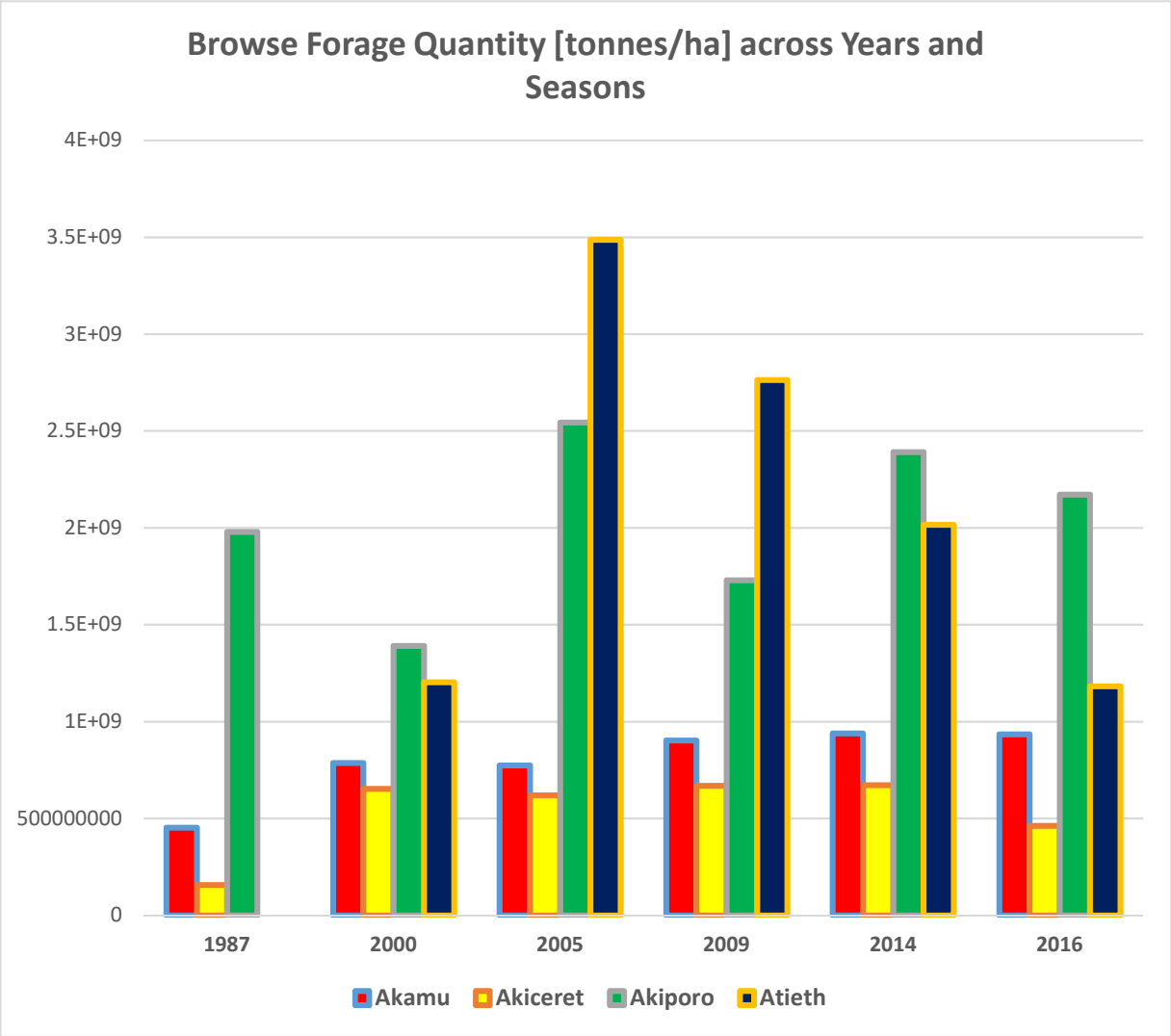

Figure 2: pasture quantity variation in Karamoja

3.2. Comparing past and present grazing patterns

Grazing in the past was extensive integrated with wildlife and it also transcended the administrative and tribal boundaries. In the period (1918 – 2005) participants from various districts sketched areas of grazing rights. Though the period stretches over a long time to enable capturing a single static map, the participants intimated that during this period, all livestock grazing crossed the Karamoja region into the Teso, Acholi and Gisu land in periods of drought. As shown on the map, the grazing areas spanned beyond the Karamoja region. There were controlled hunting areas and nature reserves with which minimal grazing could also be allowed through collaborative arrangement. Although the participants

mentioned that the colonial government and subsequent governments have been hard on the mix of wildlife and livestock. Contrasted with the past, currently, grazing areas have reduced in size and grazing outside the region has been curtailed.

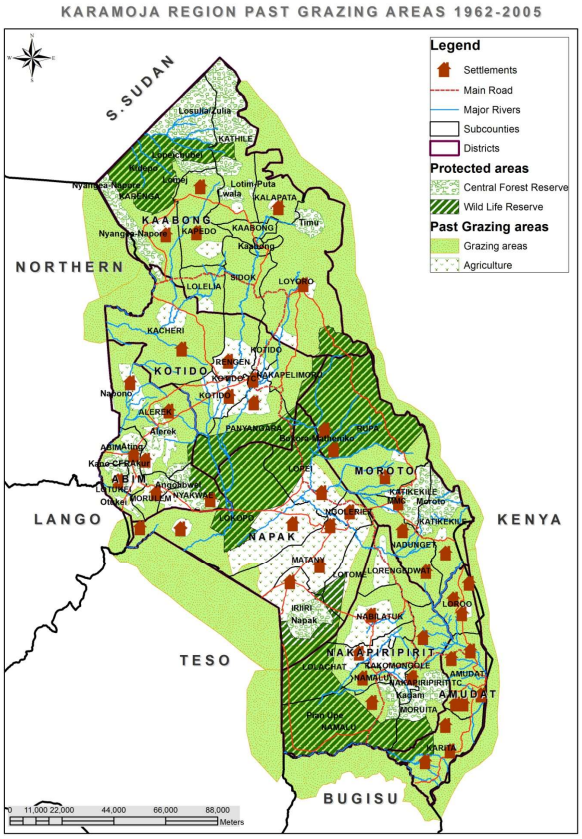

Figure 3: Map showing Past/Historical Grazing Areas in Karamoja

The period (1918 - 2005) was picked by the participants to best embody historical grazing areas and rights because the pastoralists practiced communal grazing and settlements were much more clustered though in a dispersed manner as shown on the map. Access to grazing areas during this period was mainly communal. Participants noted that land then was very fertile in wetter areas which implied that people did not have to invade the grazing land for extensive agriculture. The result was that there was more vacant land for grazing which kept conflicts between pastoralists and farmers at a bay.

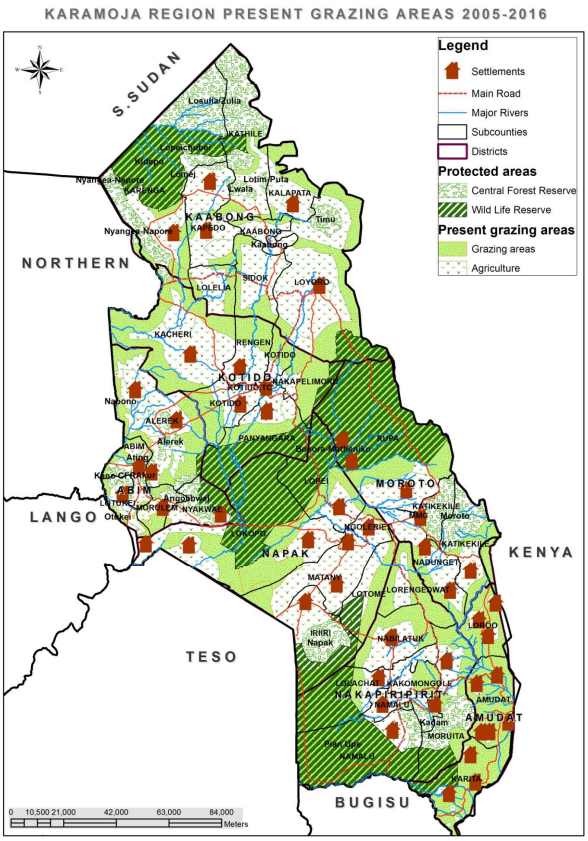

Figure 4: Map showing Present/Current Grazing Areas in Karamoja

This particular era (1980 – 2016) was highlighted for reference because the participants had more knowledge and a fresh memory of the events that took place in this period. According to the participants, this was also the most active grazing period partly due to the fact that some of the herders who lost their livestock to the raiders started repossessing them as there prevailed relative peace. The period was also suitable for reference because according to the participants it's the most recent period within which drastic changes about grazing lands have occurred. The period can be divided into two; 2005– 2009, an era of massive raids and insecurity continuing from the past and 2009 to 2016, a more peaceful period. This latter period derives its peace from the disarmament exercise initiated a couple of years earlier. Compared to the past, grazing areas have significantly altered in extent, content, and access rights. The present has seen extensive communal grazing reduced and limited to and by administrative boundaries as well as mining and agricultural farms. When compared to the past, the grazing areas have greatly reduced in size as can be deduced from the map in figure above. The participants also mentioned that the quality of pasture in grazing areas had deteriorated mostly as regards to pasture quality, water points and natural "mineral licks" known as *"Akisam"* in some local dialects.

3.3. Seasonality of Grazing

Karamoja region can be characterized by two seasons of dry and wet seasons although these are further broken down traditionally in four seasons namely Akamu/dry, Akiceret/post dry, Akiporo/pre wet, and Atieth/wet seasons. The dry season starts in the month of October and runs up to the month of February

and the wet season starts from the month of March running up to the month of August. In extreme dry season, herders in the region experience higher mortality rates of livestock, reduction in milk yields, disease outbreaks and emaciation of livestock thus fetching dismal prices in the market. These effects are as a result of limited pastures, shortage of water, long herding distances, livestock movement, and pests among others. In the wet season however, the quality of the animals improve in terms of growth, high milk yields, reduced deaths from starvation and diseases. Unlike in the dry season, livestock and humans alike do not trek long distances in search of pastures and water because the wet season comes with abundance of both. There is also easy access to veterinary services and close monitoring and supervision during the wet seasons as livestock and owners are more stationary and less on the move. The wet season therefore shows greater improvement in the survival rate of animals and reduced movements in search of water and pastures while the dry spell brings high death toll and long distance movements in search of survival respectively. The maps for the dry and wet seasons were both generated from the present grazing patterns.

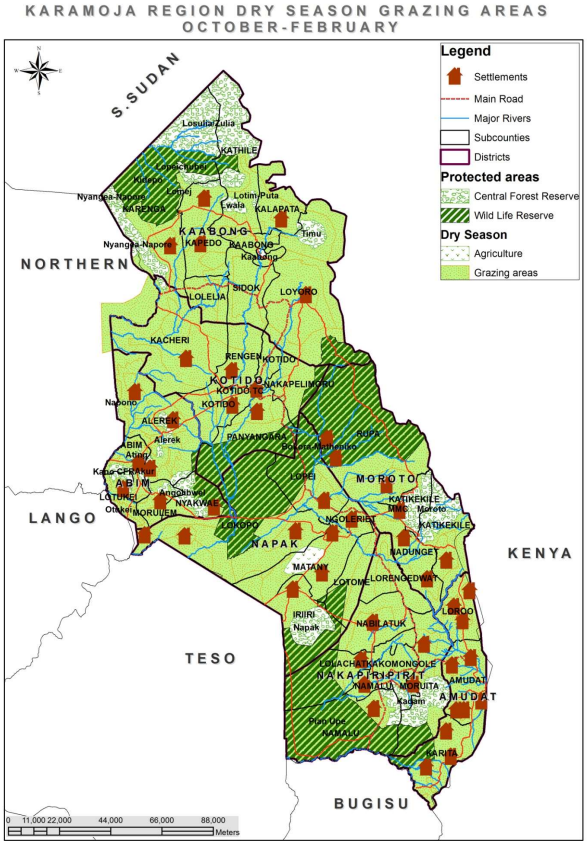

Figure 6: Map showing Grazing Areas used in the Dry season in Karamoja

The map above shows that in the dry season, grazing is everywhere possible including conservation areas. Although access to the conservation areas is restricted, pastoralists often make incursions into the conservation areas. During extended dry seasons grazing areas as shown in the map above are extended in search of pastures. The nature reserves of Bokora-Matheniko, Pian-Upe and Kidepo Valley experience competition for pasture between wildlife and livestock. For extended periods of dry weather, the migration to western parts of the region occurs and this leads to incursions into Teso and Acholi lands. A

number of water points also dry out and as most grazing areas are incomplete without water sources, they are abandoned. This in turn leads to degradation and conflicts over resource sharing and rights of use especially between wildlife conservation institutions like UWA and NFA and herders in the district. The dry season witnesses shrinking of agricultural activities almost to nonexistence except in a few areas like in Abim which is not as devastating as in other districts in the region due to a fairly favourable microclimate and the mountainous landscape. In this season, the once crop fields in the wet season are now dry and desolate left only to support a handful of livestock usually shoats. Often times the dry season is extended into a long dry spell or drought with devastating implications. In many cases when this happens, grazing areas are set on fire to stimulate tender vegetative pasture growth when the rains come. Fires are in turn employed to manage rangelands in the region for fresh sprouts. One of the most marked feature of dry season grazing is Kobebe dam which attracts livestock from most parts of the region including Turkana and South Sudan.

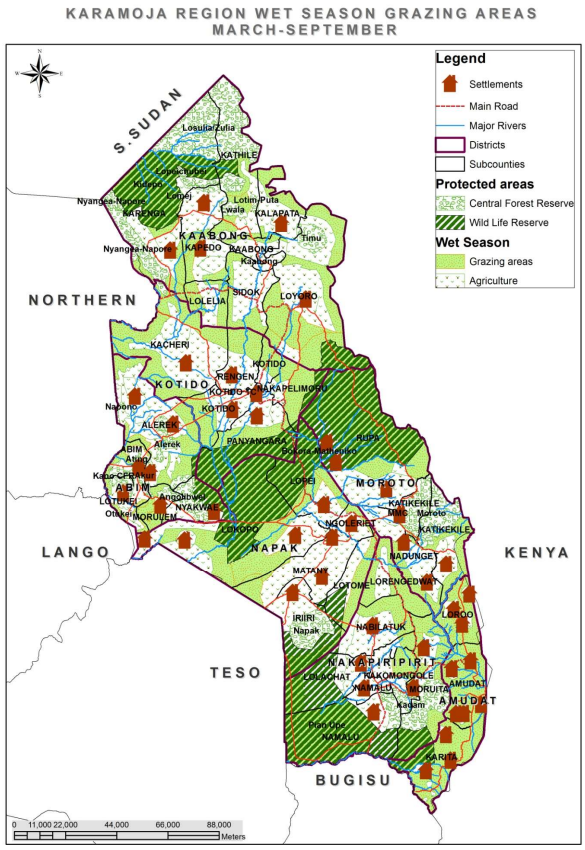

Figure 7: Map showing Grazing Areas used in the Wet season in Karamoja

In the wet season, agricultural fields shape up and shrink grazing areas as shown in Map. The wet season witnesses flourishing of agricultural activities and pastoralism alike. During the wet season, the soil is enriched with moisture suitable for cultivation and also begets tender lush palatable pasture for livestock. Water points are again filled depending on the intensity of the rains and grazing areas can support livestock again. During this season, herders and livestock that had migrated in search of water and pasture in the dry season return to their respective grazing areas. The wet season witnesses an increase in the cases of herder-cultivator conflicts since the once abandoned farm lands are again tilled. These farm lands may have been grazing lands in the dry season. Similarly conflicts amongst herders for resource sharing and rights of access and use are greatly diminished owing to plenty of water and pasture Conservation areas are least threatened during this season because there is abundance for livestock outside the protected areas. In this wet season, livestock are healthy, fat and fetch premium prices from the market. Livestock diseases are fewer than in the dry season but this also may be due to the fact that in the wet season livestock are physiologically more able to fight against disease invasions. Some of the implications of such changes in seasons in the region included; threats to pastoralism as a livelihood, escalation of tick borne diseases mostly in the dry season, doubts about peaceful coexistence between herders and cultivators and need for diversification for survival.

3.4. Large watering points and grazing patterns a case of Kobebe dam during the Dry season

Moroto participants highlighted and discussed key livestock services and water resources in the district prominent of which was Kobebe dam. The dam was constructed along the Bokora-Matheniko game reserve by the central government under the ministry of water and environment. Kobebe dam was chosen by the Moroto participants due to its being all weather.

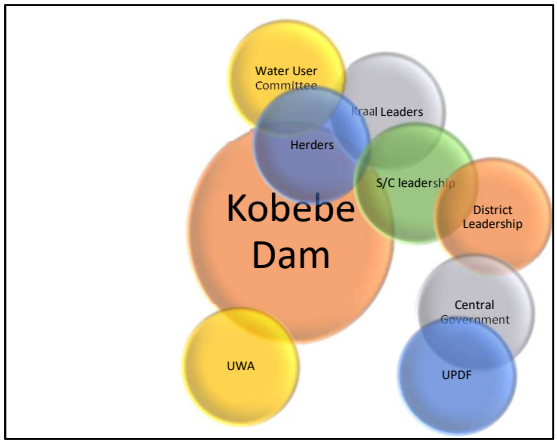

Figure 8: Schema showing key actors in the control of Kobebe dam

From the schema in figure, the central actors in the control and management of Kobebe dam are the herders, sub county leadership, and UWA. The other actors in the schema like the RDC and the DVO play more periphery roles. During the dry season, the control and access dynamics around this dam become more intensified. UWA and UPDF tend to have more control and they institute restricted access

in the name of regulating access for all. There have been several conflicts around this dam over the years especially when it attracts herders from Kenya.

4. Migration as an adaptation and 'following water'

For pastoralist communities like the Karamojong, migration is not only a lifestyle but also a means of survival in a harsh environment. In this context migrations refer to the movement of herders with their livestock in search of pasture and water. In Karamoja migrations take on two forms; temporary short term migrations in which the group in question migrates to a new location to access pasture and water for their livestock typically for a short time. This form of migrations is triggered by normal seasonal changes and the migrating groups return when the rains appear again. The second form of migrations is triggered by climate extremes and shocks like long dry spells and droughts. The migrating groups move far from the place of residence in search of pasture and water and sometimes do not return to that same location or return in small numbers when the climate shock/extreme subsides. Whereas migrations across the region were on a large scale, predominantly agropastoralist communities like the Ethur were most at risk from neighbouring purely pastoralist communities like the Jie. Migrations by the inhabitants of the agropastoralist districts have been at a scale generally to escape raids from the Jie and other antagonistic tribes in the region. Key migrations in the region are characterized by two periods, the past defined by the period 1950 to 2004 and the present demarcated by the period 2004 to 2016 as discussed the two next sections.

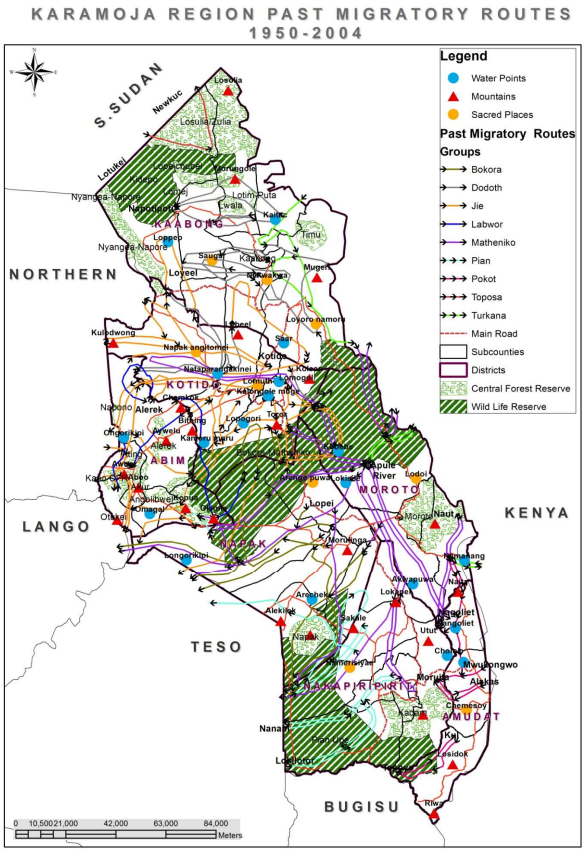

Figure 9: Map showing Past Livestock Migratory Routes in Karamoja

Past migrations in the region were placed in the period between 1950 and 2004. The participants chose the period in a consensus that that's the period when migrations were common and unaltered in distance, form and nature. During this period, Karamoja was still generally insecure, raids were rampant and authority and order were still entirely in the hands of clan chiefs, opinion leaders and kraal leaders. In the past, the groups that crisscrossed the region were as the Jie, Dodoth, Turkana, Matheniko and Pian. These groups were much organised and habitually followed the same routes whenever they migrated. They started out from the same general location and split along the way to take control of virgin grazing lands and avoided congesting in the same destination. The routes taken by these groups have been clearly displayed on the map in the figure. The key migration routes are from Moroto south to Pian and Bugisu lands as well as westwards through Napak and Abim to Teso and Acholi areas. The westward routes of migration were popular in the dry season due to abundance of water and pasture for their livestock in Teso and Acholi lands. The migrant pastoralists would move in organized and planned sequences and where necessary they would split out to nearby grazing lands. At the end of the dry season, the members of this group would then follow the same route back to their former destinations until the next trigger of migration.

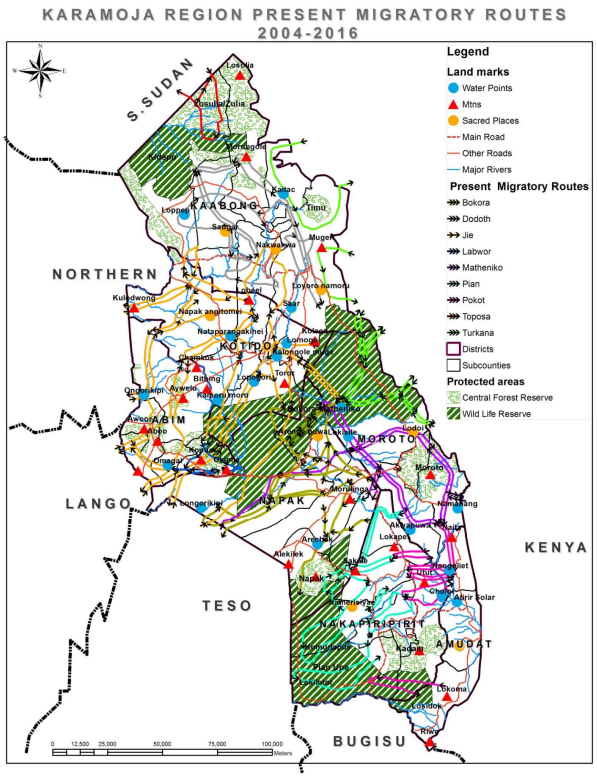

Figure 10: Map showing Current Livestock Migratory Routes in Karamoja

Present migrations and routes associated were discussed in the period between 2004 and 2016. This period saw major shifts in the nature and number of migrations. This was the period that witnessed the disarmament exercise of the Karamojong in 2009 and ushered in the region relative peace. Migrations triggered by escape from raids greatly reduced after the disarmament exercise. During this period there was also a step up of livestock services like veterinary and water services by the government and the increasing number of NGOs promoting development in the region. In this period, there is generally reduced migrations but also cross district migrations which is not directional patterned. The participants put forward reasons for this cessation which included; shifting from livestock to agriculture, construction of water dams in each sub county of the district, and practice of zero grazing. This has as by 2016 forced many pastoralists to limit their grazing to their resident sub counties. The participants noted that migrations in the district have been to a great extent curtailed but there are still a few migrations. However these migrations from the neighbouring districts have become infrequent, small in number and more systematic and peaceful. As the map in figure shows, there has been intensified migration to Pian Upe and crisscross migrations between Abim, Kotido, Kabong and Napak. As mentioned earlier, this is attributed to the increasing water dams as well as veterinary services that sometimes are linked to market days as well as particular sites. In general changes in the migration patterns and migratory routes were on the big part welcomed by many pastoralists as they came with them relative peace. The participants viewed these changes as being permanent and anticipated that there will be more peace, increased food security from unhampered cultivation, and absolute control of their grazing lands.

5. Conclusion

Being a predominantly pastoralist region, Karamoja grapples with the same problems faced by pastoralists everywhere. Although rights of access have not changed much, grazing areas continue to reduce significantly both in size and carrying capacity. As shortage of pasture and water dictate the size of grazing areas in the dry season, farmlands do so in the wet season. Migrations across the district have almost ceased as grazing gets more confined to district boundaries while conflicts have shifted from livestock raids and taken on the form of petty thefts, land grabbing, and clashes around mining areas. The region has witnessed significant increase in the number and types of livestock services, water points and the respective service providers. The changes to grazing areas are expected to be long term and could carry far reaching impacts. A comprehensive all inclusive grazing lands management plan could reverse the effects of such changes and foster sustainable pastoralism.

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