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Can Elephants and Livestock Co-Exist?:Solving Grazing Conflicts through Adaptive Collaborative Management in Southern Kenya

By Peter Kamau

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I. Introduction

Conflicts between pastoralists and protected area managers are long standing and widespread in the rangelands of East Africa (Homewood and Rodgers 1991; KWS 2014; Lore and Mulder 1999; Neumann 1997). Most of these conflicts occur in arid and semi-arid areas. For many generations, East African pastoralists utilized arid and semi-arid areas to produce livestock products for subsistence, trade and cultural purposes (Herskovits 1926). For these people, access to critical livelihood resources such as water and grazing pastures has always been vital. In the past, these groups relied on livestock mobility and communal management of natural resources to sustain their livestock and their livelihoods. Pastoralists and their livestock used the same lands with wild animals with minimal conflict. However, this ancient tolerance of wildlife by pastoral communities is under threat. Growing human population and the introduction of new land use such as farming and wildlife conservation in pastoral rangelands have increased competition for water and pastures among people, livestock and wildlife.

Political ecologists among other scholars have focused on the interactions between pastoralists and their environments in East African savannahs (Homewood and Rogers 1991; Little 1996; Neumann 1992, 1998). Most studies indicate a long history of pastoralist activities in these savannahs and emphasize the manipulation of savannah vegetation through grazing and burning (Laris 2006; Sheuyange*et al.* 2005). Despite studies that show the ecological benefits of livestock grazing in East Africa rangelands (Reid 2012; Western 1994), there is a still widespread perception that livestock grazing is inherently detrimental to savannah landscapes. Arguably, this perception emanates from ideas such as the "tragedy of the commons" (Harding 1968) which holds that individuals acting in their own self-interest will tend to overuse a common resource, thereby depleting the resource and consequently hurting all the users.

In East Africa, the "tragedy of the commons" paradigm has provided a strong rationale for governments efforts to protect natural habitats and "wilderness" from anthropogenic disturbances. Since the 1940s, former grazing lands and drought refuges have been given protected area status such as national parks, thus excluding any use by livestock within them (Brockington 2005; Neumann 1998). In the post-colonial era, development efforts in pastoral areas focused on the establishment of group ranches. These group ranches, which confine pastoralists to particular blocks of land, do not provide adequate gazing resources, especially in drought periods.

Also popular, is the equilibrium view of East African pastoral systems and the widely held perception that these stable systems are under threat from overstocking and other human activities which destabilize the equilibrium. Ellis and Swift (1988) examine this view in detail. Proponents of the equilibrium view recommend the reduction of livestock numbers and other measures such as eliminating fires from

Author: e-mail: wakamau2011@gmail.com

savannah ecosystems in order to return them to stable states (Johnson and Tothill1985; Walter 1971).

However, the tragedy of the commons and equilibrium theories have been discredited. Scholars have pointed out that Harding was confusing commons with a "no-man's land" with no boundaries and rules for access. In a strong critique of the tragedy of the commons theory, Ostrom (1990) has argued that local people often come up with solutions to the commons problems, but when common resources are taken over by extra local forces such as the state, those solutions do not work (Ostrom 1990). Non-equilibrium theories have replaced equilibrium views of savannah ecosystems. In non-equilibrium paradigms, change and not stability is thenorm in savannah ecosystems, and disturbances including human induced fires and livestock grazing have played an important role in the evolution of savannahs (Dublin 1995).

Other studies have rejected simplistic assumptions about the negative impacts of pastoralism on savannah landscapes and suggested that herding is often compatible with wildlife. For example, Reid (2002) has shown that livestock grazing enriches East African savannah landscapes and is important for biodiversity. Other studies have found that grazing reduces fire fuel loads and therefore lowers fire frequency and intensity (Roques*et al*. 2001; Ward 2005). Augustine (2003) found that livestock grazing promotes the redistribution of nitrogen and phosphorous in soils and plants. These studies suggest that livestock can have positive impacts on savannah ecosystems.

In Kenya, conflicts between pastoralists and conservation authorities have received significant attention from scholars (Norton-Griffiths 2000; Oketch 2010; Waweru and Oleleboo 2013). However, the bulk of research conducted in Kenya on these conflicts, has given little attention to the role played by African elephants in shaping these conflicts. On the one hand, elephants are the most important tourist attraction and therefore the center of conservation efforts in Kenya. On the other hand, elephants pose a threat to pastoral peoples' lives and livelihoods. The conflict between tourism and pastoralism is exemplified in the Tsavo landscape in southern Kenya. Tsavo hosts the largest concentration of elephants in East Africa and is key to Kenya's tourism industry. Although livestock grazing is outlawed in all national parks in Kenya, local people occasionally graze their livestock illegally in Tsavo parks (Tsavo West, Tsavo East and Chyulu Hills National Parks), thus causing tension between local pastoralists and the Kenya Wildlife Service (KWS). KWS is the state agency responsible for managing national parks in Kenya.

Grazing in national parks by the local Maasai has been a controversial issue since the establishment of the Tsavo West National Park in 1948. Past and current government officials have blamed the Maasai herds for competing with wildlife for grazing resources in the national park especially during the dry seasons. The District Commissioner in Kajiado lamented in a 1964 report:

> Furthermore, when the Maasai were desperate for grazing in the drought of 1961, they claimed that most of the western section of the park (Tsavo West) was their traditional dry-weather grazing, and in spite of strong protests by the trustees they invaded many thousands of acres and plundered most of the grazing which was equally necessary for wild animals.
>
> [May 1964. KL/1/32].

Recently, the KWS blamed the decline of hippopotamus in Mzima springs on livestock grazing in Tsavo West National Park. The Chairman of KWS, Dr. Richard Leakey, said in an interview;

> The domestic stock took most of the grass and pushed the wildlife further and further into the heart of the park and by the time the hippos get out to feed, they find the grass is gone. If we had kept cattle out of the park, which we must do if we want a national park, that would not have happened[January 2016 interview with a Kenyan television channel, Nation TV].

Each year, KWS spends a significant amount of resources to apprehend herders and drive out livestock that encroaches into the parks. However, elephants continue to use lands adjacent to national parks for water, browse and dispersal to other areas. This generates conflict between KWS and local people and also undermines opportunities for collaboration.

This political ecology study focused on the Maasai people who are residents in three group ranches located in the region west of Tsavo West and Chyulu Hills National Parks. This chapter will refer to the research subjects as the Maasai of Tsavo. The Maasai living in the three ranches are a microcosm of the larger Maasai cultural group that forms about 2.5% of Kenya's total population of 44 million people.

The study employed the framework of political ecology to achieve two research objectives. First, it sought to better understand the perspectives of the Maasai of Tsavo on the role and impact of livestock on local livelihoods. Secondly, this research explored how local knowledge of livestock management can contribute to a collaborative grazing management plan that solves grazing conflicts between the Maasai and KWS. Political ecology has traditionally paid attention to how resource conflicts are mediated between and among social groups, with unequal power (Escobar 1995; Ndi and Batterbury 2017; Watts 1983). This study hypothesizes that solving grazing conflicts in the study area will promote elephant conservation. The study employed an applied research design that supports Adaptive Collaborative Management (ACM) and aims at creating knowledge sharing opportunities between local people and park authorities regarding livestock grazing and elephant conservation. The ACM approach is based

on the premise that there are no strict instructions regarding natural resource management. ACM assumes that knowledge about how socio-ecological systems work is never adequate and recognizes the need for adaptive learning processes that accommodate local knowledge in conservation decision making (Olsson and Folke 2001; Sluyter 2002).

II. Study Site and Methods

a) Study area: Geographic setting

This study was conducted in Maasai villages adjacent to the western boundaries of Tsavo West National Park (TWNP) and Chyulu Hills National Park (CHNP), in southern Kenya (Figure 1).

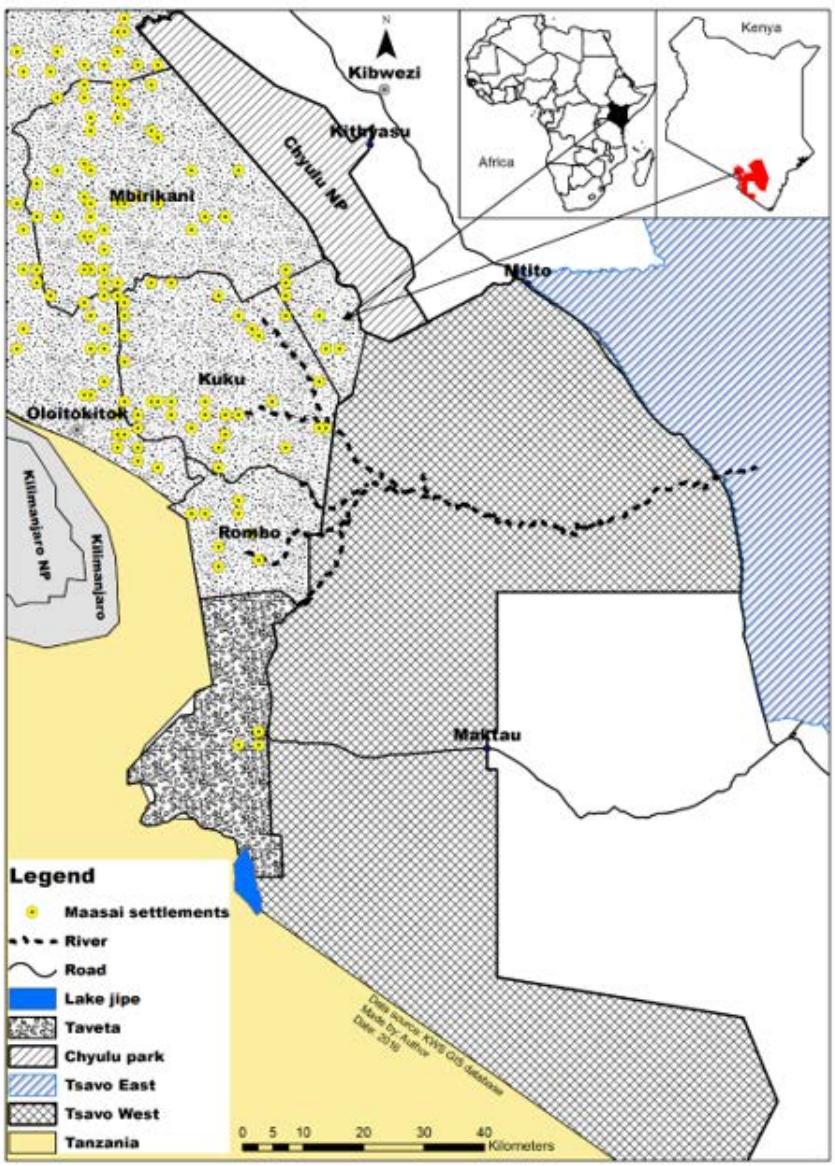

Figure 1: Location of study villages in Mbirikani, Kuku, and Rombo group ranches in southern Kenya

The study villages are within the Mbirikani, Kuku and Rombo group ranches and fall within a 20 km buffer zone from the CHNP and TWNP boundaries. This area is approximately 5,000 km^2 and falls within Kajiado county in Kenya. The general topography of the area is low and flat, but the north of the study area lies on the western slopes of Chyulu Hills and is hilly. The study area is arid to semi-arid. The rainfall pattern is bimodal: about 200-600 mm of precipitation fall during the long rains (March-May), and 300-700 mm during the short rains (November and December). Higher elevations in areas near the ChyuluHills, receive more rainfall and have cooler temperatures. Acacia-Commiphora savanna is the most dominant vegetation type in the study area. This Acacia-Commiphora savanna comprises varying densities of trees and shrubs, open grassland, woodlands, scrub, and thicket. Montane evergreen forests also occur on the spine of the Chyulu Hills.

The study area is 85-100% arid and semi-arid (ASAL) and about 40 % of resident population live below the poverty line-less than $ 2 a day (ROK 2013). Droughts are recurrent in this area; livestock mortality is

common during drought periods (Nkendianyee*t al*. 2011). Despite the arid conditions, the area has a unique grassland landscape that supports a variety of wildlife species including the iconic "big five": The African elephant *(Loxodontaafricana*), the African buffalo *(Synceruscaffer*), the African lion (*Pantheraleo)*, the African leopard (*Pantherapardus*pardus), and the black rhinocerous (Dicerosbicornis). People, wildlife, and livestock (Figure 2) compete for scarce pastures and water in the semi-arid area sometimes resulting to conflicts.

Figure 2: A Maasai herder in Mbirikani group ranch drives his herd home after a day in the pastures. Photo taken on July 17, 2016

The three group ranches in the study area are also a wet season dispersal area for wildlife in Amboseli National Park, West of CHNP, and other parks in Tsavo. As a critical habitat for endangered plant and animal species, the area receives immense attention globally for tourism, scientific and conservation reasons. Two high-end lodges among other tourist facilities are found on the western slopes of the Chyulu Hills. These facilities create jobs for local people and generate revenues, some of which are reinvested in conservation and community projects. There is also a predator compensation scheme in the area funded by Western donors which pays for livestock killed by wildlife, especially lions.

b) People and land resources

The study area is traditional land of the Maasai who lived a transhumant lifestyle before the advent of British colonialism in Kenya in the 1890s. Traditionally, the Maasai relied solely on a subsistence economy of keeping livestock. Livestock was owned by individual families and livestock products including meat, milk and blood were the staple foods of the Maasai. Other than being a source of food, livestock also played an important social and political role among the Maasai. Even today, livestock is an important measure of wealth and social status and also a medium of exchange. For example, cows may be used to pay dowry to a bride's family. Individual, family or clan ties are strengthened by using livestock as gifts. For many generations, land tenure in the study area was communal; the Maasai had institutions and practices that allowed for extensive livestock grazing. Seasonal migration with livestock ensured their survival even during extreme dry seasons. Recently, a few Maasai residents have begun engaging in small scale farming in the group ranches. However, the bulk of food consumed in the study villages (maize,

rice, cabbage) is grown by non-Maasai immigrants from other parts of Kenya who cultivate fertile areas around Loitoktok town (Ntiati 2002). The Maasai living in the study area are also gradually venturing into small scale businesses such as shops and restaurants, selling milk locally and also selling beads, masks and carvings to tourists.

The traditional grazing range for the Maasai has, however, shrunk due to the introduction of new land usesin their traditional lands (Bekure and de Leeuw 1991). Wildlife conservation as a land use reduced grazing areas for the Maasai. Tsavo West National Park was established in 1948 under British colonial rule. Chyulu Hills National Park was gazetted in 1983, two decades after Kenya attained independence. The boundaries for these parks were drawn without adequate consideration of Maasai movements during the dry seasons. The boundaries also blocked routes used by the Maasai to trade with their agro-pastoral eastern neighbors, the Kamba.

In the 1970's, the Kenyan government began a program in pastoral rangelands to replace communal ownership of land with private land ownership in the form of individual and group ranches (Ntiati 2002; Campbell *et al*. 2003). Group ranches were introduced in the study area to sedentarize the Maasai and modernize livestock production. Mbirikani, Rombo and Kuku group ranches were established in 1981, 1973 and 1975, respectively, and currently have an estimated 87,000 head of cattle (Table 1).

Table 1: Showing human and livestock population in Mbirikani, Kuku, and Rombo group ranches

Group Ranch	Area in Sq km	Human population	Persons per Sq km	Heads of cattle (2016)	Date of establishment
Mbirikani	1228	10225	8.32	25,000	1981
Kuku A and B	1446	11200	7.74	17,000	1975
Rombo	526	21510	41.12	45,000	1973
Total	3200	42935		87,000	

Human and livestock population data extracted from reports by Kenya National Bureau of Statistics, and Kajiado County Integrated Development plan, 2013-2017

There are other Maasai group ranches, which fall outside the study area. Group ranches are managed by a committee elected by group ranch members. Due to modernization pressures, the group ranches are facing the threat of subdivision. Some local Maasai, especially young men, are frustrated with the way group ranches are run and prefer to have their own parcels of land rather than a share of family land.

For cultural reasons, gender inequality in the study area is still prevalent. During this study, we found that the level of illiteracy among middle aged women was higher than that of men. Property ownership, especially cattle was for the most part vested in men who head the majority of households in the area.

c) Methods

The purpose of this study was to explore how local views about livestock grazing among the Maasai living adjacent to TWNP and CHNP can contribute to an adaptive management plan with the KWS. To achieve this objective, field research was conducted in different periods: June to August 2012; June to August 2015, December 2015 to January 2016. The research covered 6 villages stratified north to south in Mbirikani, Kuku and Rombo group ranches occurring within a 20 km buffer zone from CHNP and TWNP (Fig 1). During the research periods, twenty-four in depth interviews were conducted with key informants: two men, and two women from each of the 6 villages. I also held one focus group meeting in each of the six villages. Each focus group meeting comprised of five men, and five women (n = 10 for each group, total = 60 participants). Local administrators (chiefs and assistant chiefs) helped to select participants from their villages. Participants in interviews and focus group meetings were asked for voluntary consent; they were also assured that any information they shared would not identify them as individuals or their villages. Interviews with key informants involved four key research questions (Table 2) that focused on their perspectives on livestock grazing and land conditions in their villages.

Focus group meetings explored how the knowledge shared by the key informants might contribute to an adaptive co-management plan with the KWS with respect to livestock grazing. All the meetings started by introducing the concept of Adaptive Collaborative Management (ACM). During focus group meetings, some of the data gathered during interviews with key informants was shared and discussed. Two open ended questions guided focus group

meetings:1.,What information on livestock grazing do you want to share with KWS? 2., How will an adaptive co-management plan with KWS resolve grazing conflicts and promote elephant conservation? I moderated the meetings, which took about three hours on average. I also gave equal opportunities for participation by both genders and representatives across the three ranches. Discussions were held in Swahili and local research assistants helped translate from Maasai to Swahili and vice versa where necessary. Formal interviews were also held with four senior park officials in TWNP and CHNP. The officials are employees of the KWS who are conversant with park laws and regulations.

Table 2: Key research questions and type of data collected

Key research question	Type of data collected	Tool used
What is the importance of livestock in your household?	Reasons for owning livestock and the economic and cultural uses of livestock.	Interviews with key informants
Where do you graze your animals during the wet and dry seasons?	Areas where local residents take their animals to graze according to seasons.	Interviews with key informants
What grazing concerns/information would you like KWS to know?	Issues about livestock grazing	Focus group discussion with Maasai participants.
What are your views about an ACM KWS that resolves grazing conflicts and promotes elephant conservation?	Views on how local people and KWS can collaborate to resolve grazing conflicts	Focus group discussion with Maasai participants.

III. Results

a) Interviews with key informants

Interviews with key informants who are village residents in the Mbirikani, Kuku, and Rombo group ranches revealed a strong attachment to their landscape and cattle. Cattle are an important element in the culture of the Maasai, and the "Cattle complex in East Africa" described by Herskovits (1926) cannot be overemphasized among the people I interviewed. Eighteen out of the twenty-four key informants interviewed (75%) reported that they owned at least ten heads of cattle. Key informants gave seven key reasons why livestock ownership is important for their livelihoods (Table 3).

Table 3: Key reasons for owning livestock reported by Maasai informants and ranked by the total number of key informants (men and women) who mentioned each reason

Reasons for owning livestock	Men key informants (out of 12 men)	Women key informant (out of 12 women)
1. For food (milk and meat).	12	12
2. For income for other daily needs.	12	12
3. Cultural tradition (Maasai should own cattle).	12	8
4. Land conditions suitable for livestock rearing.	10	8
5. For marriage ceremonies (to pay for brides).	8	6
6. As a form of wealth, security/safety net).	7	4
7. For circumcision ceremonies (food, gifts).	6	5

According to both men and women key informants, the most important reasons for owning livestock was food and nutrition (milk and meat) and a source of income for daily food needs. The majority of participants reported that income from livestock and livestock products, especially milk, is used to purchase other foods, mainly maize and beans. Income from livestock was also reported to serve for other non-food needs such as buying clothes, books and school fees for school children. Women participants highlighted the importance of livestock in providing income to meet emergency needs. Seven out of twelve women (58%) mentioned that they sell their goats to pay for health care when their children get sick. It was also clear from

narratives that while men are ordinarily the owner of livestock in male headed households, women milk cows and have more control over the sale of milk. Cultural reasons for owning livestock were also reported by the majority of informants who said that owning cattle is a moral responsibility of the Maasai. Eleven out of all twelve men interviewed mentioned this reason as compared to eight out of all twelve women interviewed.

The arid and semi-arid conditions of the area that are more compatible with pastoralism than other land uses were also mentioned as a main reason residents own livestock. Participants emphasized that livestock grazing is more sustainable than farming in the group ranches. Other reasons mentioned include the use of livestock as social security and ceremonies such as marriage and circumcision events. Perhaps due to cultural reasons, male interviewees gave more reasons than did women; men also seemed to have well-rehearsed talking points about the questions asked. Generally, key informants, both men and women had sufficient knowledge of local issues, and their insights helped the researcher shape the agenda of focus group discussions.

b) Local perspectives on grazing

I asked key informants about their activity schedules and seasonal calendars to show where they graze their animals at certain periods of the year (Table 4). There was considerable consensus among different informants about grazing patterns in the landscape. Responses given by local pastoralists suggest that their livestock production system depends on herd mobility.

During the wet season, most of the livestock is grazed in the ranches. At the beginning of the dry season, livestock is moved to areas with higher herbaceous biomass. The are as most relied on during the dry seasons are the higher elevations on the slopes of the Chyulu Hills. The hills experience higher rainfall than do lower elevations in the group ranches where permanent settlements are located. It was clear from narratives by key informants that the Maasai perceive the green undulating Chyulu Hills as an area with high grass biomass and a grass bank for their livestock during the dry season. The hills are free of tsetse flies and are less prone to serious cattle diseases such as East Coast Fever. One male participant who was forceful and articulate said:

> The only place where grass does not get depleted is Chyulu Hills. We prefer grazing our animals in the hills from October to December, during this time the grass has a "high libido" effect on bulls. This causes intense mating between bulls and cows in the hills and this increases the chances of getting new born calves in the following wet season. Also, due to higher levels of moisture in the hills, animals can survive for 12 days without being supplied with water. [December 5, 2015].

Table 4: Common grazing locations through a calendar year in the study area

Season	Areas commonly grazed	Explanation
Jan- April	Group ranches in study area, at the foot and western slopes of Chyulu Hills	This is the middle of the wet season and there is grass in the hilly areas of the ranches. If the rains are good, and there is enough grass in ranches, animals are moved to lowland pastures
May- June	Group ranches in the study area	This is the beginning of the dry season. Most livestock are in the ranches, when new calves are born
Jul –Sep	Ranches in the study area. Other neighbor ranches	This is during the dry season and pasture in ranches begin to decline Livestock is gradually moved to other group ranches around Amboseli National Park and later to CHNP and TWNP
Oct-Dec	CHNP, TWNP, ranches around Amboseli	The short rains begin, very little grass is available in ranches. The parks have nutritious grass that has a high libido effect on bulls, this increases mating

CHNP- Chyulu Hills National Park
TWNP- Tsavo West National Park

Other than the Chyulu Hills, livestock is also taken to other lands including parts of Tsavo West National Park and Kiboko Range Research Station. The Maasai also move their livestock to other ranches adjacent to the Mbirikani, Kuku, and Rombo group ranches. Local narratives indicate that the Maasai would like to have access rights to pasture and water resources in protected lands which they referred to as former "Maasai grazing lands". Interviews with local informants also revealed a culturally grounded understanding among the local people that, during dry seasons, livestock owners should be allowed access to other grazing lands in order to sustain their herds. A woman informant said: "We know that the park belongs to the government and we are not allowed to graze in the parks but we request that when we exhaust grass in the ranches, the government should open up the park for the Maasai to graze."

Local informants gave a nuanced explanation of the relationship between the Maasai, livestock and wildlife. Nineteen out of the twenty-four informants (79%) mentioned that since elephants and other wildlife graze on pasture in the Maasai owned ranches during the wet season, livestock should also be allowed into the parks during the dry season. It was clear that this mutual reciprocal right of use is a customary practice whereby the local Maasai allow user rights of their resources to those who also extend them the same rights. Furthermore, local ecological wisdom holds that while individuals own the livestock; the land, pasture and wildlife are the collective property of the community. One man who is also a local administrator argued:

> We the Maasai regard the animals including elephants, leopards and lions as part of our environment, these animals are our property. We have lived with these animals and we have protected them in so far as they do not threaten our lives and that of our livestock. If you look at the area between Tsavo and Amboseli, there are many animals outside the park sharing pasture with livestock. KWS should allow us to graze in the parks in the dry season when we exhaust grass in the ranches. If they don't care about our cows, why should we care about theirs? But if there are people with too many animals, they should only be allowed to bring a limited number of animals into the park. [December 8, 2015].

Three Maasai informants also mentioned that livestock grazing was an important check on fires. They explained that grazing prevents the accumulation of dry grass and other fuel over large areas. They noted that high fuel loads in the Chyulu Hills often result in high intensity fires that negatively affect wildlife and vegetation.

c) *Focus group meetings and ACM as a planning strategy*

I used focus group meetings withMaasai village representatives and interviews with officials of the KWS to gather views on the possibility of employing the co-management approach to solve grazing conflicts in Tsavo. This research hypothesized that solving grazing conflicts would ensure more cooperation in elephant conservation between the Maasai and the KWS. Two focus group meetings were held in each of the three group ranches. Each of the six meetings consisted of five men and five women local participants. The researcher moderated the discussions and ensured equal participation by both genders. The concept of ACM was introduced to the participants in Swahili, a language that most participants understood.

Participants were given an opportunity to ask questions in order to clarify the concept of ACM. At first, participants asked questions revolving around the relationship between local people and KWS. For example, one participant wondered why KWS responded quickly when a wild animal is killed by poachers or dies of other means while showing a slow response when a villager is attacked by wildlife. I explained that ACM has the potential to address such questions because it supports dialogue and information sharing among stakeholders. I also further explained the meaning and goals of ACM.

To set the tone for the discussion, participants in focus group meetings were also asked to rank the major reasons for livestock ownership given by key informants. All the seven reasons were read and displayed on a manila paper. Participants were given twenty minutes to discuss amongst themselves and rank the seven reasons by consensus. The most important reason was assigned rank one while the least important was assigned rank seven (Table 5).

Table 5: Reasons A-G for owning livestock as ranked by Maasai participants in 6 village focus group meetings. Rank 1 is assigned the most important reason while rank 7 is assigned the least important reason.

Village focus group	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7
# 1	A	B	D	C	E	G	F
# 2	A	B	C	D	F	E	G
# 3	A	B	D	F	C	E	G
# 4	A	B	D	C	E	F	G
# 5	A	B	F	C	D	E	G
# 6	A	B	C	F	E	G	D

(A) For food (milk and meat) (B) Source of income for other daily needs. (C) Cultural tradition (Maasai should own cattle) (D) Land conditions suitable for livestock rearing (E) For marriage ceremonies (to pay for brides) (F) As a form of wealth, security/safety net (G) For circumcision ceremonies (food, gifts)

For the most part, the views of focus group participants on the role of livestock corroborated those of key informants. Like key informants, participants in focus groups selected food and source of income as the most important reasons for owning livestock. Their ranking also indicated a strong perception that livestock rearing provides employment opportunities in arid and semi-arid environments where other land uses such as agriculture would not be viable. Participants in the focus group meetings stressed that local people are key stakeholders and custodians of wildlife. They emphasized the distinction between the pastoral culture of the Maasai and neighboring cultures that practice cultivation and traditionally hunted game.

It was clear from the discussions that although the Maasai are beginning to venture into small scale agriculture, their traditions still regard the opening up of soil for cultivation as sacrilege. They perceive pastoralism as a more reliable source of income than farming. One elderly man in the second focus group meeting said:

> The Maasai are only interested in grass for their cattle, just grass. We are not cultivators like our Kamba and Taveta neighbors. Cultivation diminishes grass and makes the land look empty when trees are cut. Those who cultivate harvest only once or twice a year but the Maasai have animals throughout the year and this provides us with a regular source of income from sales. We are surprised that when Maasai herders are caught grazing in the national parks, they are made to pay fines like someone who has killed wildlife. [December 9, 2015].

d) *What information on livestock grazing do you want to share with KWS officials?*

Participants were then asked to mention the issues they would like to share with KWS with regard to the issue of grazing both in the ranches and national parks. I outlined to each group some of the reasons KWS does not allow livestock grazing in the national parks. Some of the reasons I mentioned included: competition for grass and browse between wildlife and livestock, that livestock is a cause of park degradation, and that herders have sometimes colluded with elephant poachers (Table 6).

Participants in focus groups acknowledged the damage a large number of livestock can have on local vegetation and soils. There was general agreement in all the meetings that cattle have contributed to degradation in some parts of group ranches and the TWNP. But most participants expressed the view that the majority of local Maasai own livestock only for subsistence and have grazed responsibly. Participants blamed "immigrant livestock" for the influx of livestock in TWNP. They alleged that livestock from other parts of the country are brought to Tsavo with the full knowledge and cooperation of government officials.

Table 6: Contrasting Maasai and KWS views about livestock grazing in Tsavo

Impacts of grazing	Maasai	KWS officials
Competition for resources	Our animals graze without depleting forage for wild animals.	Parks are for wild animals. Livestock reduces pasture available for wildlife.
Woody plants	Eliminates invasive species that compete with native grass species.	Livestock tramples on grass and woody plants and can make land bare.
Fires	Reduces fire occurrence by reducing fuel loads.	During the dry season, herders lights fires in the park to promote new shoots for their animals.
Wildlife	Opens up the landscape, small herbivores can easily see their predators and vice versa.	Livestock compete with wild animals for grass.
Park security	Our herders look out for poachers and report suspicious activity to KWS officials.	Some Maasai herders are used as local guides by poachers who kill elephants for ivory in parks.
Disease interaction	We inoculate our livestock to reduce disease attacks.	Livestock can transmit diseases such as east cost fever to wildlife.

The Maasai explained that TaitaTaveta County where most of TWNP lie was declared a livestock disease free zone. This has encouraged livestock owners from arid northern parts of Kenya, especially the Somali, to bring their animals to community ranches within TaitaTaveta County. When grazing pastures diminishes in the ranches that neighbor the parks in Tsavo, the "immigrant livestock" is grazed illegally in national parks. Attempts by the Kenya Wildlife Service to drive out domestic animals from national parks are sometimes frustrated by local and national politics. Some participants alleged that senior government officials with high level political connections owned some of the "immigrant livestock."

Participants conceded that Maasai herders were responsible for some of the dry season fires that occurs in parts of Chyulu Hills which often spread into CHNP. They however, suggested that fires were necessary for killing ticks and other disease-causing pests. They added that fires promoted faster grass regeneration and ensured palatable grass for livestock and wildlife. When asked about the possible threat of disease transmission from livestock to wildlife, some informants reported that the Maasai inoculate their animals against infectious diseases. They reported that cows are regularly dipped in acaricides to control ticks. Livestock grazing was also reported to reduce invasive species in the landscape and also prevent encroachment of bush.

During the meetings, there were disagreements among participants in focus group meetings on issues of grazing and access to local resources. Some participants felt that the Maasai do not have to graze in the parks if they had a good plan to utilize pasture in the group ranches. This group of participants seemed to blame group ranch management committees for the mismanagement of pasture in the group ranches. They argued that local disagreements and inequality in livestock ownership were the causes of overgrazing and unequal access to pasture in the ranches. They stated that local wealthy livestock owners kept large herds of livestock and therefore took more than their fair share of group ranch resources. Such sentiments among "poorer" livestock owners have motivated calls for group ranch subdivision. One youthful Maasai said:

> If we utilize our pasture well in the ranches, we do not have to go to the park. But the leadership of the ranches has failed to come up with a good grazing management plan that ensures that pasture does not get depleted. Those who own big herds take all the grass. I support calls to subdivide the group ranches because we don't get any benefit from them. If the land is subdivided and I get my share, I will lease it to wealthy livestock owners who need it to graze their animals and I will make some income. Those who own many cattle such as 300 heads, are the only ones who benefit from group ranches.[December 13, 2015].

Participants also pointed out that TWNP and CHNP block traditional and historic routes of trade and transportation. Although a right of way has been granted through TWNP by KWS, participants said the route is not convenient for most local people. It was also revealed in the focus group meetings that despite a right of way across CHNP having been granted to the Maasai to take their livestock to markets in Kibwezi area by a former district commissioner, sometimes the Maasai are refused permission to take their animals through the park by KWS officials.

Focus group discussions also revealed that the relationship between local people and the KWS in relation to grazing is not always confrontational. Some participants explained that, at times there is "cooperation" between KWS rangers and local Maasai, where herders are allowed to graze in the park after giving "gifts" to KWS rangers. Most participants were hesitant to admit that such gifts offered to KWS rangers were a form of bribery. They insisted that park officials are their neighbors and as good neighbors they were expected to show mutual support and fellowship with the Maasai. Participants also reported that the majority of herders who take their animals in the park escape arrest from KWS rangers by taking vantage positions where they spot rangers from a distance and hide in the bush. It was also reported that young school-age boys are sent out to graze cattle in the park because KWS rangers are hesitant to arrest minors. And in any case, if the minors get arrested by KWS rangers, local police stations lack special facilities to handle underage offenders and they end up being released at the police station.

e) *How will an ACM plan with KWS resolve conflicts and promote elephant conservation?*

Participants were asked about the kind of ACM plan they would like to have with KWS that resolves grazing conflicts as a strategy for promoting elephant conservation. The issue of elephant poaching was mentioned by a majority of participants during the focus group meetings. Most participants underscored the role that the Maasai have played in protecting elephants in the ranches. They blamed elephant poaching on non-Maasai immigrants, especially from Tanzania, who recruit very poor Maasai (*dorobo*) as accomplices in poaching in ranches and parks. Participants also insisted that elephant poaching is more common in the parks than in Maasai group ranches, and attributed this to their vigilance in the group ranches. There was unanimous agreement in all focus group meetings that community projects have boosted local people's support for elephant conservation. Members of Mbirikani and Kuku group ranches have collaborated with investors who have set up luxury tented cottages and suites in their ranches. Part of the tourism revenue generated from these facilities directly supports community projects. One of the successful projects is the game scout's project whereby local people are recruited to provide security for wildlife. Such benefits from wildlife have enhanced local support for conservation. One participant said:

> The Maasai are helping the government to protect elephants. The eyes of KWS rangers cannot be everywhere because this area is vast and they are few, but we are many and we see more things than them. We have enjoyed some benefits of conservation, we now have schools and hospitals in this area which were built using money from wildlife tourism. We would like KWS to engage us more in protecting elephants.[January 3, 2016].

Participants insisted that their ranches are also wet season wildlife dispersal corridors and that elephants need the ranches for pasture and water. They pointed out that the survival of elephants will depend on the willingness of the Maasai to tolerate elephants in their villages. Some participants said that KWS should be mindful of the losses local people incur when predators kill their livestock or when elephants damage crops. The majority of participants felt that an adaptive co-management plan with KWS should recognize the role local people play in wildlife conservation. One participant said:

> We have been very active in protecting wildlife especially elephants and lions and we want to collaborate with KWS. They should listen to us when we tell them that livestock and wildlife can coexist. Our collaboration will work if they allow us some areas to graze our livestock.[December 28, 2015].

Participants suggested that in order to reduce grazing conflicts between them and KWS several steps were necessary. They preferred adaptive steps that are sensitive to their grazing concerns. Local participants unanimously agreed on seven steps (Figure 3) that they thought would support an ACM plan with the KWS. The seven steps in Figure 3, are in the context of the ACM approach, experiments that will be adjusted to new realities in future.

1. KWS and other government agencies to ensure that no 'immigrant livestock' is allowed in the Tsavo area.
2. Residents of the study area who own large numbers of livestock to voluntarily reduce their herds.
3. KWS to zone parts of TWNP and CHNP that have low tourism potential and designate these areas for livestock grazing during the dry season.
4. KWS and group ranch officials to establish joint grazing committees in each ranch comprising of KWS officials and local elders.
5. Introduce a grazing fee per head of cattle grazing in the park to be paid to KWS. This grazing fee to be used for catering administrative costs of grazing committees such as paying allowances to committee members.
6. KWS to develop training programs for local people to build capacity for participation in grazing committees.
7. Hold regular meetings between KWS officials and the Maasai.

Figure 3: Steps to an Adaptive Collaborative Management plan between the Maasai and the KWS as agreed by focus group participants

If the steps are implemented, new experiences will arise that might require new decisions or steps. During the discussions, participants agreed that the steps are not cast in stone; they will need continual feedback and evaluation. For instance, getting rid of "immigrant livestock" in Tsavo might encourage local people to increase their livestock herds. This might lead to the unintended consequence of more human-elephant conflicts. The steps outlined are therefore just the beginning of a learning process; all the feedback generated during their implementation will be used to improve future actions. The steps create new institutions; joint grazing management committees comprising of KWS and group ranch officials. This is an important adaptive tool for monitoring changes, proposing new actions and solving disputes that may arise.

Unlike the current practice where KWS uses its legal powers to enforce rules with regard to grazing, with little regard to the views of the Maasai, the ACM plan depends on the good will of the Maasai. In the spirit of ACM, the steps will be continuously validated and revalidated by the Maasai and KWS in order to produce the best outcomes acceptable to both parties. This will require negotiation and constant engagement between the Maasai and KWS. These steps towards an ACM plan are more likely to generate better outcomes than current practices which are hampered by confrontational power relations between KWS and the Maasai.

Village representatives were optimistic that adaptive plans with KWS would promote cooperation in elephant conservation. They also pointed out that such plans should only involve registered members of the three group ranches who are local residents. Participants were confident that an adaptive plan that focuses on livestock grazing would help solve the problem of "immigrant" livestock since local communities would ensure that livestock from other parts of the country were not allowed in the parks.

However, local views about co-management with KWS varied across villages and group ranches and among individuals. In Mbirikani and Kuku group ranches where there are active conservation programs driven by hotel and lodge operators, village representatives were more familiar with co-management ideas due to community based conservation programs in the area spearheaded by powerful conservation based non-governmental organizations such as the Big Life Foundation. Village representatives from the Rombo group ranch, where such programs were not active, seemed skeptical about whether KWS would agree to discuss grazing issues with the Maasai.

f) Interview with KWS officials on an ACM plan with the Maasai

Three KWS officials working in TWNP and CHNP were interviewed separately. The officials were in agreement that the Maasai are efficient livestock producers and are good protectors of their land. Two out of the three officials interviewed supported the proposal that the Maasai can be allowed to graze in the national park during the dry season but also added that such a move might invite the incursion of livestock from other parts of Kenya. The officials were in agreement that an ACM plan with the Maasai would work best if the government first solved the problem of "immigrant livestock." One of the KWS officials added that, there was a provision in Kenya's wildlife law that allows local communities to graze in the park in drought conditions. Section 102, subsection 4 of The Wildlife Conservation and Management Act, 2013 states that: "The Cabinet Secretary shall make guidelines in consultation with the Service with respect to accessing national parks for

purposes of grazing and watering livestock in times of drought and other natural disasters."

KWS officials explained that this legal provision has not been implemented because the number of livestock that entered the park illegally already exceed the "carrying capacity" of the parks. Most of these livestock is "immigrant" and is not owned by the local people. "Even if the Cabinet Secretary gave such a directive, it would be difficult to enforce", one KWS official concluded. The comments by KWS officials point to the conflicting views between local people and state resource agents about grazing in Tsavo. Their comments also indicated the willingness for dialogue and information sharing between the two parties.

IV. Discussion

Past conservation and development policies affecting East African pastoral rangelands were imposed from above (Schroeder 1999). Very little or no effort was made to include the views of pastoralists in policy making and planning processes (Boyd *et al*. 1999; Lamprey 1983; Lindsay 1987). For the most part, policies implemented in pastoral rangelands resulted in the disruption of access to seasonal water and pasture resources. This disruption is the genesis of contemporary conflicts between local pastoralists and conservation authorities. Despite the overwhelming evidence that the root cause of these conflicts is failure by planners to acknowledge features that are inherent in pastoral societies, East African governments, development experts, and conservationists continue to blame pastoralists for being ignorant, primitive and too stubborn to change their ways of life.

Pastoralists have lived with wildlife in savannah landscapes of East Africa for several millennia. This mutual coexistence had ecological benefits for people, livestock and wildlife. National park regulations in East Africa have outlawed livestock grazing within park boundaries. However, wildlife, especially elephants, often stray out of parks, sometimes posing a threat to livestock, crops and human life. As a result, pastoralists have perceived elephants as having a political advantage over humans, and have sometimes killed them in retaliation when elephants kill people or damage property (Norton-Griffiths 2000).

The narratives of the Maasai of Tsavo about the role of livestock grazing in their landscape resonate with views of other pastoralists across the world who give their own subsistence top priority. Just like other pastoralist in East Africa (Halderman 2013; McCabe 1990), the Maasai of Tsavo believe that wildlife and livestock can share grazing resources and co-exist with minimal conflict. Narratives from participants in this study suggest that cattle and elephants are at the heart of Maasai culture. Among the Maasai, livestock is historically a source of nourishment and currently a source of income. Local narratives indicate that traditionally, elephants were valued for customary reasons and were never used for economic reasons. Killing of elephants was a taboo in Maasai culture. Neighboring tribes who hunted and consumed elephant meat were seen as dirty and "uncivilized." This research supports other findings where pastoralists tolerate wildlife in their lands as a traditional cultural obligation. A good example is research done among the Samburu pastoralists of Kenya (Kuriyan 2002). It was clear during this research that although KWS officials emphasized the importance of elephants for tourism, local narratives were more focused on the role of elephants in cultural and naturalheritage.

The study also revealed differences in perceptions of corruption between KWS officials and the Maasai. Senior KWS officials interviewed in this study stated categorically that it is a malpractice for any KWS officer to accept gifts in exchange for allowing livestock access in the park. However, the Maasai do not perceive KWS rangers who accept their "gifts" in exchange for livestock access to the park as corrupt. Despite their awareness of park regulations, the Maasai perceive such rangers as good neighbors who embrace the need for cooperation and mutual aid. This finding about "mutuality" in peasant societies echoes other political ecology research such as Neumann's work around Arusha National Park in Tanzania (Neumann1998). Paying small bribes to rangers by the Maasai can be understood within theories of "village moral economy" and "every day forms of peasant resistance"elaborated by Scott (Scott 1976; 1985). The Maasai resist park policies that threaten their livelihoods by grazing illegally in the parks.

a) Balancing KWS and Maasai interests through Adaptive Collaborative Management

The shift from equilibrium to non-equilibrium views of social ecological systems provided support for management approaches that embrace more adaptive and collaborative forms of natural resource management (Berkes and Folke 1998; Hollin*get al*. 2002; Mclain and Lee 1996; Sluyter 2002). One such approach that has emerged in natural resource management is Adaptive Collaborative Management (ACM). Although there is no single universally accepted definition of ACM, it emerged from two concepts: co-management and adaptive management. Co-management emphasizes that stakeholders who have a claim to a certain natural resource should share rights and responsibilities of managing such a resource (Colfer 2005). ACM also recognizes that human knowledge is imperfect and incomplete because the world keep changing and presenting new surprises. Some of the recent changes affecting natural resource management include; rapidly changing human population, land use and climatic patterns, new

resource conservation laws, etc. Therefore, in ACM, policy choices are treated as experiments which can succeed or fail. When policies fail, policy makers learn from past experiences and adjust management actions in a continual cycle of action, learning and adjusting policies (Armitage*et al*. 2008b). ACM is now widely recognized as a tool that can be applied to solve complex natural resource conservation problems.

ACM supports the shift from the "fences and fines" approach to people-focused approaches in natural resource management (Holmes 2003). It emphasizes not just the co-operation of various stakeholders but also their contribution of knowledge (Fisher 2001). Focus group discussions held in this study show that the Maasai are willing to share their knowledge about elephants and livestock grazing with the KWS. It is clear that the Maasai would support opportunities to work with the KWS to resolve grazing conflicts through an agreed ACM plan. The seven adaptive steps suggested by participants in focus group meetings (Box 1) represent important first steps towards an adaptive collaborative plan. However, since no human activities are allowed in national parks, according to current national park regulations in Kenya, the success of such a collaborative plan will require changes in policy. These policy changes should embrace local participation and integration of local knowledge in conservation planning. The new policies should be a break away from the prevailing "command and control" approaches that marginalize, ignore, and devalue Maasai knowledge and culture.

Maasai views on livestock and elephants support the "polycentric" governance, and "citizen science" approaches (Dickinson *et al*. 2010; Ostrom 2005; 2010), whereby governments at multiple scales interact with community organizations so that management decisions are made at local places by a diversity of actors. In some of the success stories where the polycentric approach has been applied in resource management, local groups have been given the independence to make and enforce rules within a specified geographical area (Acheson 2003; Singleton 1998). In these cases, community groups have worked together with governments to devise rules to manage natural resources on which they rely for livelihood. Such co-management systems enhance localized control over resources and may reduce resource conflicts. Our research shows that the Maasai prefer an adaptive co-management plan with KWS that supports the co-managementof wildlife resources in their landscape.

V. Conclusion

The goal of this study was to gain local perspectives on the role of livestock grazing in Maasai villages adjacent to CHNP and TWNP in Kenya and validate those perspectives towards an adaptive collaborative management plan between the Maasai and KWS that enhances the protection of elephants. Using a participatory learning approach, I investigated local knowledge on livestock grazing and sought to understand how this knowledge relates to the conservation of elephants. I also explored how resolving grazing conflicts between the Maasai and KWS can be an avenue for ensuring the future survival of elephant populations in Tsavo. Results shows that local people regard livestock as a critical component of their pastoral livelihoods,their views differs from official perceptions that portray livestock as a threat to key wild species, especially elephants.

According to the narratives of Maasai participants in this study, shared grazing between livestock and wildlife is mutually beneficial and also supports grassland ecosystems. Livestock grazing prevents the spread of invasive species and also maintains savannah grasslands by curbing the encroachment of bush. Local knowledge of the Maasai dictatesthat the ability to move to other lands to exploit pastures and water resources is a key survival mechanism for livestock in times of droughts. Currently, most of the traditional grazing frontiers for the Maasai fall in national parks,where cattle grazing is officially prohibited. Participants in this study expressed the need to graze in national parks during times of severe droughts in order to protect their livelihoods. This might require the adjustment of national park policies. Although the extent of landscape transformations in Tsavo will not allow for a return to traditional grazing patterns, there is need for grazing plans in the region to build on traditional grazing practices.

This study validates Maasai knowledge and argues for its inclusion in adaptive co-management plans with the KWS. Clearly, the Maasai residents of Tsavo would like greater participation in conservation decision making. Successful biodiversity conservation in East Africa will depend on cooperation between state conservation officials, local farmers, and pastoralists to protect wild species. This chapter asserts that negotiations between the Maasai and KWS officials in Tsavo, Kenya to jointly forge new conservation plans will safeguard local livelihoods and promote the survival of elephants. As Daniel Wildcat argues in his book *Saving the Planet with Indigenous Knowledge,* indigenous traditions and world views must be acknowledged for us to be successful in saving the last great species and places on earth (Wildcat 2009). Resolving grazing conflicts between the Maasai of Tsavo and the KWS will promote the long term conservation of elephants in the Tsavoregion.

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