



S F S THE SCHOOL
FOR FIELD STUDIES

Elephant Ecology and Conservation in Kenya

SFS 3252

Syllabus
4 Credits

The School for Field Studies (SFS)
Center for Endangered Species Conservation
Kimana, Kenya

This syllabus may develop or change over time based on local conditions, learning opportunities, and faculty expertise. Course content may vary from semester to semester.

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COURSE CONTENT SUBJECT TO CHANGE

Please note that this is a copy of a recent syllabus. A final syllabus will be provided to students on the first day of academic programming.

SFS programs are different from other travel or study abroad programs. Each iteration of a program is unique and often cannot be implemented exactly as planned for a variety of reasons. There are factors which, although monitored closely, are beyond our control. For example:

- Changes in access to or expiration or change in terms of permits to the highly regulated and sensitive environments in which we work;
- Changes in social/political conditions or tenuous weather situations/natural disasters may require changes to sites or plans, often with little notice;
- Some aspects of programs depend on the current faculty team as well as the goodwill and generosity of individuals, communities, and institutions which lend support.

Please be advised that these or other variables may require changes before or during the program. Part of the SFS experience is adapting to changing conditions and overcoming the obstacles that they may present. In other words, this is a field program, and the field can change.

Course Overview

The African elephant (*Loxodonta africana*) is an important keystone species in Africa and has profound influence on the structure and dynamics of landscapes where it co-exists with other species. It's one of the most charismatic and charming species, but its conservation and population status has continued to attract concern within and beyond Africa. A key worry is that its conservation is increasingly becoming uncertain across the entire African continent due illegal poaching, landscape fragmentation and retaliatory attacks by local communities due to human-elephant conflict. At the beginning of the 20th century, there were several millions of elephants roaming Africa (Douglas-Hamilton 1979), but today, they have declined rapidly, and are estimated to be nearly 450,000 - 700,000 (Stephenson, 2007).

Illegal poaching has been and remains the biggest threat to the survival of elephants, and this threat is rampant throughout the entire continent (Douglas-Hamilton et al. 1992). Habitat loss, associated with anthropogenic effects is the second biggest threat to the future conservation of the species, and in the last century, large swathes of elephant natural habitats have been converted into human dominated landscapes (Esikuri 1998). This not only leads to loss, reduction, and degradation of elephant prime habitats, but curtails their free movement, reduces their home range, blocks their movement corridors and routes but increases conflicts with humans (Spinage 1990). Collectively, this matrix creates an inhabitable and hostile environment for elephant survival and conservation in all its range in Africa.

Since the advent of wildlife-based tourism in Africa, the African elephant has remained one of the species highly sought by tourists as a member of the big five large mammals which include the rhinoceros, cape buffalo, leopard, and the lion (Okello et al. 2005). Consequently, it plays a key role in the tourism industry across the entire continent, and in this regard, most countries have enhanced their protection and conservation efforts all geared towards saving elephants. In the same breath and given that the species doubles as a flagship and keystone species, its successful conservation is viewed by conservationists as a testimony of how humans can effectively protect other biodiversity types, and their commitment to co-exist with wildlife. The elephant is also an umbrella species which depends on securing large tracks of ecologically connected landscapes and ecosystems, and therefore serves the objective of wider biodiversity conservation (Litoroh et al. 2012).

The spatial-temporal distribution of elephants in Africa is influenced by multiple factors. These include intensity and prevalence of poaching and conflicts with humans, availability of suitable habitats and associated resources especially food and water, human population density and land use changes (Spinage, 1990; Croze and Moss, 2011). For instance, food requirements have been found to be a major determinant of wet and dry season habitat occupancy for the Amboseli elephants, and hostile encounters with local Maasai have been documented to force elephants to avoid local Maasai homesteads (Kangwana, 1993). Similarly, prevalence of poaching in 1970s and 1980s forced elephants to spend more time inside Amboseli National Park for safety reasons (Croze and Moss, 2011), and this phenomenon was observed in most parts of Africa in response to surge in the menace.

Elephants are mega-herbivores, consuming vast quantities of food, and are known as 'wasteful feeders' (Kerley et al., 2008). They are a savanna keystone species (Western, 1989; Laws, 1970), meaning that their presence ecologically benefits other wildlife species and due to its ecological role in an ecosystem (Twine et al., 2008), they are important in nutrient recycling and seed dispersal, and elicit plant defense

and growth responses (Kerley et al., 2008). Elephants and fire are regarded as drivers of alternate states in ecosystems (Kerley et al., 2008). It is sometimes difficult to disentangle the relative roles of elephant, fire, drought, disease, and other browsers in tree population patterns because they often affect the vegetation in combination (Kerley et al., 2008).

As bulky feeders, elephants include low-quality plant matter in their diets (Owen-Smith, 1988). However, to maximize their energy intake there should be a trade-off between selection for scarce, high-quality resources and the utilization of lower quality resources that are presumably more abundant (Illius, 2006). For elephants, nutritional constraints are pronounced as the dry season progresses. In theory, elephants are therefore expected to increase the size of their home range during the dry season to include the resources otherwise available during the wet season. Most often, elephants tend to concentrate their foraging activities in areas close to water during the dry season (Osborn and Parker, 2003) and they then conceivably depend on lower quality food (Owen-Smith, 1988). The restriction imposed by the distribution of water, presence of human infrastructure and presence may therefore coincide with selection for areas with higher food resource availability within the landscape, which may consequently determine the location of elephant home ranges (Damschen et al., 2006).

Few wild animals elicit drastic and different human emotions, as elephants do. They capture the imagination and unswerving affection of many people worldwide, but also inspire animosity and fear among those sharing land and resources with these mega-herbivores. Two factors have a large effect on determining the numbers and distribution of elephants in Kenya: poaching and conversion of land by people. There has been a steady decrease in elephant habitats over many decades throughout Africa wherever human populations have increased. Thus, there is a linear, negative relationship between human population size and elephant density. However, coexistence is possible at low human densities, while loss of habitat occurs at a critical threshold level of roughly 15 people per km². Apart from the widespread habitat loss that is facing elephant populations across the African continent, illegal poaching can eliminate populations, even when human land use would otherwise allow coexistence.

Numerous studies across Africa have extensively reported local community's antipathy to elephants beyond that expressed for any other wildlife species. Communities surrounding forest reserves and conservation areas engage in small-scale subsistence and cash-crop farming. Those farms close to the boundary are vulnerable to elephant crop raids and damage, which is most intense during the food crop-harvesting season, but also occurs to a lesser extent throughout the year. In the process, elephants jeopardize communities' food security and livelihoods and communities' attitudes towards elephants are consequently and consistently negative in all elephant ranges in Africa.

Resolving human-elephant conflicts has become critical to the improvement of the livelihoods of rural communities co-existing with elephants and conservation of elephants. Resolution of direct conflict between humans and elephants in Africa has become a serious local socio-economic and political issue in recent years, and a continental conservation problem. Many studies have therefore shown that elephants cause diverse damage types including crop depredation, property damage and even threat to human life. About eighty percent (80%) of the African elephant's range lies outside formally protected areas, and inadequate management of the conflicts with humans is frequently a pre-cursor to further decline in the numbers and distribution of elephants.

Case Study Overview and Background

Title of Case Study

Elephant space and other resource use, movements, conservation and population viability in Amboseli Ecosystem, Kenya

Case Study Question

How can changes in land tenure, human demography and land use in the Amboseli Ecosystem be effectively managed to enhance sustainable and long-term conservation of elephants whilst promoting socio-economic welling and co-existence of local communities with elephants?

Background: The Amboseli Ecosystem

The basis for this case study is the Ecosystem Approach, which takes into underpins the need to promote landscape connectivity as a key pillar in sustainable and long-term conservation of the African elephants. Most of the learning will focus on the Amboseli Ecosystem which is situated in the Southeastern sector of Kenya. The ecosystem comprises of expansive Maasai Group Ranches, which are privately owned parcels of land along the Kenya-Tanzania border, protected areas, mainly, Amboseli, N. Park and several private wildlife sanctuaries/conservancies. It also neighbors the Chyulu Hills, Tsavo West and Mt. Kilimanjaro N. Parks, and has a mixed community made up of different ethnic groups; the Maasai, Kikuyu and Kamba among others. Of importance are the Maasai people, whose pastoral lifestyle has remained highly tied to the environmental conditions and dynamics of the landscape. Thus, this landscape, unlike most parts of the country is still endowed with diverse and high wildlife abundance including elephants albeit in a rapidly human altered environment.

Like other parts of the country, the Amboseli region is changing rapidly and its increasingly becoming a human dominated landscape characterized by expanding settlements and infrastructure development. Additionally, its experiencing rapid and significant shifts in land tenure and use patterns, and socio-economic changes among the Maasai and migrants, which is increasing human-wildlife competition for scarce resources (e.g., space, water, and pasture). Unfortunately, the resultant human-wildlife conflicts have serious and long-term wildlife, natural resources conservations ramifications as well as socio-economic costs. They are an immediate and present danger to effective and sustainable wildlife conservation, and the historical harmonious co-existence between people and wildlife. The threats facing wildlife conservation are also a big danger to availability and sustainable use of other critical natural resources particularly water, pasture, and woody plants. And recently, Climate change has also become another serious and worrisome environmental challenge, and whose impacts on the environment, wildlife, and natural resources as well as local livelihoods will be devastating.

Water is also a critical resource limiting land use, plant productivity, wildlife movement and spatial distribution in the Amboseli Ecosystem. There is a natural scarcity of water in this region because it lies in the rain shadow of Mt. Kilimanjaro. To compound the problem, Mt. Kilimanjaro's icecaps have been documented to be rapidly receding so much that fewer rivers and streams emerge today from underground springs. Since water is a limiting resource in the ecosystem, such areas are under pressure for degradation due to over-exploitation from community home use, wildlife, livestock, and irrigated farming activities. This situation has further been worsened by recent Climatic changes characterized by highly irregular and insufficient rains, frequent dry spells, and droughts. There is an urgent need to

understand the socio-economic, political, and environmental drivers and implications of land reform for wildlife conservation and local livelihoods in this rapidly dynamic and changing landscape.

Another notable change in the Amboseli region is increase in human demography including a high influx of non-Maasai ethnic groups such as the Kikuyu and Kamba. To some extent this has increased demand for natural resources, and land for settlements. The latter has lured the Maasai to sell their land due to its high lucrative financial returns, further creating an unfavorable environment for wildlife and natural resources conservation. In addition, the state of environmental and natural resources governance in the entire region is very poor, uncoordinated, and existing laws and guidelines are not effectively enforced by government leading agencies. Accordingly, there's rampant environmental degradation, misuse, commercialization, and overexploitation of natural resources with total disregard of the impacts on livelihoods which are largely dependent on natural resources.

During the summer II program, we will visit Amboseli National Park, community conservancies in the former Kimana group ranch, and a 4 day camping trip to the world famous Maasai Mara. In the Mara, students will learn various aspects of African elephants including cross-border conservation issues between Kenya and Tanzania and compare these with aspects covered in the Amboseli region.

Learning Objectives

In this course students will learn and examine diverse and critical aspects of African elephants in Africa, Kenya, and in the Amboseli and Maasai-mara landscapes. This learning process will be achieved through classroom interactive learning sessions, experiential field activities, class discussions and lectures by Faculty and various guests. The specific objectives of the course are:

1. Discuss the status of elephants as an endangered species, their role as a keystone and flagship species.
2. Use quantitative and qualitative research methods and techniques in studying elephant ecology, management, and conservation dynamics.
3. Examine elephant ecology and social organization, and implications on their conservation in Kenya.
4. Evaluate key constraints to elephants' conservation considering ongoing land tenure transformations in Kenya and the Amboseli Ecosystem
5. Appraise current approaches, techniques and innovations that are used to enhance elephant conservation in a rapidly changing world.
6. Produce educational materials that can be used to promote elephant conservation.

Assessment

Assessment Item	Value (%)
Film on African elephant conservation in Kenya	10
Impacts of elephants on vegetation	20
Human-elephant conflict study	10
Elephant counts in Amboseli National Park	20
Final exam	30
Participation	10
TOTAL	100

Film on African elephant conservation in Kenya (10%)

This assignment will run throughout summer 2 session and will be finalized after the Maasai Mara expedition. The assignment requires students to work in three groups to develop a short film of 10 minutes to create public awareness about African elephants, their conservation challenges, and opportunities. Each group will be given a theme by faculty on which to focus their story. Students will use open-source video editing software of their choice. The idea is to combine knowledge gathered during the course, including field exercises and the Maasai Mara expedition, and storytelling skills. The videos will be considered for use in SFS-Kenya social media platforms.

Impacts of elephants on vegetation (20%)

The elephant is a key stone species and as such it has profound influence and impacts on its environment including causing significant changes in the vegetation. In the Greater Amboseli Ecosystem, Amboseli N. Park is the core use area for elephants, but during the wet season most of them move into adjacent community land. This dispersal ability is diminishing rapidly due to rampant land use change. This has led to localized abundance in elephants especially in habitats dominated by woody vegetation and this is a conservation concern in the ecosystem. In this regard, students will assess the typology, extent, and severity of woody vegetation damage by elephants in selected vegetation communities in the former Kimana group ranch. Data will be analyzed to determine the most common types of elephant damage and the severity of damage. Each student will write a 3–4 page report of their findings.

Human-elephant conflict study (10%)

Students will use an already developed questionnaire to conduct a survey with farmers on the nature and scope of HECs. Ultimately, they will understand the trends of HECs, the driving factors, consequences, and mitigation measures. Students will analyze the data and write a 2-3 page report.

Elephant counts in Amboseli National Park (20%)

Counting endangered wildlife species helps evaluate whether their population is growing, or they are likely to become extinct. Knowledge of the decline and surges in population for mega herbivores like elephants helps conservationists and managers plan conflict and habitat related conservation measures. This elephant count exercise will be done in Amboseli National Park, a core concentration area for Amboseli ecosystem elephants. Students will work in groups to count elephants in allocated blocks of the park. Data will be collated from all the groups for synthesis and each student will then write an individual report using the guideline given by the faculty for grading.

Final Exam (30%)

There will be a written exam that accounts for **30% of the overall course grade** and will comprise of short answer questions. Students will be expected to demonstrate an understanding of various competences and knowledge of conservation issues in the Amboseli and Maasai-mara Ecosystems. Each faculty shall set **2 questions with an equal weight of 10%**, from which students will answer any 1 question. Therefore, all together, students will answer 3 questions. The exam shall **last 1 hour and 30 minutes**.

Participation (10%)

Both faculties shall work together to evaluate students on their participation throughout the course. A grading rubric shall be provided to students at the beginning of the program.

Grading Scheme

A	95.00 - 100.00%	B+	86.00 - 89.99%	C+	76.00 - 79.99%	D	60.00 - 69.99%
A-	90.00 - 94.99%	B	83.00 - 85.99%	C	73.00 - 75.99%	F	0.00 - 59.99%
		B-	80.00 - 82.99%	C-	70.00 - 72.99%		

General Reminders

Readings – Assigned readings and hand outs (exercises/assignments) will be available prior to the scheduled activities. Course readings must be read and clarification on issues sought where necessary since ideas and concepts contained in them will be expected to be used and cited appropriately in assigned course essays and research papers.

Plagiarism – Using the ideas and material of others without giving due credit is cheating and will not be tolerated. A grade of zero will be assigned if anyone is caught cheating or aiding another person to cheat actively or passively (e.g., allowing someone to look at your exam).

Deadlines – Deadlines for written field exercises and other assignments are posted to promote equity among students and to allow faculty ample time to review and return assignments in good time. As such, deadlines are firm, and extensions will only be considered under the most extreme circumstances. Late assignments will incur a 10% penalty for each hour that they are late. This means an assignment that is five minutes late will have 10% deducted. An assignment that is one hour and five minutes late will have 20% of the grade deducted.

Participation – Since we offer a program that is likely more intensive than you might be used to at your home institution, missing even one lecture can have a proportionally greater effect on your final grade simply because there is little room to make up for lost time. Participation in all components of the program is mandatory because your actions can significantly affect your experience and that of your classmates have while at CWWS. Therefore, it is important that you are prompt for all course activities.

Course Content

Type- L: Lecture, **F:** Film, **FL:** Field Lecture, **FEX:** Field Exercise, **D:** Discussion/Reflection, **Lab:** Data Lab

*Required readings are in bold

No	Title and outline	Type	Time (hrs)	Readings
1	Case study overview Broad scope on elephants and wildlife conservation challenges and opportunities in the Amboseli Ecosystem.	L	2 hours	Okello, M. M., et al. (2009).
2	Introduction to conservation issues in the Kimana area and their intersection with elephants A drive through field lecture in the former Kimana Group Ranch during which Faculty will make strategic stops to demonstrate to the students the following: manifestations of land uses, abstraction of water resources, general state of the ecosystem/landscape environment, community conservation initiatives, elephant habitats fragmentation and loss of landscape ecological connectivity.	FL	2 hours	Okello and D'Amour (2008). Okello (2009).
3	Elephant ecology and social organization This lecture will examine key ecological and social aspects of African elephants and how they influence conservation.	L	1 hour 40 min	<i>Reference book:</i> Estes, R. D. (1991).
4	Environmental Education as strategy in conserving elephants (introducing semester assignment) Importance of conservation education as a strategy in conserving elephants in Kenya. Students are thereafter divided into three groups in which they work as a team a create a short video (10 minutes) to be used for educating various populations e.g., youth, tourists and farmers about elephants and promote elephants' conservation. Students can use Open-source video editing software of their choice, including DaVinci Resolve.	L	50 mins	
5	Historical background of conservation practice and thought. <i>Film: A place without people (54 min)</i> This film tackles the history of creation of world-famous conservation areas in Africa, and the associated human rights issues. Focusing on Tanzania's Serengeti and Ngorongoro parks, the film shines a light on the intersection of conservation, land use, community livelihoods and the tourism industry, which has similarities with Kenya.	L	1hour 40 mins	Nelson (2003). Kothari et al. (2013).

No	Title and outline	Type	Time (hrs)	Readings
6	Impacts of elephants on vegetation In this field exercise, students will learn how to assess impacts of elephants on woody vegetation their implications on conservation of elephants and ecological integrity of protected areas.	FEX	3 hours	
7	Impacts of elephants on vegetation In this lab session, students will synthesis and analysis data collected during EE 07 field exercise. They will also learn how to interpret the results obtained. Each student will write a report for grading.	Lab	3 hours	
8	Elephant behavior and communication The lecture will be based on long-term studies on Amboseli elephants. It will focus on key behavioral attributes of African elephants and how they communicate.	L	1 hour 40 mins	
9	Aging and sexing in African elephants: theory and field exercise preparation Lecture will provide elephant features that are typically used to age and sex them.	L	1 hour 40 mins	
10	Aging and sexing in African elephants: practice In this field exercise students will learn how to age and sex elephants in Amboseli National Park.	FEX	3 hours	
11	Wildlife Conservation Law and Policy enforcement in Kenya Students will learn some of the regulations and regulatory bodies that govern wildlife conservation in Kenya. The effectiveness of various regulatory tools will be explored, challenges identified as well as their critiques.	L	1 hour 40 min	Duffy, R. (2013). Akama, J. S. (2007).
12	Elephant movement, habitat, and space needs in the Amboseli Ecosystem Lecture will be based on studies of collared elephants by SFS, Kenya Wildlife Service (KWS) and International Fund for Animal Welfare (IFAW) in the Amboseli Ecosystem. It will primarily focus on observed elephant's movement patterns, ranging behavior and space needs, and implications to their long-term conservation.	L	1 hour 40 min	Okello, M.M., et al. (2015). Ngene S., et al. (2017).
13	Introduction to human-elephant conflicts in Kenya This lecture will be centered on the intricacies of human-elephant conflicts in Kenya. Trends, driving factors, consequences and mitigation measures are discussed. In the second part of the lecture, the faculty shall prepare students for a field exercise.	L	1 hour 40 min	Okello (2005). Muthui (2018). Mukeka, Joseph et al. (2018).

No	Title and outline	Type	Time (hrs)	Readings
14	<p>Assessing the scope and nature of human-elephant conflicts (HECs) in former Kimana group ranch</p> <p>Students will assess the typology of HECs among smaller scale farmers, their causes, patterns, impacts and mitigation. Students will conduct a household survey amongst farmers in the former Kimana group ranch. Students use predesigned tools for the survey.</p>	FEX	3 hours	
15	<p>Population status and trends of the African elephant: a continental perspective</p> <p>Lecture will examine trends in the population of African elephant in Africa. It will also examine the causes for the observed population trends of the species and underlying challenges.</p>	L	1 hour 40 min	UNEP, CITES, IUCN, TRAFFIC (2013).
16	<p>Elephant count methods and preparation for field exercise</p> <p>This lecture will examine the rationale for counting elephants, how to conduct sample and total counts using elephant signs and actual sighting and the underlying considerations.</p>	L	1 hour 40 min	Kioko, J., et al. (2006). Okello, M.M, et al. (2016).
17	<p>Elephant counts in Amboseli National Park</p> <p>This field exercise will be done in Amboseli N. Park, a core concentration area for the Amboseli Ecosystem elephants. Students will conduct elephant counts using ground count method, and use the data to determine the population, density, and habitat associations of elephants in the park, include 50 min preparatory class.</p>	3Hrs. (FEX)	3 hours	
18	<p>Land tenure regimes in Kenya, Land Use Changes, and their impacts on the Maasai and natural resources conservation in the Amboseli Ecosystem</p> <p>Elephant is a large migratory mammal that requires space and migratory corridors for survival. In this Field lecture, the faculty explains how land tenure transformation in the Amboseli ecosystem has led to expansion of irrigated Agriculture that results in negative consequences for elephant conservation. The faculty also explains some of the effort being made to address the problem including establishment of community conservancies and migratory corridors on community land.</p>	FL	2 hours 40 min	Groom and Western (2013). Mwangi & Ostrom (2009). Kantai (2007). Veit (2011).
19	<p>Determination of elephant's carrying capacity</p> <p>The lecture will examine the rationale for maintaining appropriate elephant carrying capacity in protected areas. It will also explore potential population regulation and control and strategies for Ecosystems.</p>	L	1 hour 40 min	

No	Title and outline	Type	Time (hrs)	Readings
20	The role of veterinary services in elephant conservation Lecture will examine the role of veterinary services by the Kenya Wildlife Service in enhancing conservation of elephants in Kenya.	L	1 hour 40 min	
21	Elephant demographic changes in Kenya, Amboseli and Maasai-Mara Ecosystems In this lecture students will learn how Kenya's elephant population has changed from the 1960's to date. It will also examine demographic changes on elephant population in the Amboseli and Maasai-Mara Ecosystems.	L	1 hour 40 min	
22	Fragmentation of the Maasai-Mara Ecosystem and its impacts on elephant conservation and movement Drivers of human demography, land tenure and land use changes in the Maasai-Mara ecosystem and their implications to long- term conservation of elephants.	L	1 hour 40 min	David S. Green, et al. (2019).
23	Empowering Community Rangers to Boost Elephant Conservation in the Mara (WWF-Kenya Project) In this lecture, students learn ways through which local communities can be involved in the conservation Elephants in the Maasai mara ecosystem. WWF project of community rangers is taken as example to illustrate, the role of local communities in elephant conservation agenda.	L	1 hour 40 min	
24	Conservation of elephant in the Amboseli Ecosystem: opportunities and challenges This will be a class discussion and students will share their views on opportunities for elephant conservation in the Amboseli Ecosystem and key challenges that face long-term sustainable conservation of this mega-herbivore in a landscape that is being overrun by humans.	D	1 hour 40 min	
25	Technology and innovations in conservation and security Students see some of the state-of-the art technologies used in elephant conservation and associated crimes. These innovations include amongst others, collaring and geofencing, Ranger App, drones, forensics.	L	1 hour 40 min	
26	EE Course overview and Exam Review In this class, the instructors shall do an overall review or recap of the course, highlighting main themes and messages, and outline topics that students should put more effort and focus on for the exam. Students will have a chance to seek further clarifications on course topics and practical as well as administrative matters of the exam.	D	50 mins	
	TOTAL		52	

Reading List

*Required readings are in bold

1. **Akama, J. S. (2007)**. Controversies surrounding the ban on wildlife hunting in Kenya: An historical perspective. In *Tourism and the Consumption of Wildlife* (pp. 95-108). Routledge.
2. **David S. Green, Elise F. Zipkin, Darren C. Inorvaia and Kay E. Holekamp (2019)**. Long-term ecological changes influence herbivore diversity and abundance inside a protected area in the Mara-Serengeti ecosystem.
3. **Duffy, R. (2013)**. Global environmental governance and north—south dynamics: the case of the CITES. *Environment and Planning C: Government and Policy*, 31(2), 222-239.
4. **Estes, R. D. (1991)**. The behavioral guide to African mammals including hoofed mammals, carnivores, and primates. Awake Forest Studium Book. Russel Friedman Books Publishers, South Africa.
5. **Groom and Western (2013)**. Impact of land subdivision and sedentarization on wildlife in Kenya's Southern Rangelands *Rangeland Ecology & Management*, 66(1):1-9.
6. Kantai (2007). In the grip of a vampire state: Maasai land struggles in Kenyan politics.
7. **Kioko, J., Okello, M. & Muruthi, P. (2006)**. Elephant numbers and distribution in the Tsavo – Amboseli Ecosystem, South – Western Kenya. *Pachyderm* 40: 61 – 68.
8. Kothari et al. (2013). Conservation as if people also mattered: Policy and practice of community-based conservation.
9. Mukeka, Joseph et al (2018). Characteristics of Human-Wildlife Conflicts in Kenya: Examples of Tsavo and Maasai Mara regions.
10. **Muthui (2018)**. Kenya's original sin: root cause of rising human-wildlife conflicts. The elephant (Article).
11. **Mwangi & Ostrom (2009)**. A century of institutions and ecology in East Africa's rangelands.
12. **Nelson (2003)**. Environmental Colonialism: "Saving" Africa from Africans.
13. **Ngene S., M. M. Okello, J, Mukeka, S. Muya, S. Njumbi and J. Isiche (2017)**. Home range sizes and space use of African elephants (*Loxodonta africana*) in the Southern Kenya and Northern Tanzania borderland landscape. *International Journal for Biodiversity Conservation* 9(1): 9–26.
14. **Okello, M.M. (2005)**. Land use changes and human-wildlife conflicts in the Amboseli area, Kenya.
15. **Okello, M.M. (2009)**. Contraction of Wildlife Dispersal Area and Displacement by Human Activities in Kimana Group Ranch Near Amboseli National Park, Kenya. *The Open Conservation Biology Journal*, 3:49-56.
16. **Okello and D'Amour (2008)**. Agricultural expansion within Kimana electric fences and implications for natural resource conservation around Amboseli National Park, Kenya. *Journal of Arid Environments*, 72: 2179–2192.
17. **Okello, M.M., Njumbi, S.J., Kiringe J.W., and Isiche, J. (2015)**. Habitat Use and Preference by the African Elephant, and Management Implications in the Amboseli Landscape, Kenya. *International Journal of Biodiversity Conservation* 7(3):211-226.

18. **Okello, M. M., Seno, S.K. & Nthiga, R. W. (2009).** Reconciling peoples' livelihoods and environmental conservation in the rural landscapes in Kenya: Opportunities and challenges in the Amboseli landscapes. *Natural Resources Forum* 33:123 - 133.
19. **Okello, M.M, L. Kenana, H.Maliti, J.W. Kiringe, E. Kanga, F. Warinwa, S. Bakari, S. Ndambuki, E. Massawe, N. Sitati, D. Kimutai, M. Mwita, N. Gichohi, D. Muteti, B. Ngoru and, Peter Mwangi (2016).** Population density of elephants and other key large herbivores in the Amboseli ecosystem of Kenya in relation to droughts. *Journal of Arid Environments* 135: 64 – 74.
20. **UNEP, CITES, IUCN, TRAFFIC (2013).** Elephants in the Dust – The African Elephant Crisis. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal.
21. Veit (2011). History of land conflicts in Kenya.