Comparative Analysis of Monetary Transaction Cost of Human-Wildlife Conflict in Mt. Kenya and Amboseli Ecosystems, Kenya

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Abstract

Historically, HWC has been reported in the form of crop raiding, livestock predation, property damage, human attacks, disease transmission and ignored hidden costs (HC) such as compensation transaction costs. The HC of HWC are costs that are uncompensated, temporally delayed, or of psychosocial nature. HC of HWC are not recognised in Kenya's Wildlife Conservation and Management Act (WCMA) 2013 and are scantly researched to inform compensation policy decisions; yet people in Amboseli ecosystem (AE) and Mt. Kenya Ecosystem (MKE) incur these HC. The aim of this study is to estimate and compare the monetary transaction costs (MTC) of HWC in Kenya, using AE and MKE as case studies.

Time Value for Money concept was used to estimate transaction costs as Future Value of the delayed compensation (Present Value) for respondents who had not been paid over 1-year period. MTC from uncompensated human fatalities resulted to the highest loss in both MKE (KES 228,763.89/US$1628.79) and AE (KES 152,462.33/US$1085.53). Generally, both AE and MKE lost an average of KES 410,168.04 due to delayed payment of compensation claims for one year alone. MTC arising from crop damage ($t=2.175$, $d.f=217$, $p=0.031$) was significantly different in AE and MKE, with respondents in AE expecting KES 17,081.839 (US$121.62) more than those in MKE. MTC were more in AE than MKE due to the differences in the human population, land use practices and physical barriers in the two ecosystems. The HC are key driver to community resentments due to the substantial money and time spent and not compensated. There is a need to review WMCA 2013 to incorporate the transaction cost of HWC and ways of minimizing delay in compensating victims of HWC.

Key words Human-wildlife conflict, Transaction costs, Compensation, Amboseli, Mt. Kenya ecosystem

Authors Summary

Residents inhabiting wildlife-dominated areas encounter both direct and indirect repercussions from wildlife presence. While significant attention has been directed towards immediate expenses like human fatalities, there has been a tendency to overlook the recurring and pervasive costs, such as transactional expenses.

Introduction

The interaction between people and wildlife sometimes results to human-wildlife conflict (HWC). HWC is a reciprocal complex process that affects both human and wildlife negatively (Frank et al., 2019). HWC problem is one of the most critical and worrying challenge facing wildlife conservation in the world. Consequently, it is the subject of discussions in different social, political, and economic forums across the globe. The IUCN (2022) emphasises the need to manage HWC for the purpose of attaining the United Nation Vision for Biodiversity 2050 in which 'humanity lives in harmony with nature and in which wildlife and other living species are protected'.

Historically, HWC has been reported in the form of crop raiding, livestock predation, property damage, human attacks, and disease transmission (Thirgood et al., 2005). For example, Nair and Jayson (2021) documented the Asian elephant (*Elephas maximus*) damage to major cash crops including plantain (*Musa paradisiaca*), rubber (*Hevea brasiliensis*), areca nut (*Areca catechu*) and coconut (*Cocos nucifera*) in Malappuram district in India; in the United State of America, coyotes kill an average of 300,000 head of livestock annually (United States Department of Agriculture-USDA, 2020). Similarly, several studies documented livestock predation around Serengeti and Ruaha National Parks in Tanzania (for example Kalyahe et al., 2022) and Kajiado County in Kenya (for example Manoa & Mwaura., 2016; Manoa et al., 2020b).

Across the world, HWC has mostly been conceptualized in the context of addressing the direct costs while ignoring the hidden costs such as compensation transaction costs. These are costs are usually uncompensated, temporally delayed, or psychosocial in nature (Ogra, 2008; Barua et al., 2013). The disregard for hidden costs has been cited as a barrier to finding effective and all-rounded solutions to HWC by various scholars and institutions including Redpath et al. (2015); Madden and McQuinn (2014); Massé (2016) and IUCN (2022). For these reasons, HWC continues to be a major challenges to conservation around the world, particularly in Africa, where people and wildlife still share the same space and actively depend on natural resources for survival.

The hidden costs are often excluded from economic assessments of HWC (Hunter et al., 1990; Manoa et al., 2020a). Yet, some studies have shown that hidden costs have more impacts on people than the visible costs. For example, back in 1979, the hidden costs sheep depredation in South Utah USA associated with the cost incurred to deter or control coyotes attacks was US$1.2

million compared to direct economic cost of US$ 419,000 (Taylor et al., 1979*)*. In Botswana, farmers spent US$ 30 to employ 3.5 herders to prevent livestock predation while pastoralists in the Amboseli region of Southern Kenya spent an average of KES 40,530 (US$ 288.57)[1] to install predator-proof enclosures Manoa (2015). . The Botswana and Kenya examples, captures the hidden costs that farmers and livestock keepers incur through HWC, and which are never compensated. The hidden costs of HWC are not recognised in the Kenya's Wildlife Conservation and Management Act (WCMA) 2013 and are scantly researched in order to inform policy decisions; yet people in Amboseli ecosystem (AE) and Mt. Kenya Ecosystem (MKE) incur these hidden costs..

The hidden costs of HWC are usually categorized into opportunity, transaction, or health costs. Taylor et al. (1979) have claimed that the overall indirect financial costs (hidden costs) from wildlife can be equal to or may exceed the direct costs hence the need for their consideration in wildlife management. Scientific studies on monetary transaction cost of HWC are scarce, both internationally and in African region. This is therefore the focus for this paper.

The concept of transaction costs was formulated by Coase (1937) and has been advanced over the years by other researchers including Alchian and Demsetz (1972) and Williamson (1985) among others. Zhang (2001) has indicated that the concept has only been limitedly applied in conservation decisions and mostly in forestry (see for example: Geodecke & Ortmann, 1993; Wang & van Kooten, 1999; and Zhang, 2001).

Barua et al. (2013) defines transaction costs as "those costs incurred through bureaucratic inadequacies and delays associated with compensation processing for HWC damages". Across the globe, different national governments and non-state agencies have established HWC compensation schemes intended to pay victims for HWC related damages such as human injuries, deaths, livestock predation, crop loss, and property damage, among others, in order to enhance human-wildlife coexistence (Treves et al., 2009; Manoa et al., 2021). However, in practice, many victims of HWC find it difficult to access compensation as expected in the policy and law. Consequently, scholars such as Ogra and Badola (2008), DeMotts and Hoon (2012), and Barua et al. (2013), have pointed out corruption, lack of communication, education and public awareness (CEPA), and financial inability by relevant authorities to address HWC compensation claims in a timely way as hindrances to existing compensation schemes. Most

[1] 1 US$=KES 140.45

compensation schemes usually demand that HWC victims present documentary evidence in form of death certificates, land title deeds, proof of travel expenses to HWC compensation offices among others, most of which aggravate the transaction costs (Madhusudan, 2003; Manoa et al., 2021).

HWC compensation can either be *ex-post* compensation, where damages are paid after they have occurred, or *ex-ante* advance compensation which is based on estimating the likely damage and paying regardless of actual damage occurrence (Schwerdtner & Gruber, 2007). In Kenya, the government has adopted the ex-post compensation approach where direct costs associated with visible damages resulting from wildlife can be compensated in accordance with the Third Schedule of the WCMA 2013. For example, human death caused by wildlife is compensated by KES 5 million (US$ 35,599.86), while bodily injuries attract KES 2-3 million (US$ 14239.94-21359.91). The compensation claims are supposed to be filed at the Kenya Wildlife Service (KWS), the state agency in charge of wildlife management in the country. However, since the enactment of the WMCA 2013 in January 2014, there has been delayed payment of HWC victims. In addition, during the crafting of WCMA 2013, indirect and invisible hidden costs of HWC such as monetary transaction costs were omitted. The WCMA 2013 also restricts compensation for livestock, crops, properties, injuries and death to only the listed wildlife species in the Third Schedule which leaves out a large number of risky such as porcupine, baboons, squirrels and birds such as Quelea which are associated with a lot of damages..

The aim of this study was to estimate and compare the monetary transaction costs of HWC in Kenya, using AE and MKE as case studies. The specific objectives were to: a) quantify the economic magnitude of HWC transaction costs in Amboseli and Mt. Kenya Ecosystems, and b) compare the monetary transaction costs of HWC in the two ecosystems.

Results

Although majority of the respondents in both AE (58.82%, n=120) and MKE (53.43%, n=109) filed HWC claims to KWS, only three people had received compensation as stipulated in the WCMA 2013 by October 2019. This is despite 79.4% (n=162) and 27% (n=57) of the people surveyed in MKE and AE respectively, having experienced crop raiding; 50.49% of 408 respondents lost their livestock to predators; 46 people lost their properties (water tanks, farm fence and houses) and 18 people were attacked by wildlife. The average delayed amount the respondents expected to receive for the HWC losses is shown in **Table 1**. However, the amount had not been paid by the time respondents were being interviewed. Based on the average weighted interest rates of 12.67 % by commercial banks in Kenya for the years 2018 and 2019

(Central Bank of Kenya[CBK], 2020), the real time value (Future Value) for the respective HWC damages for a period of 1 year is summarised in **Table 1**.

Table 1. Delayed expected payment of HWC costs (KES) in AE and MKE (September 2018-September 2019)

Costs	Ecosystem	N	Mean expected compensation /Present Value (KES)	S.E	Future Value at 12.67% interest (KES)	FV-PV (KES)
Crop damage	AE	57	46,649.12	9249.01	52,559.56	5,910.44
	MKE	162	29,567.28	3342.77	33,313.45	3,746.17
Livestock loss	AE	147	64,326.00	6559.21	72,476.10	8,150.10
	MKE	59	47,883.05	7407.83	53,949.83	6,066.78
Human deaths and injuries	AE	9	1,203,333.33	560800.5	1,355,795.66	152,462.33
	MKE	9	1,805,555.56	798803.1	2,034,319.45	228,763.89
Property loss	AE	12	26,458.33	7757.07	29,810.60	3,352.27
	MKE	34	13,544.12	1508.8	15,260.16	1,716.04

Delayed payment to human fatalities resulted to the highest loss in both MKE (KES 228,763.89/US$1628.79) and AE (KES 152,462.33/ US$1085.53). Generally, both AE and MKE lost an average total of KES 410,168.04 due to delayed payment of compensation claims for one year alone.

The testing of the study hypothesis, namely that there is no significant differences between the magnitude of transaction cost magnitude in AE and MKE showed that the compensation payments delayed and expected by respondents for crop damage ($t=2.175$, $d.f=217$, $p=0.031$) was significantly different in AE and MKE (**Table 2**).

Table 2. Hypothesis testing for transaction costs

Cost	t-values	d.f	Sig. (2-tailed)	Mean Difference(KES)	Remarks
Crop damage	2.175	217	0.031	17081.84	Significant
Livestock loss	1.436	207	0.153	16442.95	Similar
Human fatalities	-0.617	16	0.546	-602222.22	Similar
Property loss	1.634	11.842	0.128	12914.22	Similar

The findings showed that respondents in AE expected KES 17,081.839 (US$121.62) more for crop damage compared to MKE (**Table 2**). However, livestock loss, human fatalities, and property loss compensation payments delayed for AE and MKE were similar ($P>0.05$).

Respondents outlined six ways for compensating HWC victims **(Table 3)**. Overall, majority (36.76%, n=150) of the respondents were of the opinion that the KWS compensation process took too long for victims to be paid, and hence they proposed the process should be shortened. Another 28.19% proposed that compensation process should be handled by local leaders, who should verify damages of HWC and pay the victims.

Table 3. Compensation payment mechanisms

Mechanisms	No. of people		No. of people		Total no. of people	Total Percent
	AE	Percent	MKE	Percent		
Shorten the compensation process	87	42.65%	63	30.88%	150	36.76%
Pay the victims directly	39	19.12%	35	17.16%	74	18.14%
Use local leaders to verify damages and pay claims	47	23.04%	68	33.33%	115	28.19%
Use existing consolation schemes to pay government compensation	17	8.33%	3	1.47%	20	4.90%
Use private insurance schemes to pay victims	2	0.98%	1	0.49%	3	0.74%
Pay for all wildlife species damages	12	5.88%	34	16.67%	46	11.27%
	204	100.00%	204	100.00%	408	100.00%

In addition, 18.14% were of the opinion that the government should pay the compensation money directly to the victims of HWC, while 11.27% of the respondents felt that compensation should be associated with all wildlife species rather than the few-gazetted species in Schedule III of WCMA 2013. The use of the existing consolation schemes for wildlife damages was also proposed by 4.90% of the total respondents but this was preferred by more people (17) in AE than MKE (3 people). Only 0.74% of the respondents were of the opinion that the government should use private insurance companies to pay victims of HWC.

Majority of the respondents in AE (56.37%, n=115) and in MKE (51.47%, n=105) indicated that they were fully aware of the government HWC compensation process. Generally, the remaining 46.08% (n=188) were not conversant with the HWC compensation procedures. Majority of the respondents in AE (47.55%, n=97) and MKE (38.24%, n=78) were aware of the KES 5 million eligible for victims of HWC in case of human death. Also, 33.33% (n=68) of respondents in AE and 20.10% (n=41) were aware that the government should pay KES 3 million to victims of HWC in the case of human injuries that resulted to permanent disability.

Only 15.20 % (n=31) of the respondents in AE and 17.16% (n=35) in MKE aware of the maximum amount of KES 2 million compensation in case of any other body injuries with no permanent disability.

Discussion

The wildlife management law in Kenya, namely WCMA 2013, gives a provision for victims of HWC to file for damage compensation at KWS. The respondents in the two ecosystems experienced different types of HWC based existing differences in land use and livelihood systems. Majority (53%) of the respondents registered crop raids, 50% livestock attacks, 11.27% property damage and eighteen (18)human fatalities. Out of the 56% complainants, only 0.7% successfully filed and received their compensation claims from the government through KWS. Delays in the payment of HWC compensation claims by governments is not a new phenomenon in the world. For example, Madhusudan (2003) reported that villagers around Bandra Tiger Reverse in India received only 14% and 5% of compensation claims for HWC related crop and livestock losses, respectively, after an extended delay. Another study conducted in Boromo region in Burkina Faso, established that 98% of the people who incurred losses due to elephants opted not to file any compensation claims because the government had not paid the previous damages (Marchand, 2002).

In Kenya, the 2018 performance audit report for KWS revealed that HWC cases worthy KES 2,235,388,000 (US$15,915,898.85) had not been paid since 2013 (GoK, 2018). From the economic perspective, the delayed payment of HWC amount results to transaction costs over time. An analysis of the future value at 12.67% interest of the expected amount for crops indicated that AE had a higher transaction cost compared to MKE, while the transaction costs for livestock loss, human fatalities and property loss were similar. The regional difference in crop transaction costs can be linked to the nature of crop, farm size, and intensity of crop raiding, while the resemblance for livestock, human fatalities and property loss can be attributed to the similarities of the wildlife species in AE and MKE. In AE, the Amboseli National Park is not fenced, and therefore there is free movement of wildlife between the park and the community group ranches, where human settlements are. The park accounts for only about 8 % of the AE size (5,700 Km^2), which is a small area to contain population of some of the highly mobile and problematic species such as elephant, lions, and hyena, whose home ranges are estimated to be 5200-7790 km^2 (Ngene et al., 2017), 28-37km^2 (Tuqa et al., 2014) and 24-1000km^2 (Hofer, 2002), respectively. In MKE, there is also wildlife movements between Mt. Kenya National Park and the adjacent conservancies and forest. However, in MKE, there are several electric fences around conservation areas, which minimises wildlife entry into human

settlements. For example, the movement of elephants from Mt. Kenya Forest Reserve into the Lewa Wildlife Conservancy is facilitated by an electric fence along the corridor that links the two conservation areas, with an underpass on the Nanyuki-Meru/Isiolo highway (Manoa et al., 2020b). Similarly, since 2016, the Big Life Foundation has been erecting several short electric fences around in AE (BLF, 2020). However, this was done for selected crop farm areas on the southern part of the Amboseli, Kimana and Namelok irrigation farms, leaving out other large areas such as Kuku, Rombo, Imbirikani, Eselenkei and Kaptei settlement areas (Manoa, et al., 2020b).

Overall, the delay in payment of wildlife damages has partly been blamed on the failure of KWS to put in place an implementation guideline to ensure that HWC related compensation obligations as outlined in WMCA 2013 is operational and fully implemented within a specified timeframe (GoK, 2018). In addition, KWS has previously encoutered the challenge of insufficient budget for its operations including HWC compensations. For example in the 2019/2020 financial year, KWS had a deficit of KES 735 million (US$5,233,179.05) which increased to KES 754 million (US$5368458.51) in the 2020/2021 financial year. Yet according to the Departmental Committee on Environment and Natural Resource, KWS required KES 4.7 billion (US$33,4638,66.05) per years to sustainably operate (GoK, 2019). Consequently, the agency does not have a standing vote to deal with the claims received from wildlife victims, hence the huge backlogs.

The HWC claims filed with KWS were only those associated with the 30 listed species in Schedule III of WCMA 2013. However, in this study, respondents reported about the problems caused by other species such as primates and birds. In July 2020, the National Task Force on HWC compensation recommended that the government should not compensate injuries and deaths arising from snakes (GoK, 2020). The task force further recommended compensation for death or injury associated only to the elephant (*Loxondonta africana*) , lion (*Panthera leo*), leopard (*Panthera pardus*) , rhino(*Ceratotherium simum* & *Diceros bicornis*), hyena (*Crotuta Crocuta*), crocodile(*Crocodylus spp*), cheetah(*Acinonyx jubatus*), buffalo (*Syncerus caffer*), hippopotamus (*Hippopotamus amphibius*) and wild dog (*Lycaon pictus*) attacks. These decisions are likely to heighten the transaction cost to the victims of HWC in Kenya (Koech, 2017). In the same breathe, the task force recommended that upon submission of all the necessary documents, compensation should be paid within 60-90 days. The acquisition of the required documents which include police abstract, incident report from KWS, burial permit, post-mortem report and death certificate, requires time and money to process, yet such cost

are not factored into the final compensation figures. The additional transaction costs have previously been pointed out by Barua et al. (2013). The delay in compensation does not only lead to transaction cost, but also results to hostility, negative attitudes and perceptions toward wildlife conservation and its stakeholders.

Although both households in AE and MKE experienced HWC, the magnitude of transaction were more in AE than MKE. This indicates that the magnitude of the HWC transaction cost is significantly influenced by the sorts of wildlife species present in a region in relation to its human population and land use patterns. Overall, it appears that the continued disregard of exclusion of transaction costs in the HWC compensation equation as well as the delayed payment of the claims is likely to erode community goodwill for wildlife conservation in Kenya. This will escalate hostility between people and wildlife. In May 2023, pastoralists in Mbirikani area bordering Amboseli National Park speared and killed six lions in one day after they preyed on their livestock. Such animosity is likely to increase unless HWC compensation is undertaken on time, smoothly and in full including the hidden transaction costs.

The government should review the WMCA 2013 to incorporate the transaction cost of HWC and measures of minimizing the time it take to compensate victims of HWC. The hidden costs are key driver to community resentments because of the substantial amount of money and time spent and not compensated.

The list for the wildlife species that can be compensated in Kenya also needs to be reviewed to incorporate other species that are problematic such as baboons which may not be threatened or are not of international conservation concerns. Instead of excluding certain species from list because of the huge economic damage/loss, the government should invest in simple preventive measures (for examples predator-proof bomas for livestock) and an effective communication, education and public awareness (CEPA) strategy on how to deal with some conflict issues such as snakebites. The government also needs to invest in specific anti-venom as per the problematic snake species in different areas, which have registered high number of snakebites.

HWC compensation should be standardised countrywide. The existing NGO consolation schemes should be incorporated into the national scheme, so that there is no discrepancy in payment of HWC victims. Compensation for human deaths and injuries should be guided by the role of the individual in the society, training, age, health conditions and number of dependants.

To address the issue of limited financial resources for conservation, a tax imposition on the use of selected wildlife species that are classified in HWC as problematic on commercial businesses

as emblems and logos can greatly help to raise funds to cater for preventive measures, hidden costs compensation and the proposed insurance schemes. In addition, the Government of Kenya needs to allocate a substantial budget to KWS to enable it carryout its core function of wildlife conservation and addressing the HWC issue.

Materials and Methods

Study Areas

AE is located in Kajiado County along the boundary of Kenya and Tanzania boarder (**Figure 1**). The Kajiado County (36°,5' 37°,55' E; 1°10' ,3°,10' S (County Government of Kajiado, 2018). has a core conservation area, namely- Amboseli National Park, that is linked to six community owned land (Ol gulului/Olorashi, Imbirikani, Kuku, Rombo, Eselenkei, Kimana/Tikondo) that form the buffer zone around the park, totalling to 5700 km² (KWS, 2020). On the other hand, the MKE (0°25'S,0°10'N; 37°00'E, 37°45'E) is located in the Central part of Kenya and consists of Mt. Kenya National Park, Mt. Kenya National Reserve, Ngare Ndare Forest and the Lewa Wildlife Conservancy, all estimated to be 958 Km² (County Government of Meru, 2018). As shown in **Figure 2**.

The two ecosystems have diverse wildlife species ranging from herbivores such as elephants and rhinos to carnivores such as lions and hyenas. AE has about 1800 elephants (KWS, 2020), while MKE is estimated to have 2000-3000 elephants (KWS, 2010). The elephants, hyenas and lion migrate within the ecosystems, and are reported to destroy crops, attack livestock and people (KWS, 2010; KWS, 2020; Manoa & Mwaura, 2016).

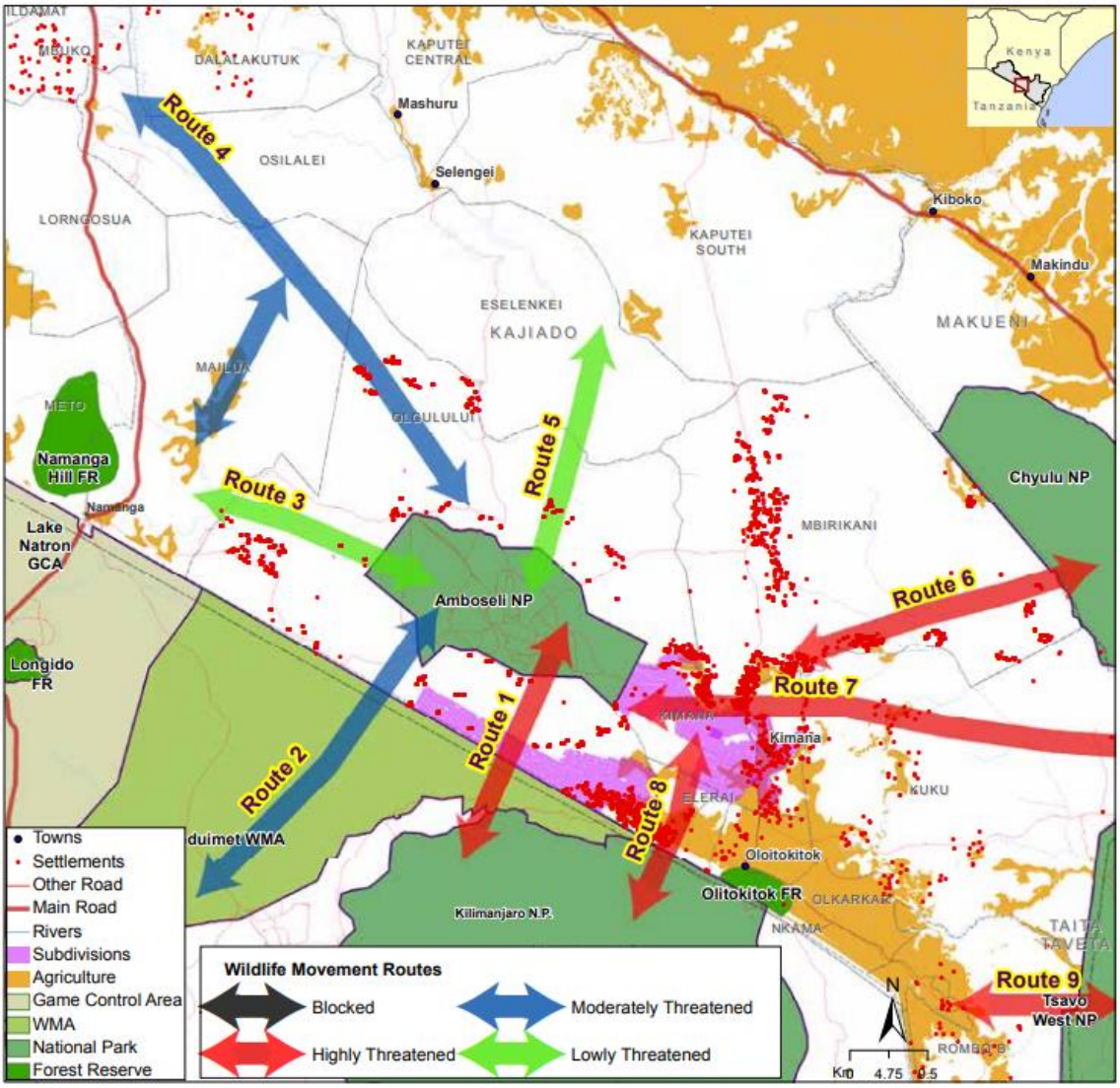

Figure 1. Map of Amboseli Ecosystem showing the human settlements within the wildlife migratory and dispersal areas. The arrows indicate the wildlife movement routes and the level of threats to each routes due to human activities. The wildlife routes are: 1). Kitenden-Kilimanjaro 2). Kitirua-West Kilimanjaro 3). Amboseli-Mailua-Namanga 4). Amboseli-Magadi-Shompole 5). Amboseli-Eselenkei-Imbirikani 6). Amboseli-Chyulu-Tsavo 7). Amboseli-Kimana-Tsavo 8). Kimana-Elerai-Kilimanjaro.

Source: Ojwang et al. (2017)

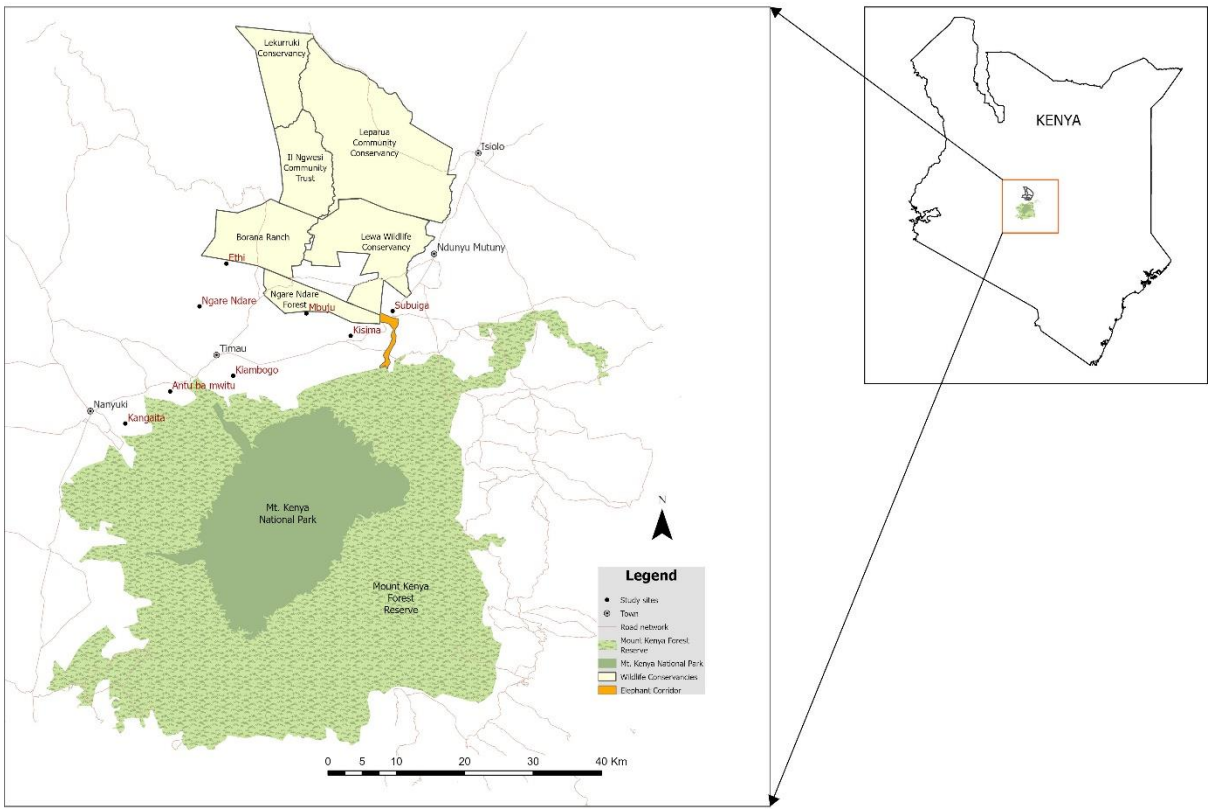

Figure 2. Mt. Kenya ecosystem showing Mt. Kenya National Park and Forest Reserve as well as the link to the northern conservancies including Lewa, Borana, Illgwesi and the Nagare Ndare forest via the elephant corridor in orange colour in the map.

The two ecosystems experiences two wet seasons in March-May (long rains) and October-December (short rains).. AE rainfall ranges from 500mm to 600mm, whereas MKE receives and average of 2500mm of rain per annum and 300mm (on the northern side) . The maximum temperature for AE is 34°C (County Government of Kajiado, 2018) compared to 32°C in MKE (County Government of Meru, 2018)

Most parts of the AE are sparsely populated, with an average population density of 51 person/km^2 with up to 75% of the residents relying on livestock for income (KNBS, 2019a). On the other hand, MKE population varies, with the humid Meru County having a higher average population density of 318 people/km^2 (County Government of Meru, 2018), while the semi-arid Laikipia County has a lower density of 52 people/km^2 (KNBS, 2019b). The main economic activity in MKE is crop faming in Meru County. However, the semi-arid areas in Laikipia County are associated with private wildlife ranches and communal pastoral livelihoods, with migrant communities also engaging in dryland agriculture.

Data collection

Data for this study was collected between March and October 2019. This was preceded by an extensive literature review and consultations with 20 key informants from conservation

organization and local administration to locate the sites with the highest incidences of HWC in the two ecosystems. A multi-stage sampling was then used to cluster the population in each ecosystem into administrative units (sub-locations) from which HWC respondent samples was drawn. Within the target sub-locations, village respondent samples were selected according to correspondent population sizes. The researchers adopted the simplified Yamane (1967) formula to determine the sample size. A sample size of 204 was derived for the AE sampling areas: Imbirikani and Eselenkei (100); Kimana and Inkoriak (135); and Entonet/Lenkisem (180), all totalling to 415 households based on the 2017 household population projection data (KNBS, 2019a), .

A sample size of 204 was proportionately distributed to the sampling areas in MKE: Kisima, Timau and Ethi making the total sample size of 408 for the study. An equal sample sizes for AE and MKE was used to strengthen the robustness of comparing the population means and testing the hypotheses of no significant differences in the economic magnitude of the HWC. AE was used as the basis for setting the sample sizes, as it had less households compared to MKE.

Target households were identified using common landmarks in the sub-location, such as schools, water points, dips, clinics and main junctions.. In each household, the researcher sought permission to interview an adult where the target was mostly the household heads or their spouses or any other adult (above 18 years) who had lived in the household for at least one year.

Transaction costs was calculated based on crop damage, livestock predation and human fatalities caused by wildlife and the respective amount the respondents expected to be paid by the government as compensation. The delayed compensation was based on a 1-year period, and in cases where the respondents had not been paid, the Time Value for Money (TVM) concept was used to calculate the Future Value (FV) of the delayed payments (Present Value). The Central Bank of Kenya's (CBK) commercial banks weighted average interest of 12.67% for the 2018 and 2019 years (CBK, 2020) was used to calculate Future Values as: $FV = PV \times [1 + (r / n)]^{(n \times t)}$. Where, r= interest rate, n = number of compounding periods per year, t = number of years.

The TVM was based on the idea that rational investors would prefer to receive money today rather than the same amount of money in the future, because of the potential growth in money value over a given period. Equally, the victims of HWC would be better off if their losses were

compensated within a short period, than over a delayed period. An independent student-test statistical analysis was used to test the hypothesis that there is no significant differences between the magnitude of transaction cost in AE and MKE. All the inferential statistics were tested at 95% confidence level.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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