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Coexisting with Wildlife: Its Effects on Pupils and Children in a Maasai Community, Tanzania

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Abstract

It is well known that human-wildlife conflicts can be most challenging for local people living inside or nearby protected areas. While many studies focus on the impacts of human-wildlife conflicts on community bordering PAs, few studies, however, have focused on these impacts on children. We conducted interviews with 46 primary school pupils and children from a pastoral community, 5 teachers and 21 parents, three focus group discussions, and direct observation to investigate how living with wildlife impact pupils and children. The findings revealed that distance to school was directly related to more disturbances by wild animals. Both girls and boys were disturbed by wildlife, but boys were affected more because they exposed themselves to wildlife attacks due to their role of grazing livestock and guarding crops at night during farming seasons. Crop loss and livestock depredation impaired families' capability to provide food for the children. Hunger combined with long walking distances to school made pupils tired and hungry, leading to poor concentration and understanding thus poor performance academically. Generally, pupils' dislike dangerous wildlife due to costs they incur, however, their attitude differs with perceived benefits, i.e. those who have received benefits had a positive attitude than those who had not. In order to reduce disturbance to school children and pupils, this study recommends building boarding schools, improving school infrastructure, and constructing schools nearby areas highly settled by local people.

Keywords: Conflicts, Conservation, Impacts, Pupils, Wildlife

1. Introduction

Many studies show the importance of children relationship with nature as it is important to their healthy development, acquisition of knowledge, and halt the loss of the natural environment in the future (e.g., White, 2004; Knight, 2009; Richardson, 2015; Geng, Xu, Zhou & Zhou, 2015). These studies also show that children who are close to the natural environment tend to relate to it as a source of wonder, joy, and awe. The studies further stress that children spirits are nurtured by nature and they learn through its "sources of human sensibility" (Wilson, 1992, p. 348). Nature-related involvements tend to nurture a child's emerging sense of wonder – denoted by Plato as the

foundation of knowledge and by Cobb (1977) as the basis of imagination. Failure to expose the children to nature exposes them to the "risk of never developing positive attitudes and feelings toward the natural environment or achieving a healthy degree of competency on the environmental literacy continuum" (Disinger & Roth, 1992). Moreover, studies show that after-school activities enhance children to develop social skills, improve their academic performance, and establish strong relationships with others (Junge, Manglallan, &Raskauskas, 2003).

While these studies applaud nature due to its direct and indirect benefits (economic importance, nutritional value, ecological role, socio-cultural significance, and its aesthetic value) to children and humankind (Chardonnet et al., 2002), in some parts of the globe, these benefits are of little value due to negative impact of nature, in particular wildlife pose on people living in or near protected areas (Hemson, Maclennan, Mills, Johnson, & Macdonald, 2009; Dickman, 2010). These negative impacts include depredation of livestock by carnivores, wildlife injury or killing of humans, crops raiding, competition for water and pasture, transmission of diseases between wildlife and livestock, psychological effects (fear), and water infrastructure damage. These impacts affect different community groups in different geographic areas differently. The frequency of the negative incidences can be, for instance, year-round incidents, stochastic or seasonal (Thirgood, Woodroffe & Rabinowitz, 2005; Madden, 2008).

The negative impacts of wildlife can pose serious problems for local communities such as economic hardship, decreased physical and psychological wellbeing, increased workload, decreased food security, and sometimes lead to retaliation (Ogra, 2008). Human-wildlife conflict (HWC) is defined as "any interaction between humans and wildlife that results in negative impacts on human social, economic or cultural life, on the conservation of wildlife populations, or on the environment" (WWF, 2005). Some factors leading to increase in HWC include expansion of wildlife populations (Zedrosser, Dahle, Swenson & Gerstl, 2001), exponential increase in human populations and consequential expansion of anthropogenic activities (Woodroffe, Thirgood & Rabinowitz, 2005), as well as an inability of wildlife-related institutions to respond effectively on time in mediation of such conflicts (Mariki, Svarstad, Benjaminsen, 2015).

A large number of protected areas in Tanzania were established over the last 50 years (few cases dates back to colonial-era). Some of the PAs in Tanzania are created in marginal land largely not suitable for agriculture. Prior to their gazettement, these areas were formerly used and occupied largely by pastoralists. During PAs establishment, local people were evicted, and customary rights were denied (Nelson, 2012). Creation of protected areas with restrictions of ‘no entry’ philosophy interfered with the community traditional practice and increased land competition (Mariki, 2016). Apart from already established protected areas (national parks, game reserves, game controlled areas, open areas), in the 1990s, the government of Tanzania approved another category of PAs known as wildlife management areas (WMAs). These are community-based conservation areas where several villages would come together and set aside land for conservation in return, and these villages would receive a certain percentage of the tourism revenues from these areas (URT, 1998). Creation of WMAs partly aimed to conserve migratory wildlife routes, dispersal areas, and buffer zones.

Demarcation of the landscape for wildlife conservation in some parts of the country has led to a high level of interaction between local people and wildlife (du Toit, 2011). Studies have revealed that in some areas, human settlements are similar to an island surrounded by wildlife (e.g., Mariki et al., 2015). The situation becomes critical especially during dry seasons as many wildlife species such as elephants, buffalo, wildebeest, and zebra, and eland disperse outside protected areas on private and communal lands searching for water, forage, and nutrients (Nelson, 2012). The consequences of wildlife spill over from PAs to adjacent communities include crop damage, livestock depredation, and fear (e.g., Trench, Kiruswa, Nelson & Homewood, 2009).

To lessen the effects, different strategies have been used in various areas to control/eradicate wildlife populations e.g. managing population size, regulating harvesting, fertility control, use of physical barriers, fear-provoking stimuli, guarding crops and livestock, application of chemical repellent, use of diversions, land use modification, voluntary human population resettlement, adoption of human-wildlife coexistence (direct or indirect benefits), and compensation schemes (Ogada, Woodroffe, Oguge & Frank, 2003; Stander, 1997).

Several scholars have studied direct and indirect impacts of wildlife conservation on local communities (e.g. Infield & Namara 2001; Anthony 2007; Kaswamila, Russell & McGibbon, 2007; Warren, Buba & Ross, 2007; Dublin & Hoare, 2004; Madden, 2004; Hazzah, Borgerhoff Mulder, & Frank, 2009), on women (e.g. Khumalo & Yung, 2015), and gender (e.g. Ogra, 2008; Mariki, 2016); very few, if any have attempted to document the impact of wildlife conservation on children and pupils. It is not clear to what extent wildlife interference affects pupils and children. This study, therefore, was conducted in Tingatinga Primary School and neighbouring villages to explore how pupils and children in the pastoral community are affected by free-roaming wildlife in the area. It attempts to answer the following questions: 1) what are the conservation costs incurred by pupils and children (wildlife encounters, place and time of the encounter, reactions to encounters)? 2) What mitigation measures in place to prevent the impacts? and 3) what are the attitudes of pupils towards wildlife?

The study falls under political ecology scholarship which demonstrates that whilst benefit of environmental conservation accrue to the national, regional and global level much costs of conservation are borne by local communities. Interestingly, stories of successful win-win environmental conservation initiatives continue to be told by many powerful actors because they have much to gain by keeping it that way. Win-win discourse may constitute a tool for protected areas establishment and generally facilitated conditions to increase wildlife and for the extraction of revenues, while local people lose through visible and invisible costs. There is a mismatch between the rhetoric and practice of win-win claims advocated by actors of participatory approaches, and there is unequal sharing of the costs and benefits of conservation.

This study proceeds by describing the study site, followed by data collection methods before presenting results and discussion.

2. Methodology

2.1 Study area

Tingatinga Primary school is located in Enduimet Division in Longido District. Pupils enrolled in this school come from Tingatinga and nearby villages such as Kalimaji and Miti Mirefu. The Enduimet Division has a total area of 1281.79 km^2 where 742km^2 is set aside as a community-based Wildlife Management Area (WMA). The WMA was established following a wildlife survey report in 1997 that revealed a decline in the wildlife population due to bushmeat poaching (Madulu, Yanda, Maganga, Mung'ong'o & Mwakaje, 2007; Nelson, 2007). The Enduimet WMA acts as the dispersal zone for several wildlife populations, including elephants and migratory route to various PAs such as the Kilimanjaro, Arusha, and Amboseli national parks (Honey, 2008; Kikoti, 2009; Trench et al., 2009) as well as Longido Game Controlled Area.

Movement of wildlife in the region has led to an increasing in human-wildlife conflicts in the form of crop raiding, livestock depredation and threats to human life in villages located in close proximity to these PAs. The study area is mainly occupied by the Ilkisongo Maasai who is mainly agro-pastoralists and few minority ethnic groups.

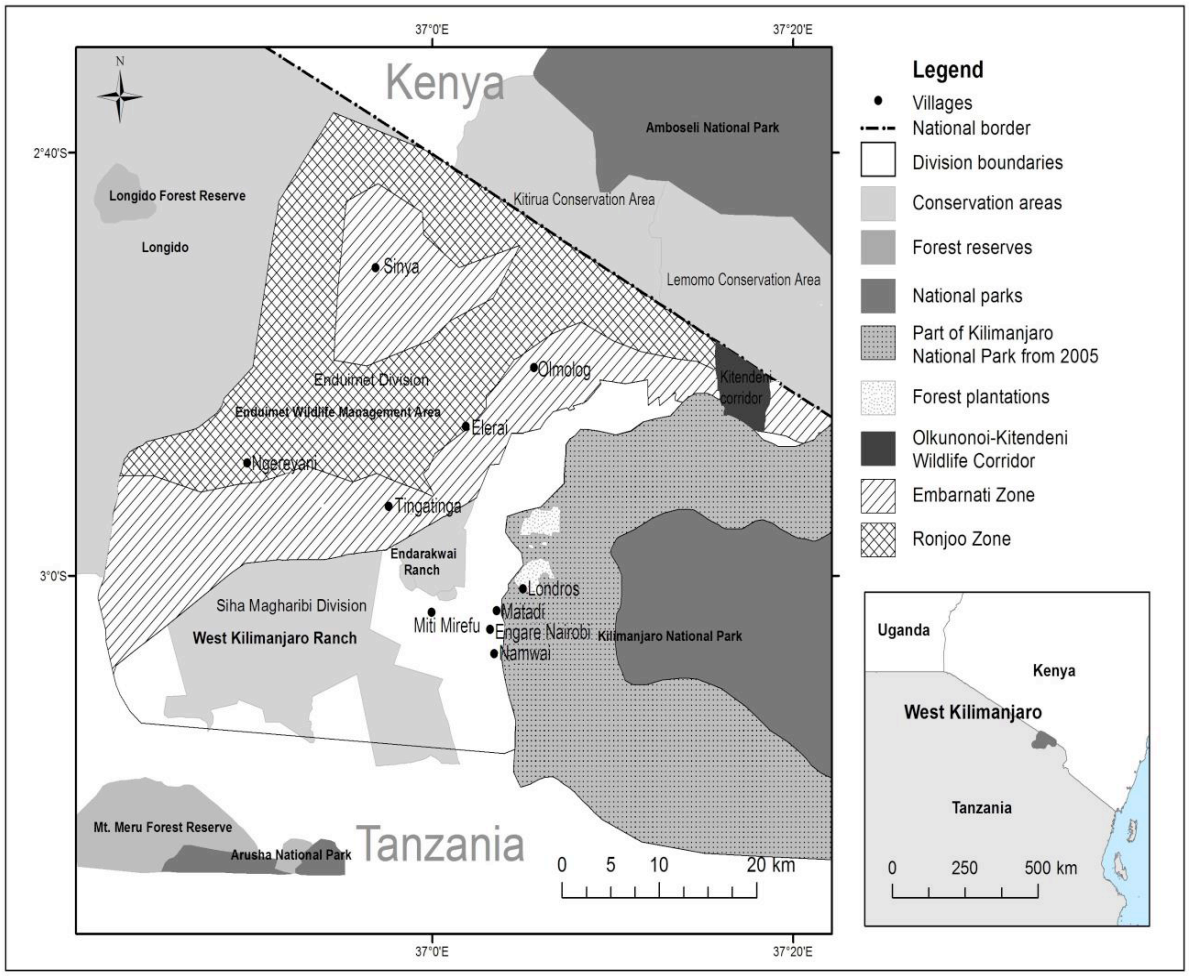

Figure 1: Map showing the study area in West Kilimanjaro, Tanzania (source: Mariki, 2016)

The Maasai are "well known for their strong socio-cultural practices and norm that govern all dimensions of their community" (Ngoitiko, 2008, p. 3). In 2009, the Enduimet Division had a total population of 45,763 people (according to the village registers).

The division of labour in the Maasai community is gender-based. Men are mainly responsible for livestock grazing and protection. Young boys (below 12 years) take care of calves and lambs. Women and girls are responsible for all domestic tasks, milking cows, collecting water and firewood for domestic use, cooking, looking after children, growing crops in small fields for basic food supply, partly taking care of small livestock (Kipuri and Ridgewell 2008). Some women also make bead jewellery which they sell to tourists, markets or wholesalers. Very few women engage in small-scale business, politics, or public employment.

2.2 Methods

The fieldwork was conducted in different periods between 2009 and 2016. Interviewees were chosen purposively. Data were collected using both quantitative and qualitative methods. The data collection techniques involved semi-structured questionnaires, formal and informal interviews, focus group discussion, participant observation, and desk review. The information collected included distance to school, costs of conservation, and attitudes towards wildlife.

Interviews were conducted in Kiswahili, a language in which most people understood. The total of 46 pupils studying in Tingatinga Primary School–23 girls and 23 boys residing from three villages, i.e. Mitimirefu (15), Tingatinga (29), and Kalimaji (2) were interviewed. Also, 5 teachers and 21 parents were interviewed. The interview sessions lasted between 30 minutes to one hour. Participants were encouraged to express themselves freely, and they were guaranteed anonymity and confidentiality. We conducted three focus group discussions with 7 to 12 people and further engaged in participant observation and informal interviews. Finally, we reviewed relevant documents and several other studies that have been conducted in the area. We used a field notebook to record information, and where permission was granted, we used a tape recorder.

After data collection, the quantitative data were analysed using the excel program. The qualitative data were transcribed, later organised into categories, and grouped into themes. The identified core themes were linked to the aims of the study, and these served as the basis for our findings and discussion presented below. Statements supported by appropriate quotations from the interviews are provided where necessary to elucidate the particular theme.

3. Results and Discussion

3.1 Pupils' age and grade

The findings show that the interviewed pupils' age ranged between 11-15 years. Many (57%) were of 12 and 14 years old (Table 1). For standard 7 pupils, the average age was 14.2, which was higher than the expected age (13 years). This finding can be linked to the fact that many parents in Enduimet community won't be comfortable to send their children to school until they are old enough to walk long distances to school and are able to evade dangerous wild animals. Also, this can be linked with a Maasai culture where many of Maasai children start school at late ages.

Table 1: Pupils age

Age	Number	%
11	3	6.5
12	13	28.3
13	10	21.7
14	13	28.3
15	7	15.2
Total	**46**	**100.0**

3.2 Family head and occupation

Most pupils (82.6%) belonged to male-headed households. This is because Maasai are patriarch; thus a man is ahead of the family. Maasai engage in livelihood diversification which has provided more opportunities to increase their income outside the pastoralism sphere. Agriculture and livestock keeping were the major socio-economic activities (Table 2). About 54% of pupils reported that their families kept less than 10 heads of livestock because the herds have dwindled due to drought (Table 3). Apart from farming and pastoralism, other livelihood activities included employment, trade, handcrafts, tourism, and investment in other enterprises.

Table 2: Family head and occupation

Family Head	**Number**	**%**
Female	5	10.9
Male	41	89.1
Total	**46**	100.0
Occupation	**Number of respondents**	**%**
Livestock keeping	44 (cows, goats, sheep, chicken, pigs)	45.4
Farming/agriculture	43 (beans, maize, potatoes, vegetables, tomatoes, green gram, garlic, and sweet paper)	46.4
Business, hand crafts, & tourism	3	5.2
Employed (public and private sector)	4 (2-public and 2-private)	2.1
Bricklayer	1	1.0
Total	**95***	**100.0**

*Some students reported more than one social, economic activity

Table 3: Number of livestock and number of respondents

	Number of respondents				**Total**	**%**
No of livestock	**cows**	**goats**	**Sheep**	**pigs and chicken**		
200-500	2	4	4		10	10.4
100-200	3	3	3		9	9.4
50-100	1	3	3		7	7.3
40-50	4	6	4	2	16	16.6
Less than 10	18	15	13	6	52	54.16
Not keeping (0)					2	2.14
Total	**28**	**31**	**28**	**9**	**96**	**100.0**

3.3 Distance to school

About 54% of pupils spent 1-2 hours on walking to school. Of those who walked for 1-2 hours, many (35%) were from MitiMirefu Village followed by Tingatinga Village (Table 4). The distance from the MitiMirefu Village centre to school was estimated to be about 15 km. Due to long distances pupils slumbered in the class because of tiredness, and hunger (Interview no. 8, 2016). Of the interviewed pupils, many (79%) stated that they did not take breakfast before going to school. The results further revealed that pupils delay to school or fail to attend classes because of elephants as one Teacher explained:

> "When pupils encounter elephants, some go back home, some wait for the elephants to pass by or use another road or look for someone to assist. Sometimes they fail to attend classes or arrive very late, sometimes at 10 am instead of 7:30 am, so they miss some subjects/periods. The villages are very distant, and the houses are distant too" (Interview no. 9, 2016).

Another Teacher explained that:

> "The effect of walking long distances to school disorganizes pupils' concentration in class as some of them arrive at school sweaty, stressed and exhausted both physically and psychologically, making them to

slumber in class. This challenge combined with lack of lunch leads to pupils' exhaustion due to lack of energy to sit and listen to teachers a situation which affect overall pupils' performance" (Interview no 15, 2016).

Table 4: Walking distance to school

	Number				%
Walking time to school	**Mitimirefu**	**Tingatinga**	**Kalimaji**	**Total**	
1-2 hours	16	9		25	54.3
half to one hour		6	1	7	15.2
15 to half an hour		7	1	8	17.4
less than 15 minutes		6		6	13.0
Total	**16**	**28**	**2**	**46**	100.0

3.4 Activities after class

More boys (35%) graze livestock after school time than girls (6%). Girls are involved in household chores (35%) and sometimes graze small stocks like goats and sheep nearby home (Table 5). The interviews with teachers showed that activities pupils are engaged in after-school have more effect on boys than girls in relation to their attendance to school and performance. Also, these activities increase the chances of boys to encounter with wild animals. This is because the labour demands for grazing and guarding crops require boys to participate (in the wild) whereas girls are responsible for household chores (at home, safer) which do not have any economic value attached to it. At the age of six years onwards, Maasai consider children (preferably boys) old enough to graze livestock usually with older family members. From eight years onwards, children are old enough to go alone grazing or can supervise younger ones.

Table 5: Activities after class based on gender

Activities after school	**Girls**	**Boys**	**Total**	**%**
Grazing livestock	4 (goats and sheep)	23	27	41
Household chores	23		23	35.4
Guarding crops (during the farming season)		13	13	20.0
Total			**63**	**100.0**

Various after-school activities (e.g., house chores, livestock grazing), lack of lunch and breakfast, and threats on the way to school (e.g., encounter with dangerous wild animals) prevent children from having a meaningful and conducive learning environment (Interview no. 14, 2016). Similar findings are reported by Vuri, (2017).

3.5 Conservation costs

i) *Wildlife encounters, place and time*

All pupils have encountered wildlife especially elephant several times on their way to school and/or grazing livestock. Other animals encountered include buffaloes, leopards, lions, snakes, and hyenas. Pupils encountered elephants mostly when animals are drinking water at water troughs, and/or searching for green pastures (Table 5).

Table 6: Type of wildlife encounters and the number of encounters by pupils

	Type of wildlife	Number of encounters by pupils
1	Elephant	46
2	Buffalo	3
3	Leopard	4
4	Lion	3
5	Hyena	3
6	Snake	3

Most wild animals have been encountered on the way to/from school, at school (33.7%), at home premises, e.g. snake, while grazing livestock, guarding crops and collecting firewood. The time of wildlife encounters was mostly in the morning and evening (Table 6).

Table7: Place of wildlife encounter and number of encounters

	Number of encounters			
	Girls	**Boys**	**Total**	**%**
On the way to school	14	14	28	33.7
Home area	8	9	17	20.5
In the wilderness grazing livestock	4	12	16	19.3
Guarding crops at night	0	13	13	15.7
In the bush collecting firewood	9	0	9	10.8
Total			**70***	100.0

*Multiple encounters

Table8: Time of encounter wild animals

Time	Encounters	%
Morning and evening	19	41.3
Afternoon/day	12	26.1
Morning, evening, afternoon	10	21.7
Afternoon and evening	2	4.3
Morning, evening and night	1	2.2
Mostly evening	1	2.2
Mostly morning	1	2.2
Total	**46**	100.0

ii) *Pupils reaction to encounters*

All interviewed pupils stated that they know almost all dangerous wild animals. In cases of encounters, most pupils (83%, N=38) stated that they evade wildlife or run away. Some pupils stated that when they encounter elephants, they run downwind in a zigzag fashion. Another pupil added that "*the wind is in our favour—with their poor eyesight elephants are highly dependent on their sense of smell for detecting enemies"* (Girl 13 years old, MitiMirefu Village, 2016*).* Some pupils (4.3%, N=2) reported that if they are grazing livestock, they leave them in the wild and run for their lives, later come back. Few stated that they keep quiet and leave the wild animals to pass (4.3%, N=2) and some said they use another route (6.5%, N=3). For snakes, they ask assistance from neighbours to

kill them if they cannot kill them by themselves (2.1%, N=1). In cases of predation attempt, one boy stated that "*if I am with people, I fight predators with an arrow, but if I am alone I run away* (Pupil, 13-year-old boy, Tingatinga Village). However, not all pupils are stopped by wildlife on the way to school as one pupil stated: "*Wildlife don't stop me from going to school, if I see them I run away*" (Pupil, 14-year-old boy, Tingatinga Village). The traditional skills and techniques for avoiding dangerous wild animals are acquired by the children as they grow up. Conversely, it was reported by some parents that some pupils intensify wildlife attacks on the way to school and in the wilderness as one reported: '*Some children are naughty they throw stones and make noises to dangerous animals, sometimes they use dogs to chase elephants. Elephants don't like noises'* (Interview No. 47, TingaTinga Village).

iii) *Family attacks by wildlife*

About 22% (N=10) of pupils reported of a family/relative attacked by wild animals while 78% said no one had been attacked by wildlife in their families. Twenty-six pupils reported 2 to 3 incidences of wildlife attack (Table 8). All attacks reported were from elephants. The attacks reported occurred in 2013–2015, and all the victims were men. Two victims were severely injured as they were trampled by elephants (one broke his legs while the other had his spleen removed because the elephant stepped on him) and the rest died. These cases occur because of various reasons such as the presence of wildlife in the area most times. As pointed above, Enduimet acts as dispersal and a corridor to nearby protected areas such as Kilimanjaro, Arusha, Amboseli national parks and Longido Game Controlled Area. Another reason is sharing of the landscape for livestock and wildlife grazing; accidentally encountering animals during the day or late in the evening; population increase leading to expansion of settlements nearby wildlife-rich areas; and livelihood diversification. Livelihood diversification has made Maasai engage in agriculture thus leading to human encroachment to wildlife corridors leading to shrinkage of wildlife habitat and disrupting the traditional elephant migration routes. The shrinkage of wildlife habitat leads to violent clashes between people and elephants. The climate change effect also has led to longer periods of droughts making elephants move from protected areas to people homesteads searching for fresh pasture and water. Similar cases of attack have been reported in India, Bangladesh (Desai & Riddle, 2015).

Table 9: People killed by wildlife

No. of family members	Students who reported
1	6
2-3	26
>3	4
Total	**36**

iv) *Crop raiding*

About 87% of pupils (N=40) reported crop raiding by wildlife while six 13% (N=6) reported of no crop raiding. Mostly raided crops were maize and beans (87%). Other crops raided though cultivated by few people were tomatoes, pigeon peas, and sorghum. However, the recorded data from the Enduimet WMA office shows that more than 457 acres of crops have been raided by wildlife from 2014 to 2017 (Table 10). In order to prevent crop damage by wildlife and livestock and encourage pupils' school attendance, in 2016, Tingatinga Primary School invited a popular politician in the area to raise funds (*Harambee*) so as to build a fence around the school to enable the school to cultivate food crops. Due to crop raiding, the school doesn't farm thus the pupils lack lunch, a situation leading to poor attendance. It was reported that the attendance sometimes drops up to 39% (of 400 registered pupils) partly due to lack of lunch (Interview No. 17, 2016). Some years back World Food Program (WFP) had a program to support schools so that pupils could have lunch, but the program ended.

Table 10: Crop raided from 2014 to 2017

S/N	Year	**Crop raiding (acres)**
1	2014	156
2	2015	122
3	2016	102
4	2017	77
Total		**457**

The problem animals reported by pupils responsible for crop raiding were mostly elephants (75.6%) and zebras (11.5). The overall data from EWMA office show that elephants were responsible for 95% of crop damage. Most affected crops were maize (85%) followed by beans, tomatoes, and potatoes.

Table 11: Responsible wildlife for crop raiding

	Responsible wildlife	**Number of pupils reported**	**%**
1	Elephants	39	73.6
2	Zebra	6	11.3
3	Elands	4	7.5
4	Wildebeest	2	3.8
5	Impala	2	3.8
	Total		**100.0**

The findings show that people who own farms of 1-5 acres were mostly affected by crop raiding wildlife (47.8%) followed by those with ½ to one acre (17.4%) (Table 12). This variation is related to the location of farms either close proximity to the PAs or within the PAs boundaries (see, e.g. Warren et al. 2007). The situation becomes worse particularly during drought seasons because wildlife roams over the area in search of food and water.

Table 12: Area raided by wildlife and the number of pupils who reported

	Area raided	**Number of pupils reported**	**%**
1	More than 10 acres	2	4.3
2	5-10 acres	5	10.9
3	1-5 acres	22	47.8
4	½ to 1 acre	8	17.4
5	Less than ½	9	19.6
	Total	**46**	**100.0**

Pupils reported that crops were raided almost every night during the farming season. But sometimes wildlife raided every day when there was not sufficient pasture and water in the wild. Further, pupils stated that they chased wildlife from the farms if they were capable of if they couldn't see they left wildlife to raid. All pupils stated that their parents have never received any compensation are for their losses (cf. Linkie et al., 2007). Communities' inability to mitigate crop-raiding and the absence of compensation schemes sometimes lead to the retaliatory killing of wildlife species (Jackson &Wangchuk 2001, Mariki et al., 2015).

v) *Livestock predation*

About 74% of pupils reported livestock depredation while 26% did not report any case of depredation. A total of 61 livestock were killed by predators of which 46 were goats (Table 13).

Table 13: **Livestock depredation**

Livestock type	Number of pupils reported	%	Number of livestock killed	%
Goats	20	58.8	46	75.4
Cows	9	26.5	10	16.4
Sheep	5	14.7	5	8.2
Total	**34**	**100.0**	**61**	**100.0**

However, the data from EWMA show that sheep are the most killed followed by goats (Table 14). This might be due to the fact that sheep, as a rule, timid and defenseless animal, and at the same time is neither swift nor cunning. It becomes easy prey for predators. Also in many cases, sheep and goats are more often herded by children who may be less capable of deterring predators.

Table 14: Livestock depredation

Year	Cows	Goats	Sheep	Donkeys
2014	29	24	56	0
2015	25	12	93	0
2016	30	60	88	0
2017	6	8	47	0
Total	**90**	**104**	**284**	**0**

Source: Enduimet WMA office

The most responsible predators were leopards (39%), hyenas (33%) and lions (28%). Other animals reported were wild dogs and baboons. Leopard attacked mostly goats and sheep; hyena preferred goats, sheep and occasionally cows, while lions killed cows and sometimes goats and sheep. Similar findings on goat and sheep depredation by leopards are reported by Rao et al. (2002).

The incidences of predation led to the retaliatory killing of predators particularly lions. Lions are killed more than other predators (leopards, hyena) because lions often attacked cattle which have more value than the sheep and goats and during the daytime when pastoralists are armed to protect their livestock. Contrariwise, leopard and hyena attack small stock (goats, sheep) during the night. Another reason that makes lions to be killed is their tendency to defend the livestock carcass against humans thus exposing itself to more dangers than hyenas (are shy of people) and leopards (hide themselves). Moreover, the Maasai traditions of killing lions by Maasai Warriors as a symbol of bravery contribute to the killing of lions, a situation which becomes easier if the lion has killed cattle (cf. Kissui, 2008). Furthermore, the assumption that EWMA management values wildlife more than people, and acts quickly when wildlife is killed than when a person is killed by wildlife, stirs anger and increases the chances of retaliatory killings of wildlife.

The community-based conservation approach has created mixed-use of a landscape containing both wildlife and livestock thus exacerbating predation incidences. Although the AWF supported the community to establish predator-

proof bomas (stockades), few people, however, have managed to construct these types of bomas after the project phased out. Moreover, some incidences of predation occur during the daytime when the livestock are outside the predator-proof bomas.

Table 15: Wildlife killed through retaliations

Year	Animal type	Number(s)	Reasons for retaliation
2016	Lions	2	Killed 1 calf and 8 goats in a stockade
2015	Lion	1	Attacked livestock in the wild
2015	Lion	1	Attacked livestock in the wild
2017	Lion	1	Killed 2 goats in the wild

It was reported that livestock depredation affects the family income as livestock keeping is the main economic activity in a Maasai community.

Other means in which wildlife affect pupils is as indicated under Table 16 below.

Table 16: Other ways wildlife affects pupils

Costs	Effect on pupils	Number of pupils reported	Narrative
Destruction of water infrastructures	Lack of water and/or get dirty water Walk long distances searching for water	41	"Wildlife breaks the water pipes, and water becomes dirty sometimes we lack water. When water is very dirty some of us cannot drink it. Some use their shirts to sieve water to remove dirt particles before drinking. Some students request water from the teachers. At home when we do not have water, we assist our mothers to search for water. The availability of water depends on where the pipe has been broken by wildlife." (Grade 6 pupil).
Delay to school	Miss some subjects as they arrive at school late	27	There are times I delay to school because of wildlife, so I arrive late in the class and find the teachers have started teaching, I missed some subjects. I become tired because I have to use a longer way, and sometimes we wait for wildlife to pass before we can continue our way to school or home. There are times I missed to attend school completely because of wildlife (Grade 5 pupil)
Crop raiding	Lack of food at home and school	19	"We lacked food when our crops were eaten by wildlife, and I did not understand when our teacher was teaching" (Grade 7 pupil)
Stop us from going to school	Absence from classes	7	There is a day I failed to go to school because elephants did not give away. They wanted to kill us, we ran back home and did not attend the school that day (Grade 5 pupil)
Fear	Lack of freedom	34	"I become afraid to go to school or going to the wilderness. Sometimes in the evening, I cannot go out of the house. One day I met an elephant I became so afraid and ran away" (Grade 6 pupil).
Livestock depredation	Lack of money	34	Our cows were eaten by lions; we lacked money to buy food as we had only three cows (Grade 7 pupil)

3.6 Mitigation measures

Many pupils reported guarding their crops at night. They use variety of relatively inexpensive, low-tech, non-fatal deterrent mitigation methods such as torch with strong light, noise (dynamite, flute, bells, banging drums and tins, motorcycles), fire, use of scents (e.g. used car oil, pepper, plant onions and pepper at the farm boundaries), chasing them with dogs, torch, spear, stones, arrow, slingshot, use scarecrows, plastic flags. Some pupils claimed that they hire a person to guard their farm the days which they are not able to guard. Some have formulated groups to assist in guarding crops.

The findings show that the number of individuals guarding the crops ranges from 1- 5, but many families have 2-3 people for guarding crops. Almost all crops guarding are done mainly by men (uncle, father, and brothers) and women in rare cases. Women guard crops in the night when they do not have a husband or a male child to assist.

3.7 Pupils Attitudes towards the selected wildlife

Many pupils dislike strongly the four (4) selected wildlife species (elephant, hyena, lion, and leopard). However, most (41) of them were in favour of survival of wildlife in general and wanted wildlife to be protected though they desired the protection of non-destructive species like ostrich, giraffe, impala, hare, dig dig, zebra, eland, hare, warthog, buffalo, and wildebeest. Similar findings have been reported by de Pinho et al. (2014).

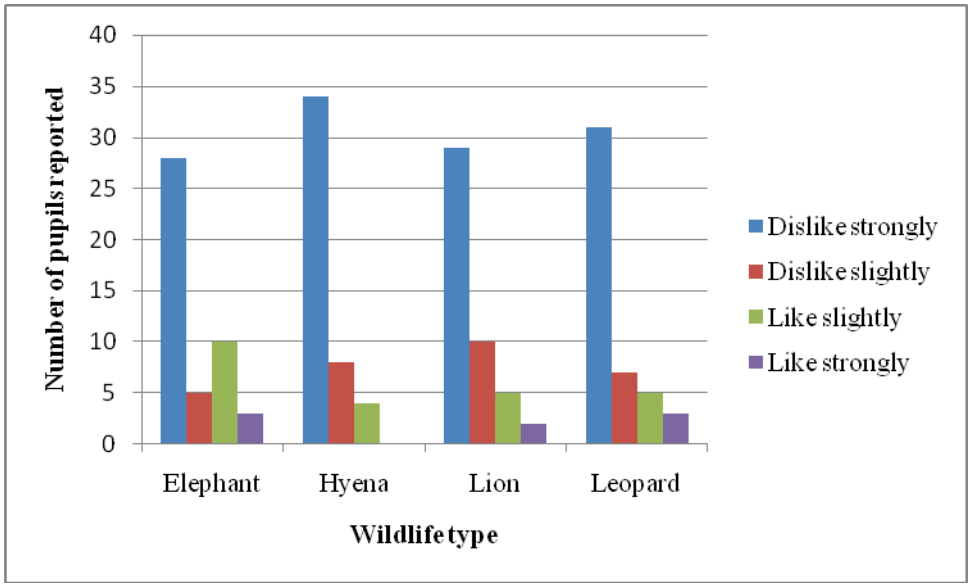

Figure 2: Pupils attitudes towards selected species of wildlife

Most pupils (N=41) were willing to support protected area management whereas 5 were not willing. Some reasons for supporting PAs were: wildlife are tourists' attraction, and it brings money to the country, has the right to exist, they are beautiful, helps to pay school fees for orphans (Table 17). Pupils from Mitimirefu had a more positive attitude towards wildlife. This can be associated with the fact that they do not have much wildlife in their village thus, not mostly affected by wildlife apart from encounters on the way to school.

Table 17: Reasons for supporting PAs

S/N	Reasons for support in conservation	Number	%
1	Wildlife in PAs are tourists attraction, and they bring in foreign currency to the country	19	39.6
2	Wildlife has the right to exist	1	2.1
3	So we can continue seeing them	3	6.3
4	They are beautiful	3	6.3
5	Protect them from poachers	4	8.3
6	There are some animals we like – not-destructive	6	12.5
7	So that wildlife won't disturb us – crop raiding, killing people and livestock	10	20.8
8	Protected areas help to pay school fees for orphans	2	4.2
Total		**48**	**100**

Those who did not want to support PAs stated that they were afraid of dangerous wildlife. Also, they dislike the costs associated with wildlife such as crops damage, destruction of water taps, livestock depredation, and killing people (cf. Lagendijk & Gusset, 2008). Several studies show that loss experienced from wildlife damage leads to negative attitudes towards wildlife (Kideghesho, Røskaft &Kaltenborn,2007). Negative emotions seem to play a greater role than positive emotions in the support or opposition of wildlife conservation. Negative impacts of wildlife can spread quickly, increases fear and decrease tolerance towards dangerous wildlife (DeStefano & Deblinger, 2005). However, the experience and history of human-wildlife coexistence and the cultural value of wildlife mediates tolerance of wildlife and may particularly overshadow the negative impact of fear on attitudes.

The question on whether PAs were beneficial resulted into 42 pupils responding 'Yes' and four (4) saying 'No.' Benefits realized by pupils from PAs were foreign currency (19); employment (2); bush-meat and skin (2); support orphans school fees (7); provision of the torch for crop guarding in the night (6), construction of modern bomas against predators (2). The findings from EWMA office show that since 2007, the WMA has received 1,998,085,347 TZS (974,676US$) where 50% of revenues were shared among member villages. About 10% of revenue received usually support school fees to less privileged children (Table 18).

Table 18:WMA Income since 2007

Year	Photographic Tourism	Hunting tourism	Concession fee	Other sources
2007				
2008	22,700,500	13,328,074		
2009	39,808,097			
2010	78,030,517	8,358,285		
2011	147,459,747	17,053,938		160,000
2012	119,454,798	9,121,471		20,566,275
2013	88,129,917	22,122,165	85,057,500	11,609,380
2014	92,785,269	137,225,000	11,777,850	3,182,000
2015	242,724,442	94,275,000	29,302,500	12,441,320
2016	116,731,227	117,705,105	79,959,000	14,866,000
2017	188,705,790	153,330,980	20,113,200	
Total	**1,136,530,304**	**572,520,018**	**226,210,050**	**62,824,975**

Those who stated 'no' claimed that they have never realized any benefit from wildlife (cf. AWF, 1996). This observation indicates that economic gain and personal advantages from wildlife can affect peoples' attitudes. Thus, income from ecotourism gives direct benefit to local people bringing tolerance to coexist with wildlife and thus offering hope for the survival of wildlife populations.

Most pupils (26) wanted problem animals to be killed because they are destructive whereas 20 stated no. The reasons for not killing problem animals were: they can be translocated to other PAs (6); If we kill them we won't be able to see them again (5); They bring us foreign currency through tourism (6). Some had empathy and affection for wildlife, and they considered wildlife with the right to exist so should be left alone (3). Studies show that people with more positive attitudes towards wildlife are more likely to support wildlife conservation and animal rights organizations (Manfredo, Teel & Henry, 2009). Moreover, familiarity with wildlife species can thus be an important factor of affection for these species.

4. Conclusion and Recommendations

Conclusion

The central research questions for this study was what are the conservation costs incurred by pupils and children and how they are affected? 2 What mitigation measures in place to prevent the impacts? and 3) what are the attitudes of pupils towards wildlife? This study identified costs pupils incur due to coexistence with wildlife. These include physical and psychological impacts such as fear, delay to school thus missing some subjects/periods, tiredness as they have to use longer roads to avoid wild animals, absent from school because of elephants, and fear due to death of family members. Crop raiding and livestock depredation indirectly affected pupils and children because it affected families' well-being. Boys were affected more by wildlife than girls as they had tasks after school that exposed them to wildlife encounters such as livestock grazing and crop raiding. Also, pupils who had long walking distances to schools had more encounters with wildlife than those walked short distances. Many pupils reported crop guarding at night and using inexpensive mitigation methods. Almost all guarding was done by men and many families have 2-3 people guarding crops. Other ways wildlife affected pupils was through breaking water pipes, making the water dirty or cut off completely. Due to economic loss and other physical and psychological negative impacts, many pupils generally dislike dangerous wildlife; however, they were in favour of their survival and protection. Benefits received affected the pupils' attitude towards wildlife conservation. This means that the involvement of the public and giving a feeling of control are necessary ingredients for successful coexistence with wildlife.

Recommendations

- Plant crops that are not preferred by common wildlife in the area.

  This can be done in collaboration between local people and agriculture experts. The assumption is possible there can be other types of crops that may be not mostly preferred by wildlife and still benefits local people in terms of direct consumption as food and for selling (extra income). For example, peppers may be planted around the small farms' fields near homes. Traditionally, peppers are repellant crops for elephants.

- In the future, construct schools nearby areas highly settled by local people

  The practical way for avoiding long distances and animal encounters for pupils is to invest and construct more schools nearby homestays. Local village governments may prioritize this. Source of funds could be from development NGOs/donors working in the area, and another source could be saving from tourism revenues sharing's from the WMA.

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