

Full Length Research Paper

Attitudes of Maasai pastoralists towards the conservation of large carnivores in the Loliondo Game Controlled Area of Northern Tanzania

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Attitudes towards the conservation of lions, leopards, cheetah, spotted hyenas and African wild dogs were assessed in the Loliondo Game Controlled Area of northern Tanzania in January 2013. Our survey encompassed 181 individuals each representing one household, of which 30 were chosen randomly from six Maasai pastoralist villages. A semi-structured questionnaire was used to acquire the required information from the respondents. We found that the majority of the Maasai pastoralists, particularly females, expressed negative attitudes towards the conservation of large carnivores. The reasons given for disliking carnivores differed between the sexes, but the most common reasons were that the carnivores attacked the respondents' livestock at night and also purposefully and frequently attacked people. The Maasai pastoralists who had been to school, mostly males, expressed more positive attitudes than those who had not been to school. Those who liked at least two carnivore species had received greater benefits from conservation programs than those who liked only one or disliked all carnivore species. Therefore, to support the conservation of wild dogs and other large carnivores at large, we recommend that where possible, female Maasai should be allowed to access Protected Areas (PAs) resources during the time of hard ship or drought to improve their livelihood. In addition, they should be empowered by being involved in conserving large carnivores as "carnivore guardians", exposed to ecotourism activities and be educated. Furthermore, conservation performance payments for carnivores should be institutionalized in the area.

Key words: Large carnivores, conservation, human attitudes, Loliondo Game Controlled Area.

INTRODUCTION

Worldwide, previous studies have found that about 95% of the total range of all carnivore species, occurs outside

protected areas (Crooks et al., 2011). Only small numbers are able to survive in human-dominated landscapes

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(Woodroffe, 2000; Dolrenny, 2013; Hazzah et al., 2013). Previous studies have furthermore, pointed out that human attitudes which normally predict human behaviour from their behavioural beliefs as explained by the theory of reasoned action (Ajzen and Fishbein, 1980), or planned behaviour (Marchini and Macdonald, 2012), could be performed at any time towards the presence of large carnivores in their vicinity (Marchini and Macdonald, 2012). Such attitudes rather than natural conditions have been the main reasons for the decrease of large carnivores (Jackson et al., 2003; Treves and Karanth, 2003; Mannelqvist, 2010; Yirga et al., 2011). The assessment of such attitudes is frequently the first stage of proper conservation strategies (Jackson et al., 2003; Kaczensky et al., 2003; Lindsey et al., 2005; Lagendijk and Gusset, 2008; Mannelqvist, 2010; Carter et al., 2014). In most cases, it has been found that, wherever humans perform negative attitudes because large carnivores kill their livestock or attack people (Løe and Røskaft, 2004; Lagendijk and Gusset, 2008; Yirga et al., 2011; Carter et al., 2014; Lyamuya et al., 2014), or had experienced Protected Areas (PAs) policy during times of hardship (for example, access policies to grazing inside PA during drought) (Hazzah et al., 2013), as well as socio-economic factors (Hazzah et al., 2009); large carnivores are the ones to suffer as the consequence of such attitudes which undermine their management and conservation efforts (Ikanda and Packer, 2008; Kissui, 2008; Yirga et al., 2011; Carter et al., 2014; Masenga et al., 2013). Usually, humans have been found to be intolerable to loss by wild carnivores and thus retaliate by killing those problem carnivores which eventually reduce their numbers at both the population and species levels (Lindsey et al., 2005; Woodroffe et al., 2005; Lucherini and Merino, 2008; Shingote, 2011; Yirga et al., 2011; Carter et al., 2014).

A similar situation has been observed to occur among the Maasai pastoralists who inhabit the Loliondo Game Controlled Area and Ngorongoro Conservation Area in northern Tanzania, where the local people frequently retaliate by killing troublesome carnivores in their areas (Ikanda and Packer, 2008; Masenga et al., 2013) as well as in other pastoral areas in Africa (Kissui, 2008; Hazzah et al., 2009; Miner, 2011). Therefore, currently there is a global challenge in facilitating human-carnivore coexistence in human-dominated landscapes since it requires to first understand factors that influence human attitudes, particularly humans who have to bear the consequences of the presence of large carnivores in their vicinity (Jackson et al., 2003; Lagendijk and Gusset, 2008; Carter et al., 2014). On the other hand, there is a need to propose proper and conducive management measures that would enhance coexistence between humans and large carnivores in an area as previous studies have proposed and proved to be successful (Kissui, 2008; Zabel and Holm-Muller, 2008; Hazzah et al., 2009; Miner, 2011; Hazzah et al., 2014; McManus et al., 2014).

This study aimed at determining the main factors that cause negative attitudes among Maasai pastoralists

towards the conservation of large carnivores such as lions (*Pantheraleo*), leopards (*Pantherapardus*), cheetah (*Acinonyxjubatus*), spotted hyenas (*Crocutacrocuta*) and African wild dogs (*Lycaonpictus*) in the Loliondo Game Controlled Area (LGCA), northern Tanzania. We made the following hypotheses: 1) Because education helps in the development of positive attitudes (Røskaft et al., 2007; Dalum, 2013), the Maasai pastoralists who have been to school will express more positive attitudes towards large carnivores than those who have never been to school; 2) male Maasai pastoralists will express more positive attitudes towards the conservation of large carnivores than females because their culture favours men in terms of the right to speak; 3) the pastoralists who receive many benefits of having large carnivores in their vicinity (for example, being part of vaccination programs, having access policies for grazing, firewood collection and water fetching in PAs during times of hardship, or acquiring the benefits of tourism for example, employment and income generation) will exhibit more positive attitudes towards these species than those who receive few benefits. Because wild dogs are the main predators of livestock in our study area, we paid this species special attention.

MATERIALS AND METHODS

Study area

The study was conducted in the eastern Serengeti ecosystem in the Loliondo Game Controlled Area (LGCA; Figure 1). The LGCA is located in the Maasai ancestral land in the northern part of Tanzania and covers approximately 4500 km² (Lyamuya et al., 2014). The Maasai are nomadic pastoralists with a very low proportion of agro-pastoralists (Masenga and Mentzel, 2005; Masenga, 2010; Lyamuya et al., 2014). The Maasai depends entirely on livestock for their economic survival. The LGCA exhibits a bi-modal rainfall pattern with peaks that occur in December and April and a total yearly precipitation of 400-1200 mm precipitation per annum (Jaeger, 1982; Maddox, 2003; Masenga and Mentzel, 2005). The LGCA is dominated by open woodland and grassland. The open woodland is found primarily in the northern region on rolling hills that are interspersed with rocky outcrops. In the central region, there are mountains with steep slopes and densely vegetated gullies. The open areas in the lowlands are either cultivated or open woodlands. The southern portion of the area gives way to short grassland (Masenga and Mentzel, 2005).

Data collection

The data for this study were collected in January 2013. Our survey encompassed 181 individuals, each representing one household chosen randomly from six Maasai villages adjacent to the eastern Serengeti ecosystem. The methods used for data collection and sample size determination followed those that have been used in previous studies (Sancheti and Kapoor, 2003). No prior notice was given to the interviewees, although the village chairman was first consulted about the study and asked for permission to perform the interviews in his/her area. The sampling strategy was opportunistic, and the interviewees were chosen according to availability based on their age and gender. A semi-structured questionnaire was administered by two researchers. They asked questions in Swahili

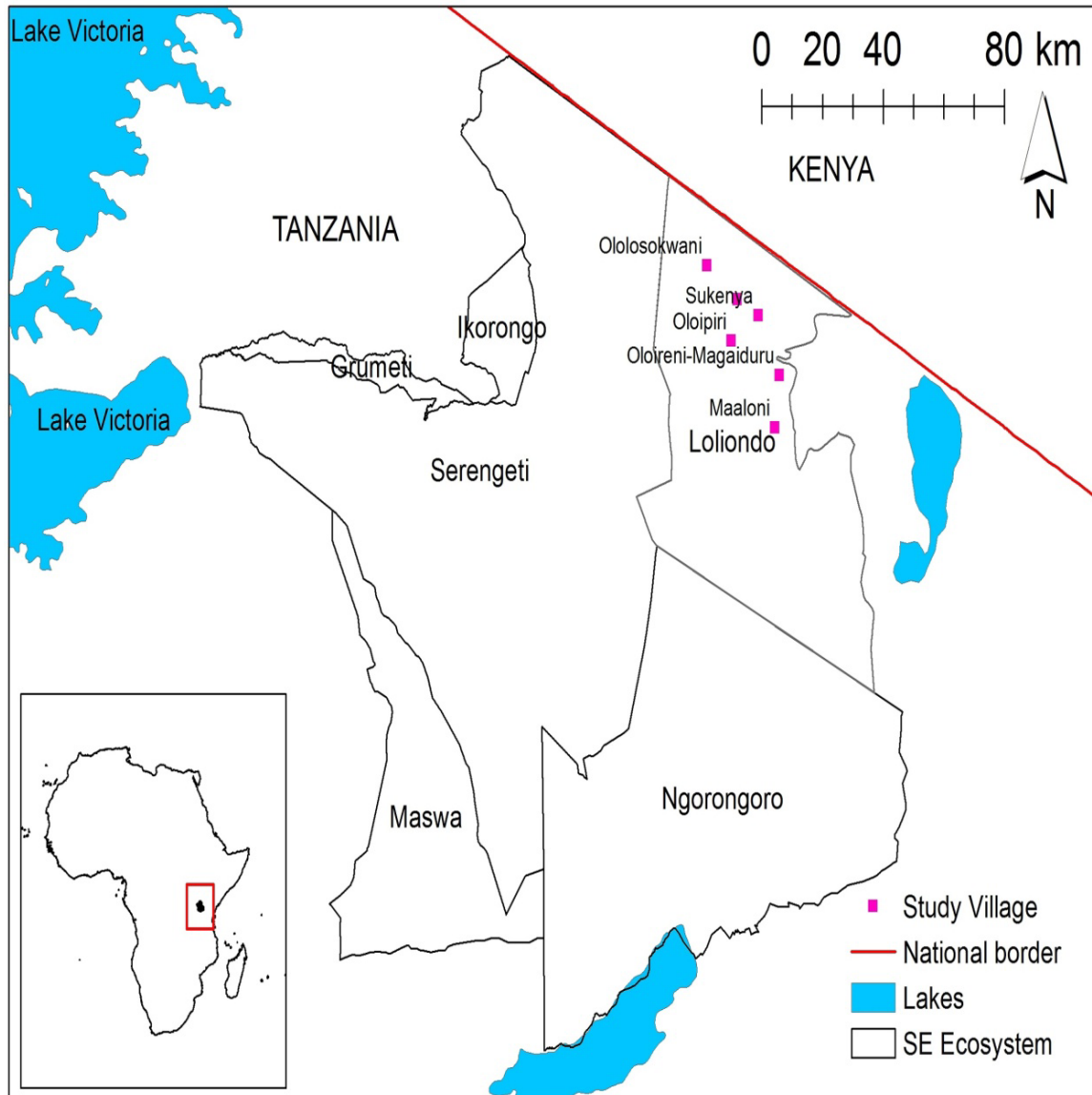


Figure 1. A map of the Serengeti ecosystem showing the study area of the Loliondo Game Controlled Area in northern Tanzania. The studied villages are indicated in purple.

which were then translated to the Maasai language with the help of Maasai translators. With this method, the researchers were able to record information on the attitudes of the Maasai pastoralists in relation to the conservation of large carnivores in their area. The data collected included basic information about the participant's age, age class (youths, adults and elders; however, rather than using these age classes in our analyses, we classified the participants into two age groups: those born before ($n = 77$) and those born after ($n = 104$) 1959), gender (males $n = 123$; females = 58), village centre GPS location, tribe (Maasai), and educational level (had been to school ($n = 74$), never been to school ($n = 107$)).

Next, we asked the participants whether they were aged between 54 - 100 years (e.g. old- born before the eviction from SNP) or between 30 - 53 years (e.g. young- born after the eviction from the Serengeti National Park (1959)). Thereafter, these participants were asked questions related to their attitudes toward the conservation of large carnivores, e.g., 1) "What carnivore species

(lion, leopard, spotted hyena, cheetah and wild dog) do you like/dislike in your area?", 2) "Why do you like/dislike the carnivores?", 3) "Do you think wild dogs have a right to stay in your area?", 4) "Do you receive any benefits (e.g., being part of vaccination programs, having access policies for grazing, firewood collection and water fetching in PAs during times of hardship or acquiring the benefits of tourism e.g. employment and income generation) from the presence of wild dogs in your area?" and 5) "What do you think should be done to conserve wild dogs?"

Data analyses

All analyses were performed using Statistical Package for Social Science (SPSS) Statistics version 17.0 for Windows. Because most of the data were nominal, we primarily used non-parametric Chi-

Table 1. Percentages of the Maasai respondents who exhibited different attitudes based on gender, age class and educational level.

| Number of carnivore species liked | | ≥ 2 | 1 | 0 | Total |
|-----------------------------------|----------------------------|-----------|-----------|-----------|-----------|
| | | N (%) | N (%) | N (%) | N (%) |
| Gender | Males | 26 (21.1) | 65 (52.8) | 32 (26.0) | 123 (100) |
| | Females | 2 (3.4) | 24 (41.4) | 32 (55.2) | 58 (100) |
| Age group | After 1959 (30-53 years) | 19 (18.4) | 52(50.5) | 32 (31.1) | 103 (100) |
| | Before 1959 (54-100 years) | 9 (11.7) | 36(46.8) | 32 (41.6) | 77 |
| Education | Been to school | 16 (21.6) | 40 (54.1) | 18 (24.3) | 78 (100) |
| | No education | 12 (11.2) | 49 25.8) | 46 (43.0) | 107 (100) |

Table 2. The different reasons given by the respondents of each gender why they liked or disliked the carnivores.

| Reasons | Males | Females | Total |
|--|-----------|-----------|-----------|
| Dislike | N (%) | N (%) | N (%) |
| They purposely attack livestock at night | 62 (50.4) | 24 (41.4) | 86 (47.5) |
| They are enemies of people | 3 (2.4) | 5 (8.6) | 8 (4.4) |
| They attack livestock and people | 16 (13.0) | 19 (32.8) | 35 (19.3) |
| Like | | | |
| They are easy to chase | 21 (17.1) | 6 (10.3) | 27 (14.9) |
| They attract tourists and are source of income | 7 (5.7) | 1 (1.7) | 8 (4.4) |
| They cause no problems | 14 (11.4) | 3 (5.2) | 17 (9.4) |
| Total | 123 (100) | 58 (100) | 181 (100) |

square tests (Fowler et al., 2009; Zar, 2010) to determine the differences in the frequencies among different variables. Additionally, descriptive statistics were used to determine the frequencies of the respondents who reported liking or disliking the conservation of the different large carnivores in their area. Very few respondents liked the carnivores, and the patterns were similar for all four species; therefore, we pooled these categories. As a first step, we analysed the frequencies with which the participants' liked or disliked each of the four carnivores and produced five categories (liked zero species (N = 64), liked one carnivore species (N = 89), or liked two, three or four of the species (N = 28)). We then pooled the last three categories into one category termed like at least two (2-4) of the carnivores (lion, leopard, cheetah, spotted hyena; n = 28), and the other two categories were termed like one carnivore (n = 89) and dislike all carnivores (n = 64). We used these three categories of attitudes in the analyses. All statistical tests were two tailed, and the significance level was set at $P \leq 0.05$.

RESULTS

Our results revealed that out of the 181 respondents, males represented 67.6% while females represented 31.9%. About 59.1% of the respondents had never been to school which represent mostly females (82.8%) while

52.0% of males had never been to school ($\chi^2 = 19.7$, $df = 1$, $P < 0.001$). Most of those who were born after their eviction from the Serengeti National Park (1959) had been to school (51.0%), while most of those born before that period had never been to school (74.0%) ($\chi^2 = 12.6$, $df = 2$, $P = 0.002$).

To test Maasai pastoralists' attitudes toward conservation of large carnivores respondents' answers of like at least two species were taken to express positive attitudes, like one species as an indicator of an intermediate attitude and "dislike all species" as an expression of the most negative attitudes. From this, females expressed significantly more negative attitudes than the males ($\chi^2 = 18.5$, $df = 2$, $P < 0.001$, Table 1). The negative attitudes of the females were related to the different reasons given by the two sexes regarding why they liked or disliked the carnivores ($\chi^2 = 16.2$, $df = 5$, $P = 0.006$, Table 2).

Furthermore, those who had never been to school (71.9%) expressed significantly more negative attitudes toward large carnivores than did those who had been to school (28.1%) ($\chi^2 = 7.9$, $df = 2$, $P = 0.018$). However, no significant difference in attitudes was found between those born before and after eviction ($\chi^2 = 2.78$, $df = 2$, P

= 0.249). A linear regression analysis using carnivore attitudes (likes ≥ 2 , 1, 0) as the dependent variable and gender, born before or after eviction and education level as independent variables was statistically significant ($r^2 = 0.120$, $F = 7.971$, $df = 3$, $P < 0.001$). However, only gender significantly explained this variation ($t = 3.73$, $P < 0.001$). The other two variables (born before or after eviction and education) did not explain any significant additional variation.

Generally, most of the Maasai pastoralists expressed negative attitudes towards the conservation of wild dogs (like = 34.1% and dislike = 65.4%). To further investigate the attitudes toward the conservation of wild dogs we used the following question: "Do you think wild dogs have a right to stay in your area"? Answers of "yes" express positive attitudes and "no" express a negative attitude". Generally, the male pastoralists expressed significantly more positive attitudes (56.1%) than the females (30.4%) ($\chi^2 = 10.2$, $df = 1$, $P = 0.001$). A logistic regression analysis with "Do you think wild dogs have a right to stay in your area"? as a dependent variable with gender, age class and education level as independent variables, was statistically significant (Cox and Snell $r^2 = 0.107$, Nagelkerke $r^2 = 0.143$, $\chi^2 = 20.327$, $df = 3$, $P < 0.001$). All independent variables explained some of the variation statistically significant (education level, Wald = 7.53, $P = 0.006$; age class, Wald = 5.27, $P = 0.022$; gender, Wald = 4.43, $P = 0.035$). This was due to the fact that males (52.0%,) were more educated than females (17.2%) ($\chi^2 = 19.7$, $df = 1$, $P < 0.001$).

Furthermore, those who liked at least two carnivore species (39.3 %) were significantly more likely to have been benefited by having wild dogs in their area as compared to those that liked one (11.2%) or disliked all carnivores (4.7%) ($\chi^2 = 20.8$, $df = 2$, $P < 0.001$). Those who had never been to school expressed more negative attitudes (60.7%) towards the rights of the wild dogs to stay in their area as compared to those who had been to school (38.3%, $n = 41$) ($\chi^2 = 9.2$, $df = 2$, $P = 0.010$). A logistic regression analysis using the answers to the question "Do you receive any benefit from the presence of wild dogs in your area?" (yes, no) as a dependent variable and gender, education level and born before or after eviction as independent variables proved to be statistically significant (Cox and Snell $r^2 = 0.074$, Nagelkerke $r^2 = 0.136$, $\chi^2 = 13.802$, $df = 3$, $P = 0.003$). However, only gender (Wald = 5.47, $df = 1$, $P = 0.019$) significantly explained the variation in receiving benefits; that is, the males generally received more benefits than the females. Education level and born before or after eviction did not significantly contribute in explaining the variation.

The results of a linear regression analysis using the "like none, one or ≥ 2 carnivores species" as the dependable variable and do you receive any benefit from having wild dogs in your area? and gender as independent variables proved that both of these factors significantly explained the attitudes of the Maasai pastoralists ($r^2 = 0.172$,

$F = 9.09$, $P < 0.001$). Both gender ($t = 3.079$, $P = 0.002$) and do you receive any benefit from having wild dogs in your area? ($t = 3.330$, $P = 0.001$) explained significantly the variation, but education level and born before or after eviction did not significantly explain any additional variation.

There were significant differences in the advice given by male and female Maasai regarding the proper strategies for wild dogs conservation in their area; the males (76.4 %) advised that local people should be involved in their conservation, while the majority of the females offered no advice (51.7 %; $\chi^2 = 20.1$, $df = 3$, $P < 0.001$; Table 3). Additionally, most of those who had been to school (82.4 %) advised that local people should be involved in wild dog conservation, while those who had not been to school (42.0 %) were more likely to offer no advice ($\chi^2 = 14.2$, $df = 3$, $P = 0.003$; Table 3). There was also a statistically significant difference between those born before and after eviction; those born after were more eager to express opinions regarding conservation ($\chi^2 = 20.1$, $df = 3$, $P < 0.001$; Table 3).

DISCUSSION

Overall, the attitudes of the Maasai pastoralists are important tools that should be considered regarding the value of conserving large carnivores in the Loliondo Game Controlled Area, northern Tanzania (Maddox, 2003; Ikanda and Packer, 2008; Kissui, 2008; Masenga et al., 2013) and other areas of Africa (Hazzah et al., 2009; 2013, 2014). Our findings support the hypothesis that females generally express more negative attitudes toward the conservation of large carnivores than males. These negative attitudes might be related on one hand to their behavioural beliefs as the result of not receiving any benefits from the presence of large carnivores in their area due to their denied access to PA resources (such as grazing their livestock, firewood collection and fetching water) during time of hardship or drought (Hazzah et al., 2013). While on the other hand, by reasons given by both of them that include the notion that carnivores cause livestock losses due to their predatory behaviour (Maddox, 2003; Lyamuya et al., 2014). Hazzah et al. (2013) found that when people are given access to PAs resources during the times of hardship they usually perform positive attitudes towards wildlife as seen near Tsavo and Nairobi national parks in Kenya. According to theory of reasoned action developed by Ajzen and Fishbein (1980) and that of planned behaviour by Marchini and Macdonald (2012), the behavioural beliefs usually determine the attitude of a person whether positive or negative towards an object. This eventually generates his or her behavioural intention as well as moral behaviour. Despite the fact that females in the Maasai culture are neglected from their right to speak, they still have negative attitudes towards large carnivores, which is of conservation concern as they might through their behavioural intention and moral

Table 3. Different reasons given by the respondents regarding the types of conservation strategies that the Maasai pastoralists would like to see implemented in relation to wild dogs.

| Variable | Reason | Local people should be involved in wild dog conservation | Compensation schemes should be established | Wild dog should be taken away from people | No advice |
|-----------|----------------|--|--|---|-----------|
| | | N (%) | N (%) | N (%) | N (%) |
| Gender | Males | 31 (25.2) | 12 (9.8) | 51 (41.5) | 29 (23.6) |
| | Females | 3 (5.2) | 2 (3.4) | 23 (39.7) | 30 (51.7) |
| Age group | After 1959 | 19 (18.4) | 9 (8.7) | 51 (49.5) | 24 (23.3) |
| | Before 1959 | 15 (19.5) | 5 (6.5) | 22 (28.6) | 35 (45.5) |
| Education | Been to school | 19 (25.7) | 8 (10.8) | 34 (45.9) | 13 (17.6) |
| | No education | 15 (14.0) | 6 (5.6) | 40 (37.4) | 46 (43.0) |

behaviour influence their children and husbands to dislike such animals, hence they hinder conservation efforts (Ikanda and Packer, 2008; Kissui, 2008; Yirga et al., 2011; Carter et al., 2014; Masenga et al., 2013). To overcome this problem, it is required that females be empowered by being involved in the conservation of large carnivores as e.g. guardians. Previous studies have shown that guardians of large carnivores have been successful where it has been applied. A good example is the Maasai land in Kenya (Hazzah et al., 2014). Moreover, since most of the females have never been to school it is predicted that they are more likely to work and entirely depend on livestock keeping for their survival. Thus they suffer from losses to wild carnivores, and become more negative than males. It has previously been found that people who have not been to school or have low levels of education hold more negative attitudes toward the conservation of large carnivores in their areas (Lindsey et al., 2005; Røskaft et al., 2007; Lucherini and Merino, 2008; Li et al., 2010; Mannelqvist, 2010; Carter et al., 2014; Dalum, 2013). Previous studies indicate that if female Maasai pastoralists were to be taken to school to improve their understanding and knowledge, this would in most cases shape their attitudes in a positive way towards large carnivores and thus enhance their coexistence (Røskaft et al., 2007; Li et al., 2010; Carter et al., 2014).

Interestingly, the strongest effects in our study were the difference in attitudes between the two genders. According to Dalum (2013) factors such as age, gender and general education level cause variation in attitudes toward wildlife conservation. Moreover, factors such as culture, economy, social status and exposure to an event have also been found to influence attitudes (Røskaft et al., 2003; Yirga et al., 2011). Thus, in our case, gender was found to be the most significant factor in explaining the negative attitudes of the Maasai pastoralists (Røskaft et al., 2007; Mannelqvist, 2010). This is because females Maasai are less educated and do less outdoor activities than males reducing their chances of encountering species that are in conflict with them which might be the

reason for the increase in negativity towards such carnivores (de Pinho et al., 2014). According to Pinho et al. (2014) facilitation for local residents, in our case female Maasai, visiting PAs increases their familiarity with species that are rarely seen or most frequently seen in conflict with their interests and hence increases their tolerance and positive attitudes towards them. The males' more positive attitudes may be explained by the preference of male to wild animals and education level (Li et al., 2010).

Furthermore, positive attitudes were related to the income generating activities of the tourist industry, and the males were more frequently involved in these activities than the females. Moreover, previous studies have indicated that older people might continue to be influenced by the potentially negative attitude that was prevalent during their childhood (Røskaft et al., 2007).

Generally, most Maasai pastoralists expressed negative attitudes towards the conservation of wild dogs in their area. These negative attitudes were associated with the participants' beliefs (Ajzen and Fishbein, 1980; Marchini and Macdonald, 2012) that the wild dogs prey on their livestock and cause economic losses. Similar reasons have been reported in previous studies (Lindsey et al., 2005; Lucherini and Merino, 2008; Mannelqvist, 2010; Dalum, 2013). We found that the males expressed more positive attitudes towards the conservation of wild dogs than the females because the males frequently see them and received more benefits from their presence than the females. The males benefited from tourism activities more frequently and generated more income than the females. The importance of such benefits in shaping positive attitudes has also been found elsewhere (Røskaft et al., 2007; Lagendijk and Gusset, 2008; Mannelqvist, 2010).

CONCLUSION AND MANAGEMENT IMPLICATIONS

We conclude that female Maasai pastoralists generally expressed more negative attitudes toward the conservation

of all five large carnivore species in their area as compared to the males. Additionally, the males who mostly had been to school were more likely to visit wilderness and more frequently observe large carnivores and receive benefits from having them in their area than females.

Therefore, to support the conservation of wild dogs and other large carnivores at large, we recommend that where possible, female Maasai should be allowed to access PAs resources during the time of hardship or drought to improve their livelihood. In addition, they should be empowered by being involved in conserving large carnivores as “carnivore guardians”. Moreover, frequent visits to PAs should be increased on the side of females Maasai to increase their chances of encountering the rarely seen conflicting large carnivores in their area. In addition, females should be taken to school to receive more education on the ecological importance of large carnivores in their area because environmental education has been a frequently used tool in attempts to foster positive attitudes towards wildlife conservation (Jackson et al., 2003; Dalum, 2013; Straube, 2013). Also, female Maasai pastoralists should be exposed to ecotourism activities in their areas. Such tourism activities are frequently attracted to local areas because of the presence of such carnivore species, which might help the female Maasai to increase their income and hence improve their livelihood and attitudes towards carnivores’ conservation (Lucherini and Merino, 2008). Furthermore, conservation performance payments for carnivores (Zabel and Holm-Muller, 2008) should be institutionalised in the area.

Conflict of Interests

The author(s) have not declared any conflict of interests.

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Appendix I

Questionnaire survey on the historical perspective of human-wild dog conflict and local people attitudes towards large CARNIVORES in the north eastern part of the serengeti ecosystem

A. RESPONDENT'S GENERAL INFORMATION

- 1A. Respondent name:
 B. Gender:
 C. Age
 D. Age class:
 E. Education level:
 F. Village name:
 G. Occupation:
 H. Tribe:
 GPS location:
 I. Place of residence:
 J. Household numbers:
 K. Livestock numbers:
 L. Date:

B. HISTORICAL INFORMATION

- 1: Living information
 a) Where you born before or after independence?
 1. Before independence (<1960) 2. After independence (>1961)
 b) Where you born in Loliondo game controlled area?
 1. Yes 2. No
 c) If not where were you born and when did you come to this area?
 2: WILD DOGS INFORMATION
 a) Since you were young, did you see any wild dogs in this area? 1. Yes 2. No
 b) If yes, how often do people in your village see them? 1. Daily 2. Weekly 3. Monthly 4. Rarely
 c) What do you think about the population trend of wild dogs in your area when you compare your sightings today with those of previous days? 1. Increasing 2. Stable 3. Decreasing 4. Don't know
 d) Is there any reason for that?
 e) Are the denning areas the same today as they used to be? 1. Yes 2. No
 f) If not, where did they den before compared to now?
 e) Since you were born, have you ever herded livestock in your area? 1. Yes 2. No
 f) If yes, were you herding livestock when you were young or Moran? 1. Young 2. Moran 3. Both
 3. HUMAN-WILD DOG CONFLICT

- a) Do you think wild dogs are a problem to you? 1. Yes 2. No
 b) If yes, what kind of problem do they cause to you? 1. Killing livestock 2. Attack people 3. Spread diseases
 c) Do you think this problem arose recently or has it existed since you were born? 1. Arose recently 2. Existed since I was born 3. Am not sure
 d) Since you were young, have you ever seen wild dogs preying on your livestock? 1. Yes 2. No
 e) How often do you see that? 1. Very often 2. Often 3. Rarely
 f) What domestic species are most frequently attacked? 1. Cattle 2. Goat/sheep 3. Donkeys 4. Domestic dogs
 g) What did you do when you saw that happening? 1. I chased them away 2. I ran away to look for assistance 3. I killed them 4. I did nothing 5. Others
 h) If you compare livestock attacks by wild dogs during old days and today, what do you think is the trend? 1. Increasing 2. Stable 3. Decreasing 4. Don't know
 i) Is there any reason for that?
 4. PERCEPTIONS OF LOCAL PEOPLE
 a) What carnivore species do you like most?

| Species | Like them | Dislike them | Why? |
|----------------|-----------|--------------|------|
| Lions | | | |
| Leopards | | | |
| Spotted hyenas | | | |
| Wild dogs | | | |
| Cheetah | | | |

- b) Do you think wild dogs have a right to stay in your area? 1. Yes 2. No 3. Don't know
 c) If yes or no, why?
 d) What do you think should be done to conserve wild dogs?
 e) Do you receive any benefits by having wild dogs in your area? 1. Yes 2. No
 f) If yes, what benefit do you receive?
 g) If you compare with the old days, do you think you are currently benefiting more than during the old days by having wild dogs in your area? 1. Yes 2. No 3. Don't know
 h) If yes or no why?
 i) What is your advice to the future generations?