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# Human-Wildlife Conflicts: The Case of Livestock Grazing Inside Tsavo West National Park, Kenya.

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**Abstract**
In Tsavo West National Park, human wildlife conflict is more prevalent due to high human populations and the incompatible land use practices in the adjacent areas. Human settlement in adjacent areas and illegal grazing in the park by the pastoralists contribute to direct conflict between wildlife, livestock and human beings. In this research a total of 220 households were sampled from different areas adjacent to Tsavo West national park. Key informants interviews of about 50 respondents were conducted. Data was analyzed using the Statistical Package for the Social Sciences (SPSS) computer soft-ware version 11.5. Both descriptive and analytical procedures were used in data analysis. The research investigated the root causes and impacts of the livestock and wildlife interactions that perpetuate the problems and suggested potential effective remedial measures to curb the conflicts. The observations in the study reveal that livestock incursion exist in Tsavo West National park.
**Keywords;** Wildlife, Livestock, National park, and Conflict

## 1. Introduction

Numerous people benefit directly and indirectly from the presence of wildlife, including tour and hotel operators, tourists, hunters, scientists and commercial game ranchers (Aboud, 1989; Burrow *et al.,* 1995). Many other workers and businesses derive their livelihood from wildlife (Aboud, 1989). Human-wildlife conflict is a serious obstacle to wildlife conservation worldwide and is more prevalent as human populations increase, development expands and people engaging in land use activities which are not compatible to wildlife conservation. While pastoralism is a land-use system that is potentially compatible with wildlife, there is a growing spatial overlap with a large proportion of wildlife found outside protected areas (Broten and Said, 1995; Lamprey and Reid, 2004; Western *et. al.* 2009) in areas where there are an increasing number of pastoralists (Reid *et. al.* 2001, Reid *et. al*. 2004). People lose their crops, livestock, property, and sometimes their lives (Bell, 1984).
Among the Maasai pastoralists who border Tsavo West National Park (TWNP), due to civilization, they have now adopted sedentary lifestyle as opposed to nomadism (Chiemelu, 2004). Human-wildlife conflicts are one of the main threats to the continued survival of many wildlife species, in different parts of the world, and are also a significant threat to lives of local communities (Hoare, 2001). If solutions to conflicts are not effective, the local communities' support for conservation will decline.
There has been increasing evidence that protected areas have often caused further impoverishment of already economically marginal communities, through loss of access to livelihood resources and physical displacement (Chatty and Colchester , 2002; Colchester 2004; Lockwood *et. al.,* 2006; West *et. al*., 2006). Increasingly, though, it has been realized that this is not only a violation of the basic human rights of people, it also often backfires on conservation itself.

## 2. Materials and Methodology

### *2.1 Location of Study Area*

The study was carried out in Tsavo West National park and adjacent areas. Tsavo National Park was established on 1st April, 1948 comprising of: - Tsavo West National Park (7,800 km$^2$) and Tsavo East (13,000 km$^2$). It is the largest single continuous protected Park in Kenya. In May 1948, Tsavo National Park was divided into two parks, East and West for administrative purposes. The two Parks are divided by Nairobi – Mombasa railway and road. Nationally, the Tsavo's comprises 52% of total protected area in Kenya country, which translates to approximately 3.9 % total land area of Kenya (Fig, 1).

### *2.2 Research Methods*

The study utilised a socio-ecological survey using a structured questionnaire, and supported by key informants' interviews and observation (ocular) methods. The research also made use of secondary data from University libraries, public offices and other relevant sources.
The population was stratified into four areas adjacent to TWNP, Mtito Andei, Rombo/Kuku, Taveta and Taita. The questionnaires were administered to 55 households which were randomly selected from each stratum making a sample of 220 households.

 

Considering human-wildlife conflict hotspots in communities adjacent to the park the most appropriate transects was established through each stratum. The first sampling unit (household) was randomly selected and thereafter households were sampled along the transect at an interval of about 200 meters each.
A structured questionnaire was administered to 10 key informants selected from, TWNP staff, and managers of wildlife ranches and farm adjacent to TWNP, and Provincial Administration and other stakeholders, totaling to about 50 informants.

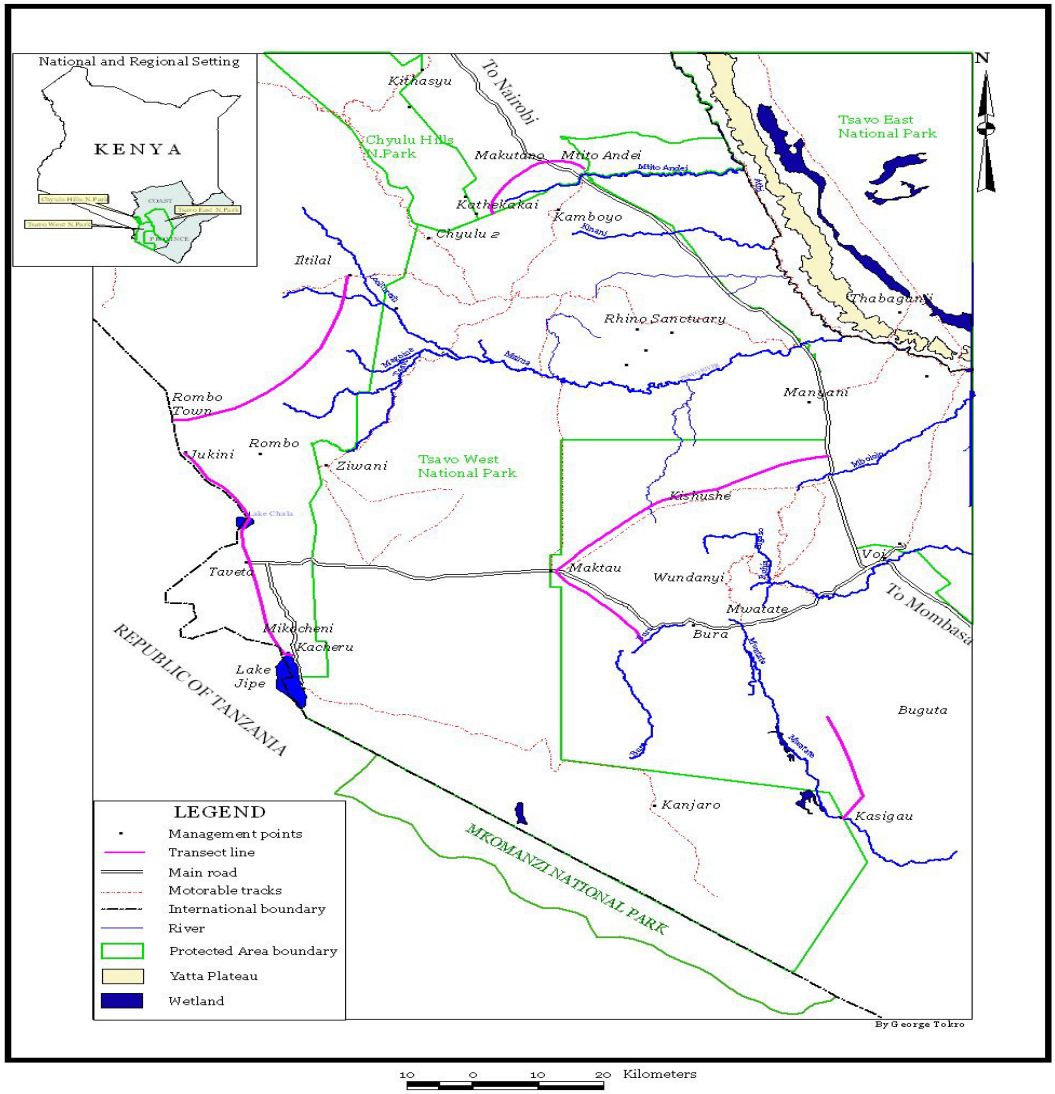


**Figure 1: Tsavo West National Park and Adjacent Areas.**. Source: Kenya wildlife service, GIS department (2009)

## 3. Results

*3.1 Household Production System.*

Figure 2 indicate that, majority of the households (65%) livelihood system was based on Agro-pastoralism, while 30% was farming and 5% was business. This can be explained by the fact that majority of the peoples livelihood are related to the natural resources available in the area as only 5% of the population is engaged in livelihoods not related to the land resources.

 

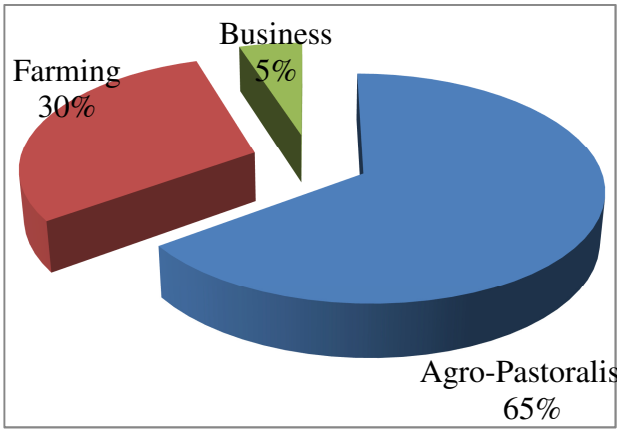


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**Fig. 2: Household production system**

3.2 Land use practices by the local communities

Five different types of land use practices by local communities were identified as indicated in table 1, these included dwelling, crop farming, grazing, agroforestry and beekeeping. The common land use in the study area was found to be dwelling (83.7%), followed by crop farming (77.7%), grazing (47.7%), agroforestry (14.5%), and finally beekeeping (10%).

Crop farming was common in the three districts Taita, Taveta and Kibwezi and less common in Loitokitok, while grazing was more common in Kibwezi and Loitokitok than the other two districts. This is because Taita, Taveta and Kibwezi residents commonly depend on crop farming for their livelihoods while Loitoktok residents are pastoralists

**Table 1: Types of land use practised by the communities in the different districts (in percentage)**

| | Districts | | | | |
|---|---|---|---|---|---|
| Land use type | Taita | Taveta | Loitokitok | Kibwezi | Total |
| Dwelling | 22.3 | 16.8 | 21.4 | 23.2 | 83.7 |
| Crop farming | 22.7 | 22.3 | 10.0 | 22.7 | 77.7 |
| Grazing | 7.7 | 5.0 | 16.4 | 18.6 | 47.7 |
| Agro-forestry | 0 | 8.6 | 2.3 | 3.6 | 14.5 |
| Bee keeping | 0.9 | 1.8 | 5.9 | 1.4 | 10.0 |
| Total | 55 | 55 | 55 | 55 | 220 |

3.3 Causes of livestock incursion into the TWNP.

The respondents gave four reasons (causes) of why they took their livestock to the park. These included grazing/pasture, water, salts and free from livestock diseases. Majority of the households (61%) frequented the park for grazing/pasture for their livestock (Fig. 3).

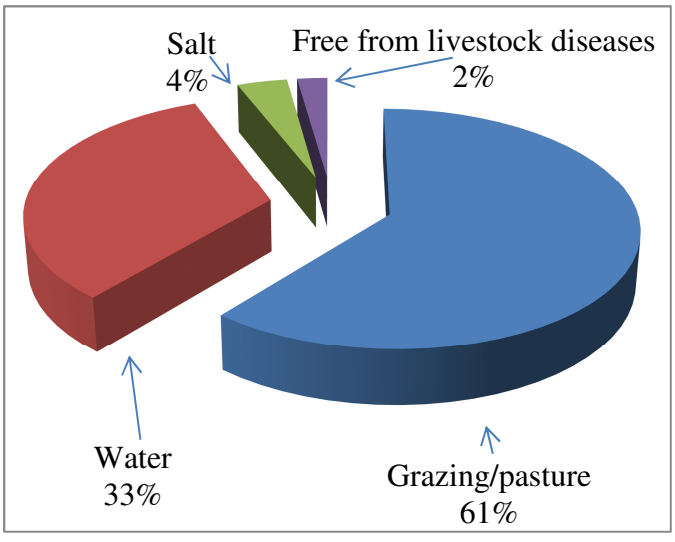


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**Fig. 3: Reasons (causes) of livestock incursions into the TWNP.**

 

3.4 Livestock entering the TWNP

The percentage of households that grazed their livestock in TWNP is given in figure 4. Twenty eight percent of the households grazed their cattle in the park, while 27 % grazed their goats, 26 % their sheep and 19 % their donkeys.

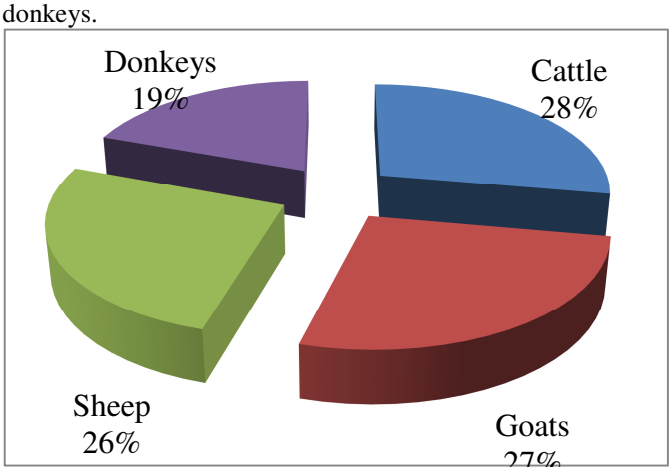


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**Fig. 4: Type and percent of livestock entering TWNP for grazing**

*3.5 Frequency and the season's livestock graze in the park*

Table 2 indicates the frequency of livestock grazing within the TWNP and the season when the grazing is done. The animals significantly (p<.001) frequented the TWNP for grazing in the dry season. The animals were found to always visit the park in the dry season (47.7 %) compared to the wet season (5 %) and all year round (7.3 %). When the frequencies were compared, statistical significant differences were found.

**Table 2: Livestock frequency and season of grazing within the TWNP**

| | Season of grazing (%) | | |
|---|---|---|---|
| Frequency | Wet season | Dry season | All year round |
| Always | 5 | 47.7 | 7.3 |
| Often | 2.3 | 17.3 | 11.4 |
| Once in a while | 8.6 | 4.5 | 39.5 |
| Rarely | 27.7 | 3.2 | 15.5 |
| Very rarely | 15.0 | 1.8 | 2.3 |
| Never | 41.4 | 25.5 | 24.1 |
| Chi-square Statistics | $\chi 2$=150.855<br>df 5<br>P= <.001 | $\chi 2$=210.091<br>df 5<br>P= <.001 | $\chi 2$=119.273<br>df 5<br>P= <.001 |

n=220

*3.6 Seasons when cattle graze in the TWNP*

Cross-tabulation of season of grazing (time) and the percent of the households grazing TWNP is given in Table 3.

It was found that, of the 163 households that grazed their cattle in the park, majority of them (78.5%) grazed the park during the dry season, while 22.5 % of them grazed all year round and only 1 % grazed the park in the wet season.

The relationship was statistically significant (p<.001).

($\chi 2$=200.16, df 5, p<.001), phi and cramers V .954, p<.001

 

**Table 3: Cross tabulation between season cattle graze in park and the number of households grazing cattle in park.**

| Season cattle graze in park | | Cattle graze in park Yes | No | Total |
|---|---|---|---|---|
| Wet season | Count | 2 | 0 | 2 |
| | % | 1.2% | 0.0% | 0.9% |
| Dry season | Count | 128 | 0 | 128 |
| | % | 78.5% | 0.0% | 58.2% |
| All year round | Count | 33 | 0 | 33 |
| | % | 22.5% | 0% | 22.5% |
| Not applicable | Count | 0 | 57 | 57 |
| | % | 0.0% | 100.0% | 100.0% |
| Total | Count | 163 | 57 | 220 |

**Table 4: Number of cattle driven out of the park**

| **Year** | **2004** | **2005** | **2006** | **2007** | **2008** |
|---|---|---|---|---|---|
| Number of cattle | 73813 | 251511 | 310135 | 306950 | 423902 |

Source: TWNP 2009

Significant $\alpha \leq .01$ positive correlation were found to exist between the number of cattle, goats, sheep and donkeys and the intensity and seriousness of the human-wildlife conflicts (Table 5).

**Table 5: Correlations between the number of cattle, goats, sheep and donkeys and the intensity and seriousness of the human-wildlife conflicts**

| **Item** | | **intensity** | **Seriousness** |
|---|---|---|---|
| Number of cattle | Pearson Correlation | .302(**) | .173(*) |
| | Sig. (2-tailed) | .000 | .010 |
| Number of goats | Pearson Correlation | .376(**) | .253(**) |
| | Sig. (2-tailed) | .000 | .000 |
| Number of sheep | Pearson Correlation | .349(**) | .206(**) |
| | Sig. (2-tailed) | .000 | .002 |
| Number of donkeys | Pearson Correlation | .184(**) | .040 |
| | Sig. (2-tailed) | .006 | .557 |
| | Sig. (2-tailed) | .887 | .605 |

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

**Chi-square statistical tests**

| **Statistic** | **Value** | **Df** | **Significant level** | **P – Level** |
|---|---|---|---|---|
| Pearson Chi-square | 15.399 | 6 | 0.170 | $P \leq 0.05$ |
| Somers' d | 0.116 | | 0.044 | $P \leq 0.05$ |
| Gamma | 0.186 | | 0.045 | $P \leq 0.05$ |

Further to confirmation by the crosstab that livestock incursions influence conflicts in the TWNP and the adjacent areas, the Pearson Chi-square (15.399) suggests a statistical significance of the relationship at $p \leq 0.05$, while the Somer'd and Gamma statistics suggest a moderate relationship between the two variables with the livestock incursions (independent variable) positively influencing conflicts (the dependent variable).

As a way of supporting the above findings, correlation analysis was undertaken which also showed a moderate relationship between livestock incursions into the TWNP and adjacent areas and the generation of conflicts, with a Pearson correlation coefficient (r) of 0.136, significant at $p \leq 0.05$ level

 

## 4. Discussion

Wildlife-human conflicts can be described as a situation whereby the use of the land resources by humans and wildlife affect or are perceived to affect each other in a negative manner. Different scholars from various disciplines have suggested, implied, or stated that domestic livestock compete with wildlife over natural resources (Averbeck *et. al.* 2009; Low *et. al.* 2009; Young *et. al*. 2005); livestock facilitate wildlife (Gordon, 1988); livestock co-exist or do not compete with wildlife (Homewood *et. al*. 2001; Sitters *et. al*. 2009); or that livestock both facilitate and compete with wildlife (Odadi *et. al.*; 2011).

The conflict can be viewed in the way the communities move into the protected areas with their livestock to graze and also to collect fire wood and hunt game animals affecting the welfare of the wild animals. So the local communities were displaced and prevented from using park resources leading to their resentment. They were deprived their livelihood. The local communities are excluded in any decision making regarding park management (Mwale, 2000). The gazettement of TWNP in 1948 was made without sufficient consultation of the adjacent communities and without or no adequate compensation for displaced households. This has resulted to continuous conflict between the park and the local communities. At Kamnarok national reserve in Baringo County gazetted in 1984, the local community still reside inside the reserve despite several attempts by the government to remove them because they were not properly consulted. At Kyulu of Makueni County, squatters are living with no alternative livelihoods, proper shelter or land to till for food after being evicted from Chyulu hills national park (Mosse , 2003)

*4.1 Land use system and wildlife-human conflicts*

The land use system practiced by the communities living around the TWNP and the adjacent farms is not compatible with the management of wildlife. The communities practice crop agriculture and livestock keeping on small land sizes which are fenced. These create barriers for wildlife to access their dispersal areas and migratory routes and also end up destroying crops. The conflicts generated by the land use are currently increasing due to the increase in human population and the changing land use systems making the long term viability of the protected area to be questionable. The Global Environmental Fund (GEF, 1992) recommends that there should be a larger area adjacent to the park whose management is compatible with conservation and that can be integrated for park use. This fact has been overlooked in the development of protected areas.

*4.2 Livestock encroachment into the TWNP*

The influx of livestock into the park for grazing and water is a common problem that was identified by the study. The problem is created by the communities as they keep many animals in very small pieces of land that they own. This causes them to seek grazing inside the protected area. Habitat and dietary overlap in the distribution of both wildlife and livestock have often been cited as the primary mechanism by which competition occurs (Beck and Peek, 2005; Georgiadis *et. al.* 2007; Madhusudan, 2004; Sitters *et. al*.; 2009; Zhongqiu *et. al*.; 2008).

The recommended minimum area for a Tropical Livestock Unit (TLU), which is an animal weighing 250 kg or its equivalent, is estimated to be between 3 and 7 ha (7 and 17 acres) per TLU (Bekure *et al*, 1991). The land area allocated for each animal by the households was calculated by dividing the number of animals owned by the households and the total acreage of land owned by the household. This revealed an average of 2.2 acres (0.891 ha) allocated per animal (cattle), which is very low considering that the recommended one for the area based on annual precipitation is between 7 and 17 acres (3 to 7 ha) per animal or an average of 12 acres (4.85 ha).

The history of cattle grazing in the park started way back before the conception of TWNP. This is because most the communities adjacent to the park are pastoralist/agro pastoralist (Maasai, Kamba, Taita, Taveta) and used to graze in the park even before the gazzettement of the park. They were displaced and denied access to the park resources (Lindsay,1987). The government should build capacity to the local people on more viable land use practises compatible to wildlife conservation. The influx of livestock from Somalis to the park as alluded by the park authority is becoming a serious challenge.

## 5. Conclusion and Recommendations

Conflicts in resource use do exist between the park management and local communities. People and livestock do enter the park for resources not adequate outside the park during dry season.

The gazettement of TWNP in 1948 was made without sufficient consultation with the communities living in the area and with no adequate compensation for displaced households. This has resulted to continuous conflict between the park and the local communities who still believe that they have right over resources inside the park.

There is need to develop policy that integrates traditional ecological knowledge, innovations, and practices of indigenous communities embodying traditional styles that are relevant to conservation.

The management of wildlife in protected areas should be participatory and local people need to be fully involved in decision making and planning processes.

There is need for the enactment of a land use policy that designates various development activities and wildlife as an important form of land use. This will provide clear zonation, setting aside areas for grazing, human

 

settlement and agriculture.
Setting up a compensation scheme for losses incurred from wildlife – loss of livestock to predators, crop raiding and loss of human life.

**Reference**

Aboud, A. A. (1989), The role of public involvement in wildlife and livestock conflicts. The case of Narok Ranches in Kenya, society and Natural resources, Vol. 2 Pgs. 319-328.

Averbeck, C, A. Apio, M Plath, and T. Wronski. (2009). Environmental parameters and anthropogenic effects predicting the spatial distribution of wild ungulates in the Akagera savannah ecosystem. Afr J Ecol 47: 756–766. Publisher Full Text

Beck, J.L., and J.M. Peek,( 2005). Diet composition, forage selection, and potential for forage competition among elk, deer, and livestock on aspen-sagebrush summer range. Rangel Ecol Manage 58: 135–147. Publisher Full Text

Bekure, F. S.; P. N. de Leew; B. E. Grandin; & P. J. H. Neate. (1991), An analysis of the livestock production system of the Maasai pastoralists in eastern Kajiado district, Kenya international livestock center for Africa systems study. Addis Ababa, Ethiopia: ILCA (now ILRI).

Bell, R.H.V. (1984) The man-animal interface: an assessment of crop damage and wildlife control. In Conservation & Wildlife Management in Africa. (eds. R.H.V. Bell & E. Mcshane-Caluzi), pp. 387 - 416. US Peace Corps, Malawi.

Broten, M., and M. Said. (1995). Population trends of ungulates in and around Kenya's Masai Mara Reserve. In Serengeti II: Dynamics, management and conservation of an ecosystem, ed. Sinclair ARE, Arcese P, 169–193. University of Chicago Press, Chicago.

Chatty, D. and Colchester, M. (eds). (2002)' Conservation and Mobile Indigenous Peoples: Displacement, Forced Settlement, and Sustainable Development. Berghahn Books, New York.

Chiemelu, N. (2004)' At whose experience?: Policy formation in wildlife conservation and human conflicts in Kenya, International Relations and History (http://www.watsoninstitute.org/ge/watson scholars/NkirukaChiemelu.doc ).

Colchester, M. (2004). Conservation policy and indigenous peoples. Environment Science and Policy, 7: 145-153

GEF. (1992). Guidelines for monitoring and evaluation of biodiversity projects. Washington DC: World bank.

Georgiadis, N., J.G.N. Olwero, G. Ojwang, and S.S. Romañach. (2007). Savanna herbivore dynamics in a livestock-dominated landscape: I. Dependence on land use, rainfall, density, and time. Biol Conserv 137: 461–472.

Gordon, I.J. (1988). Facilitation of red deer grazing by cattle and its impact on red deer performance. J Appl Ecol 25: 1–9.

Hoare R. E. (2001)' Management implications of new research on problem elephants. Pachyderm 30: 44-48.

Lamprey, R.H., and R.S. Reid. (2004). Expansion of human settlement in Kenya's Maasai Mara: What future for pastoralism and wildlife? J Biogeogr. 31: 997–1032. Publisher Full Text

Lindsay. W. K. (1987), Integrating parks and Pastoralists: some lessons from amboseli. In *Conservation in Africa; people, Policies and practices, pp*. 145-149. D Anderson and R. Grove (Eds.) Cambridge University Press, Cambridge.

Lockwood. M, Graeme. L, & Kothari. A (2006)' Managing Protected Areas: A global guide. Cromwell Press, Trowbridge, UK.

Low, B., S.R. Sundaresan, I.R. Fischhoff, and D.I. Rubenstein. (2009). Partnering with local communities to identify conservation priorities for endangered Grevy's zebra. Biol Conserv 142: 1548–1555.

Madhusudan, M.D. (2004). Recovery of wild large herbivores following livestock decline in a tropical Indian wildlife reserve. J Appl Ecol 41: 858–869.

Mosse M. N. (2003), Resolving Resource use conflicts in Chyulu Hills National Park and its environs. by Margaret N.Mosse MSc. thesis Egerton University.

Mwale, S. (2000)' Changing relationships: The history and future of wildlife conservation in Kenya. Swara, 22(4), 11–17.

Odadi, W.O., M. Karachi, S. Abdulrazak, and T.P. Young. (2011). African wild ngulates compete with or facilitate cattle depending on season. Science 333: 1753–1755. PubMed Abstract |

Ogutu, J.O., N., Owen-Smith, H.P. Piepho, and M.Y. Said. (2011). Continuing wildlife population declines and range contraction in the Mara region of Kenya during 1977–2009. J Zool 285: 99–109. Publisher Full Text

Reid, R, M.E. Rainy, C.J. Wilson, E. Harris, R.L. Kruska, M.N. Waweru, S.A. MacMillan, and J.S. Worden.

 

(2001). Wildlife cluster around pastoral settlements in Africa, creating multiple species associations of wildlife, livestock and people, PLE Science Series # 2. International Livestock Research Institute, Nairobi.

Reid, R., P.K. Thornton, and R. Kruska.(2004). Loss and fragmentation of habitat for pastoral people and wildlife in east Africa: Concepts and issues. African Journal of Range and Forage Science 21: 171–181.

Sitters, J., I.M.A. Heitnig, M. Holmgren, and G.S.O. Ojwang. (2009). Herded cattle and wild grazers partition water but share forage resources during dry years in East African savannas. Biol Conserv 142: 738–750.

West, P., Igoe, J., & Brockington, D. (2006)' Parks and peoples: the social impact of protected areas. Annu. Rev. Anthropol. 35:251-77.

Western, D., S. Russell, and I. Cuthill. (2009). The status of wildlife in protected areas compared to non-protected areas of Kenya. PLoS One 4: 1–6. Young, TP, T Palmer, and ME Gadd. 2005. Competition and compensation among cattle, zebras, and elephants in a semi-arid savanna in Laikipia, Kenya. Biol Conserv 122: 351–359.

Zhongqiu, LI., J. Zhigang, and LI. Chunwang. (2008). Dietary overlap of Przewalski's Gazelle, Tibetan Gazelle, and Tibetan Sheep on the Qinghai-Tibet Plateau. Journal of Wildlife Management 72: 944–948.