**International Journal of Agriculture, Environment and Bioresearch**

Vol. 3, No. 03; 2018

ISSN: 2456-8643

# AN ASSESSMENT OF HUMAN-WILDLIFE CONFLICT ON KUMBA FARMLANDS, SOUTHWEST REGION, CAMEROON

**Melle Ekane Maurice, Nkwatoh Athanasius Fuashi, Ngome Laura Mesame, Ekabe Quenter Mbinde, Chokeh Irene Chutame3, Mbole Veronique**

Department of Environmental Science, Faculty of Science, University of Buea, Southwest Region, Cameroon

## ABSTRACT

One of the most common conflicts between people and wildlife takes the form of crop- foraging. Unfortunately, conservation research already executed is yet to have break-through in this domain, especially in countries like Cameroon where wildlife research value lacks enough financial motivation. Hence, the main objective of this survey is to explore the human-wildlife conflict within the farming areas of Kumba municipality. For this to be met three hundred questionnaires were administered to a population sample of local farmers in the study area. The research data obtained from the field was analyzed by using Chi-square and correlation analysis. The survey recorded a significant association between Gender and Crop-type cultivated by the local farmers in Kumba municipality ($X^2$ = 83.608, df=4, P <0.05). Similarly, Gender also showed a significant relationship with the harvesting of Non Timber Forest Products by the residents of Kumba ($R^2$ = 0.660, P<0.05). In addition, Gender revealed a significant association with the methods used in fighting wildlife destruction in farms ($X^2$ = 65.861 df=5, P<0.05). Also, the survey has shown Tubers like yams, cocoyam, cassava, sweet and Irish potatoes top in yield (49.33%). The survey further recorded an extremely high score on bush mango harvest (74.67%). Moreso, the application of aerosol pesticides as a deterrent to wildlife from crop destruction showed 48.00%. The human-wildlife conflict in Cameroon would reduce when the State government embarks on proper mitigation measures such as compensating the farmers whose local crop-farms have been destroyed by wildlife.

**Keywords**: Wildlife, Crop-type, Crop-foraging, Crop destruction, Local farmers

## INTRODUCTION

Human-wildlife conflict has been identified as one of the most critical threats to many wildlife species and is now recognized worldwide as an issue of high conservation concern (IUCN 2005). It is one of the most difficult problems that conservation managers face in Africa, and poses a significant threat to the success of African conservation initiatives (Hill *et al.* 2002). Human- wildlife conflict has been defined as a negative impact of the needs and behaviour of wildlife on the goals of humans, or a negative impact of the goals of humans on the needs of wildlife (IUCN 2005); as such human-wildlife conflict can have negative impacts on both the humans and wildlife involved.

Despite the benefits of shared territories, it is wildlife's proximity to human areas, mainly occurring through human colonization of animal territories, that leads to conflict (Knight 2001). Once in close proximity to one another, competition over habitat and natural resources

Vol. 3, No. 03; 2018

ISSN: 2456-8643

is the core reason for conflict between wildlife and people (Goedeke & Herda-Rapp 2005). Human behaviour, such as planting highly palatable crops near forest edges (Riley & Priston 2010), and animal behaviour, such as the ability to adapt well to human environments (Agetsuma 2007; Henzi *et al*. 2011), both promote the opportunities for conflicts to occur.

Human-wildlife conflict is usually described in terms of how wildlife affects people, occurring in the form of damage to crops, predation on livestock and managed wildlife, residential damage, vehicle collisions, direct competition for natural resources, disease transmission between wildlife and people in close proximity and, least common but most emotive, attacks on human life (Thirgood *et al.* 2005). Damage by wildlife is often viewed as a rural or agricultural problem (Messmer 2000) and conflict peaks where wildlife directly deplete human livelihoods or food supplies by foraging in crop fields or taking livestock (Treves & Karanth 2003; Marchal & Hill 2009). Conflict also occurs however in urban areas (Lamarque *et al*.2008). People of course affect wildlife too, in the form of habitat destruction, introduction of non-native species, overexploitation, competition for and often exclusion from resources, disease transmission, and killing of wildlife (Messmer 2000; Treves & Karanth 2003). Human-wildlife conflict thus has negative impacts on both wildlife and humans, as well as the environment (Osborn & Hill 2005).

Human-wildlife conflict is estimated to cost $22.3 billion in losses per year in the United States alone, of which $4.5 billion is agricultural losses (Manfredo 2009). The direct costs of conflict to humans are the loss of livelihood and in the most extreme cases loss of life (Rajpurohit & Krausman 2000; Anthony *et al.* 2010). Loss of livelihood can result in substantial social costs, such as reduced access to resources, education, health care, labour, land tenure and food availability, even famine in extreme cases (Webber 2006). Conflict can impede development and social equality (Woodroffe *et al.* 2005). Indirect costs include the investments made in attempting to prevent wildlife damage and the associated increased risk of injury from wildlife, as well as missed opportunity costs in terms of alternative income and disruption of schooling (Hill 2004; Thirgood *et al.* 2005).

Extinction of a species is the ultimate cost of conflict to wildlife (Woodroffe *et al.* 2005). Lethal control by shooting and poisoning was a leading factor in the extinction of the Guadelupe caracara (*Polyborus lutosus*), a raptor that was reported to prey upon juvenile goats, while sheep depredation and consequent lethal control led to the extinctions of the thylacine (*Thylacinus cynocephalus*) and the Falkland Island wolf (*Dusicyon australis*) (Woodroffe *et al.* 2005). Many species have also suffered serious population declines as a consequence of active persecution. Lions (*Panthera leo*) in Kenya are in decline due to killing by Maasai people, shaped by perceptions of livestock depredation (Hazzah *et al.* 2009).

Conflict can also cause displacement or range decreases of wild animal populations. Prairie dogs (*Cynomys ludovicianus*) remain in less than 2% of their former distribution in North America, after being subjected to a massive government sponsored poisoning campaign

Vol. 3, No. 03; 2018

ISSN: 2456-8643

(Woodroffe *et al*.2005). Wolves (*Canis lupus*) were displaced from areas of a wildlife sanctuary bordering local villages, after litters were destroyed by locals in response to perceptions of livestock depredation (Mishra 1997).

The purpose of this study is to explore the association of wildlife to farmlands within Kumba municipality. Cameroon is dominated by a farming population from north to south, and this has degraded the rainforest consistently to the level that many flora species are highly threatened and some are already extirpated in the wild in some ecological regions. The traditional farming system in Kumba municipality and other parts of the country has suffered a long standing war with wildlife population, consequently, causing its population to decline due human destruction in farmlands. This conflict is seriously affecting crop-yield negatively in kumba and other parts of the country.

## MATERIALS AND METHOD

### Description of the study area

Kumba is one of the cities in the Southwest Region of Cameroon. It is found at latitude 4º,64' North and longitude 9º,45' East with an elevation of 258m above the sea level, with a population of about 144,413 (Melle, and Ewane 2015). Kumba has a coastal equatorial climate, with two distinct seasons, a long rainy season of 8 months and a short dry season of 4 months. The annual amount of rainfall ranges from 2000m to 4000mm.

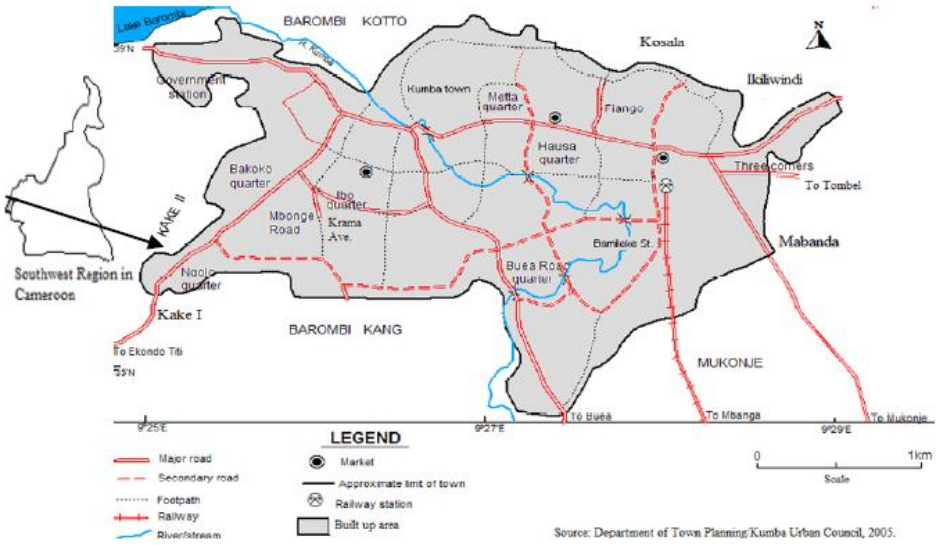


**Figure 1.** The map of Kumba (Department of Town Planning/KUC, 2005).

The rainfall pattern provides a suitable condition for both perennial and annual crops to grow, thus providing an ideal condition for two cropping seasons a year (Melle, and Ewane, 2015). The rainfall here is one of the most important climatic factors influencing agriculture. Daily

Vol. 3, No. 03; 2018

ISSN: 2456-8643

temperatures are high throughout the year and ranged from 28°c to 33°c. The atmospheric humidity varies with the absolute value and the seasonal distribution of the rainfall being uniformly high throughout the wet season and falling to lower level during the dry season. (Nkeng, 2009). Kumba municipality is mainly characterized by a coastal lowland possessing some wetland and flood zones. The lowland areas are the sites favorable for human settlement. The forest exploitation for farmland destroys the habitat of many wildlife species rendering them vulnerable to severe poaching. This is the main reason for the disappearance of many of the forest fauna species that existed in Kumba in the past. However, a few wildlife species still exist in the area (Ndam, *et al* 2002).

Food crop farming is the most important source of livelihood of the population around this area. The forest as direct source of income and subsistence through hunting and gathering is not very important for the overall population. Plantains, cocoyam and cassava are the most important agricultural products and contribute more than twice as much as cocoa and coffee to the daily livelihood. However, cocoa remains the main bulk income earner of the area (Ndam, 1998). On average the settlements are engaged in 3.7% alternative income-generating activities, but beside the various forms of livestock rearing, only beekeeping, cassava processing, fuel wood and timber harvesting have any relevance for the rural population. Agriculture is presently the most important economic activity carried out in the area, employing about 95% of the population, while timber exploitation, hunting and petty trading are also practiced by some inhabitants. Farm sizes range between 0.25 ha to more than 10 ha on average (Ndam, *et al* 2002). Non-indigenous farmers own the largest farms and account for most of the agricultural production of the area (Ndam, 1998). Livestock rearing is practiced for subsistence and for cultural sacrifices, which require the slaughtering of animals.

**Data collection and Analysis**

During this study, questionnaire was the main tool using for collecting data. The targeted population was largely literate and was unlikely to have difficulties responding to questionnaire questions, though a few of the respondents could not read and write, but with the help of interpreters, success was met. The questionnaire administration and oral interview was done by the researcher and some few friends who volunteered for the field-work. A period of one month was used for the data collection programme. Prior to the administration of the questionnaire a meeting was held with the authorities in the study area to pre-inform them on the purpose of the research and also the researchers' security guarantee assurance. This was facilitated by the letter written by the university authority that was handed to them. The collected data was analysed by the used of both inferential and exploration statistical models. SPSS version 20 was the main statistical tool used and Chi-square and Correlation programmes were used to test the association between variables.

**RESULTS**

The research results in fig. 2 has shown that Gender is significantly associated to the crop-type cultivated by the local farmers in Kumba municipality ($X^2$ = 83.608, df=4, P <0.05). Kumba

Vol. 3, No. 03; 2018

ISSN: 2456-8643

municipality is well known in Cameroon in the farming culture and the heavy production of both food and cash crops. The participation of both males and females in this farming exercise is very significant without discrimination. However, if you happen not to be good in farming your stay in Kumba might not be very meaningful even for the State office and private service workers. The farming culture in this part of the country has spread across all age classes, from the old people to the youths. Similarly, Gender has also shown in fig. 3 a significant relationship with the harvesting of Non Timber Forest Products by the residents of Kumba ($R^2$ = 0.660, P<0.05). The harvesting of Non Timber Forest Products has been a long standing tradition in Cameroon, especially in the English speaking Region. In most parts of this country, from south to north the consumption of these rainforest resources is very huge and very prominent in spicing most food delicacies. The involvement of both women and men in the harvesting of the forest resources is mainly for income generation. Inaddition, Gender has revealed in fig.4 a significant association with the methods used in fighting the destruction of wildlife to farms ($X^2$ = 65.861 df=5, P<0.05). The real area of human-wildlife conflict in this part of the world seems to be in farmlands. Crop cultivation has been very much hindered by wildlife population generating extreme low harvest and annual yields. Farmers have used all types of local methods to stop this crises but the wildlife population increase seems to be the major reason preventing success. Many farmers have resorted to killing these animals on their farmlands not necessarily for consumption but for the purpose of reducing their population in order to enhance crop cultivation and yields.

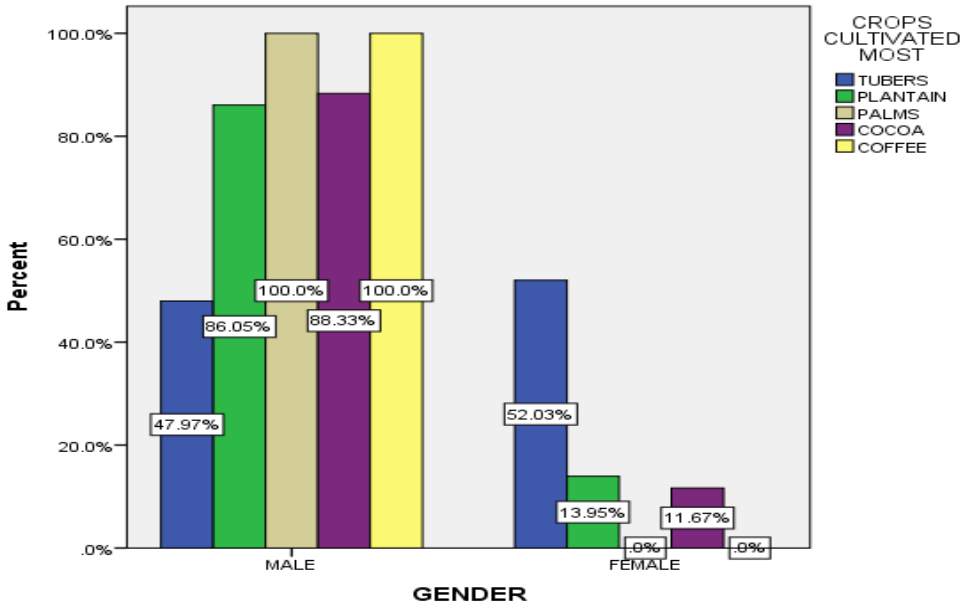


**Fig.2: Gender and Crop cultivation**

Vol. 3, No. 03; 2018

ISSN: 2456-8643

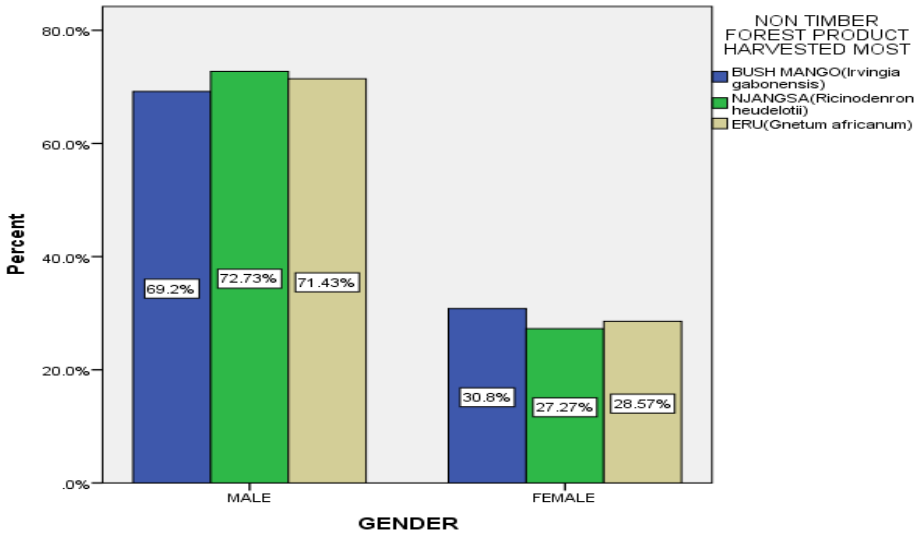


**Fig.3: Gender and the harvesting of Non Timber Forest Product(NTFP)**

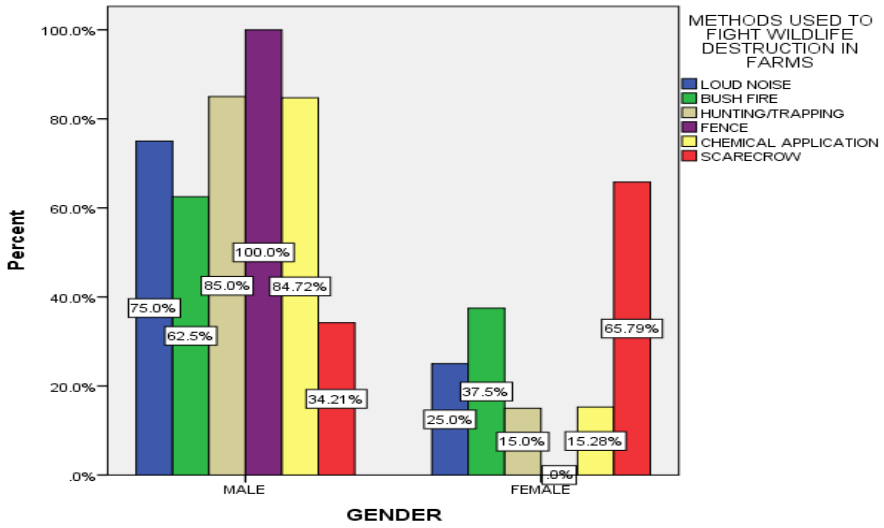


**Fig.4: Gender and the methods used in fighting wildlife destruction to farms**

Vol. 3, No. 03; 2018

ISSN: 2456-8643

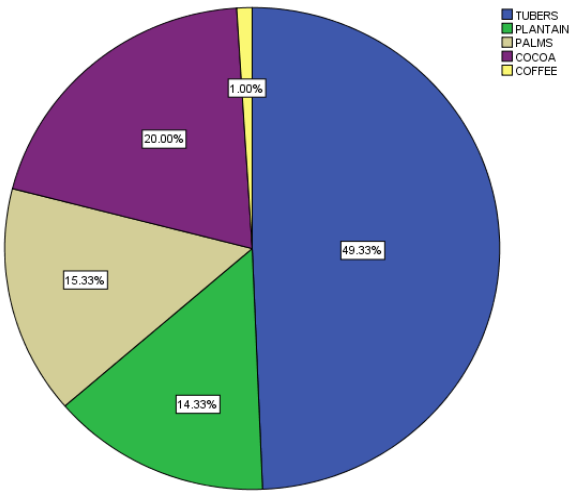


**Fig. 5: Crops cultivated**

In fig.5 the survey has shown Tubers like yams, cocoyam, cassava, sweet and Irish potatoes top in farm production (49.33%). Cameroonians generally are starch-feeders and heavily farm starch related food-crops, preventing a lot of money being spent on the importation of food-crop except for the rice, due its poor farming research that is yet to develop. The State government has also invested much income into crop-cultivation to help the local farmers who stand as the stake holders to the food market supply. Red palm farming recorded the least (1.00%) in this survey. Kumba has a climate that can grow palms healthily but not as much as the coastal areas where its production is comparatively high. For this reason the residents of Kumba municipality have for many years dependent on the importation of red palm oil from coastal neighboring areas like Ndian and Fako Division.

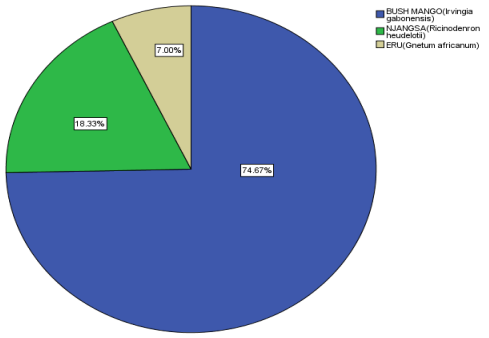


**Fig. 6: Non timber forest products**

Vol. 3, No. 03; 2018

ISSN: 2456-8643

There is a need for the people of Kumba and other parts of Cameroon to be educated on the cultivation techniques of bush mango *(Irvingle gabonensis)* as shown in fig 6.This survey recorded an extremely high score of bush mango harvest (74.67%). This Non Timber Forest Product resource is harvested from the wild forest mostly for income, hence its exportation to neighboring Nigeria where it sells costlier is pushing its wild population and regeneration rate to breaking limits of extirpation. It is believed that the farming of this wild crop has been initiated timidly in some parts of Cameroon, but Kumba seems not to be engaged in this production research propagation exercise. The local wild plant was not very famous in the food menu of most households in the past, but today the consumption of bush mango in soup is gradually gaining grounds in most homes and even in the international food menu in standard five star hotels in Cameroon and neighboring countries. The concoction of bush mango and some other spices in soup attracts not only an appetite but also guaranties a swallowing sensation that facilitates the eating of pounded starchy food like fufu.

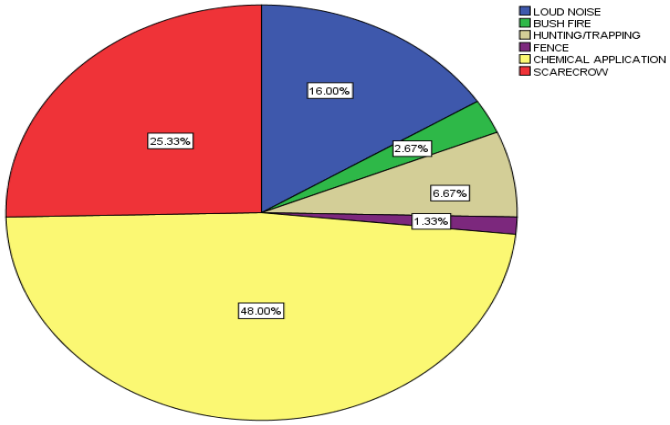


**Fig.7: Methods used to fight wildlife destruction**

The survey further showed in fig.7 that the application of aerosol pesticides is the most preferred method used by the local farmers in Kumba to protect their crops against animal pests (48.00%). Unfortunately, the local farmers using these chemicals for their crop protection do not have enough financial resources for farmland protection fortification. However, the environmental negative impact cost by using these chemicals in farms urges the State government to join the local farmers in order to disseminate educational knowledge to their application. The indiscriminate use of crop farmland chemicals in the agricultural industry has very severely affected and destroyed very important food chains in the aquatic ecological systems, specifically through the rain-surface-run-off contaminated which form the bulk of our streams and rivers.

## DISCUSSION

The impacts of human-wildlife conflict extend beyond negatively affecting human and wildlife populations and can affect entire ecosystems, the consequences of which are only just

Vol. 3, No. 03; 2018

ISSN: 2456-8643

beginning to be recognised (Woodroffe *et al*. 2005). Many conflict species are keystone species, whose removal can cause unexpected effects on the structuring of ecosystems and may cause the extinction of other species. For example, the absence of predators has been shown to cause an increase in herbivore numbers, in turn causing a decrease in vegetation, and consequently leading to a reduction in biodiversity (Terborgh *et al.* 2001). Grizzly bear (*Ursus arctos*) and wolf extirpation has led to an increase in moose abundance, changes in habitat structure and ultimately a decrease in nesting bird migrants (Berger et al. 2001). Elephants (*Loxodonta africana*) are a keystone species with significant roles in ecological dynamics and have the ability to profoundly affect the structure of entire ecological communities; their persistence outside protected areas is therefore important for the conservation of biodiversity (Graham *et al*. 2009).

Human-wildlife conflict can also directly drive further habitat destruction, when people convert habitat in a deliberate attempt to reduce contact between themselves and wildlife; this perhaps is more common than is realised (Wang *et al*. 2006). Maasai people converted traditional wildebeest (*Connochaetes taurinus hecki*) calving grounds to wheat farms in an attempt to eliminate wildebeest from these areas and minimise transmission of a disease from wildebeest to their cattle; this resulted in an 81% reduction in the local wildebeest population (Ottichilo et al. 2001). Loss of yields via crop raiding can also result in the need for farmers to cultivate progressively larger areas (Woodroffe *et al.* 2005). Lastly, conflict can jeopardise species conservation and requires increased resources from conservation managers (Baruch-mordo *et al.* 2009).

Human-wildlife conflict is not a new phenomenon, and has been occurring for centuries (Lamarque *et al.* 2008). Scientific data suggest that the annual frequency and severity of conflicts are rising (Manfredo 2009). For example, complaints from producers of black bear (*Ursus americanus*) depredation on agriculture in Massachusetts increased by 167% from 1980 to 1990 (Jonker *et al.* 1998); 93% of farmers interviewed around Budongo Forest Reserve, Uganda believe that wildlife crop-raiding increased over the previous 10 years (Tweheyo *et al.* 2005); the killing of livestock by wild carnivores increased over five years in India (Mishra 1997).

The increase in human-wildlife conflict can be attributed to a number of factors. Human-wildlife conflict increases with the growth of human populations (Torres et al.1996; Woodroffe 2000). The world's human population is now at 7.1 billion (World Bank 2015). Despite a decline in growth rate since the 1960s, absolute increments in population are still very large (Alexandratos 1999), and population numbers are expected to reach 9 billion within the next 35 years (Manfredo 2009).

Increased human populations lead to a variety of other circumstances which pave the way for increased levels of conflict. With more human mouths to feed, agriculture expands and

Vol. 3, No. 03; 2018

ISSN: 2456-8643

intensifies (Tweheyo et al. 2005; Nahallage et al. 2008; Marchal & Hill 2009), despite the world already producing more food than people can consume (Alexandratos1999). From 1700 to 1980 the world total of land under cultivation increased by 466%; current world agricultural production is likely to keep up with, or exceed, increase in demand as it has in the past (Meyer & Turner II 1992). 37.7% of the world's land cover is now under cultivation (World Bank 2013a) and the human population currently channels over 40% of terrestrial net primary productivity to their own ends (Robinson 2005); demand for food is predicted to grow by 50-60% by 2030 (Scherr & McNeely 2002).

Extinction of a species is the ultimate cost of conflict to wildlife (Woodroffe *et al.* 2005). Lethal control by shooting and poisoning was a leading factor in the extinction of the Guadelupe caracara (*Polyborus lutosus*), a raptor that was reported to prey upon juvenile goats, while sheep depredation and consequent lethal control led to the extinctions of the thylacine (*Thylacinus cynocephalus*) and the Falkland Island wolf (*Dusicyon australis*) (Woodroffe *et al.* 2005). Many species have also suffered serious population declines as a consequence of active persecution. Lions (*Panthera leo*) in Kenya are in decline due to killing by Maasai people, shaped by perceptions of livestock depredation (Hazzah et al. 2009).

Conflict can also cause displacement or range decreases of wild animal populations. Prairie dogs (*Cynomys ludovicianus*) remain in less than 2% of their former distribution in North America, after being subjected to a massive government sponsored poisoning campaign (Woodroffe *et al.* 2005). Wolves (*Canis lupus*) were displaced from areas of a wildlife sanctuary bordering local villages, after litters were destroyed by locals in response to perceptions of livestock depredation (Mishra 1997).

Different species have varying abilities to cope with human encroachment and the resulting conflict (Woodroffe *et al.* 2005). Many fare poorly when human-induced changes disrupt their surroundings, and as a result their populations frequently decline so drastically that they become rare, endangered or extinct. Some species however adapt well in an anthropogenic landscape and have flourished under these conditions. Species such as sika deer (*Cervus nippon*) and Japanese macaques (*Macaca fuscata*) are able to adapt various aspects of their ecology, including diet, range use and daily rhythm, to proactively explore novel environments (Agetsuma 2007). Yet overabundant species can pose similar problems as exotic or introduced species, reducing natural diversity by monopolising resources, changing species composition and can be devastating for the less adaptable, rarer species (Garrott *et al.* 1993). For example, extensive timber cutting boosted white-tailed deer populations, which in turn led to detrimental effects on plant communities (Alverson *et al.* 1988).

## COCLUSION

Most countries in sub Sahara Africa are poor in exportation of resources that would help them generate internal revenue and foreign exchange for international business transactions. However,

Vol. 3, No. 03; 2018

ISSN: 2456-8643

wildlife tourism has been the only natural element to help survive the economies of these nations, thus, the conflict between humans and wildlife specifically on farmlands, aggravated by wildlife poaching and social insecurity seem to defeat this last economic generation hope for the people causing them to live in sustainable poverty. This study has revealed that the use of illegitimate methods like application of very toxic chemicals to control the population of wildlife on local farmlands might be a time bomb for both the ecosystem and wildlife population much needed for the tourism industry. The State government extensive farming education and subsidies given to local farmers in enhancing sustainable agricultural practice is yet to give an expected growth respond that would nationalize and internationalize crop-production capacity. The global exponential increase in living cost has severely affected developing nations like Cameroon, a situation aggravated by the importation of food resources like rice, oil, and fish that they themselves could produce. However, the human-wildlife conflict in Cameroon would reduce when the State government would seriously embark on mitigations factors like the compensation of farmers whose local crop-farms have been crop-raided by wildlife.

**REFERENCE**

Agetsuma, N., 2007. Ecological function losses caused by monotonous land use induce crop raiding by wildlife on the island of Yakushima, southern Japan. *Ecological Research*, 22(3), pp.390–402.

Alexandratos, N., 1999. World food and agriculture: outlook for the medium and longer term. *Proceedings of the National Academy of Sciences of the United States of America*, 96(11), pp.5908–14.

Alverson, W.S., Waller, D.M. & Solheim, S.L., 1988. Forests too deer: edge effects in northern Wisconsin. *Conservation Biology*, 2(4), pp.348–358.

Anthony, B.P., Scott, P. & Antypas, A., 2010. Sitting on the fence? Policies and practices in managing human-wildlife conflict in Limpopo Province, South Africa. *Conservation and Society*, 8(3), pp.225–240.

Baruch-Mordo, S., Breck, S.W., Wilson, K.R. & Broderick, J., 2009. A tool box half full: how social science can help solve human–wildlife conflict. *Human Dimensions of Wildlife*, 14(3), pp.219–223.

Berger, J., Stacey, P.B., Bellis, L. & Johnson, M.P., 2001. A mammalian predator-prey imbalance: grizzly bear and wolf extinction affect avian neotropical migrants. *Ecological Applications*, 11(4), pp.947–960.

Goedeke, T.L. & Herda-Rapp, A., 2005. Introduction. In Herda-Rapp A. & Goedeke T.L., eds. *Mad About Wildlife: Looking at Social Conflict Over Wildlife*. Brill Academic Publishers, pp. 1–21.

Vol. 3, No. 03; 2018

ISSN: 2456-8643

Graham, M.D., Douglas-Hamilton, I., Adams, W.M. & Lee, P.C., 2009. The movement of African elephants in a human-dominated land-use mosaic. *Animal Conservation*, 12, pp.445–455.

Hazzah, L., Borgerhoff Mulder, M. & Frank, L., 2009. Lions and warriors: social factors underlying declining African lion populations and the effect of incentive-based management in Kenya. *Biological Conservation*, 142(11), pp.2428–2437.

Henzi, S.P., Brown, L.R., Barrett, L. & Marais, A.J., 2011. Troop size, habitat use, and diet of Chacma baboons (*Papio hamadryas ursinus*) in commercial pine plantations: implications for management. *International Journal of Primatology*, 32(4), pp.1020–1032.

Hill, C.M., 2004. Farmers' perspectives of conflict at the wildlife-agriculture boundary: some lessons learned from African subsistence farmers. *Human Dimensions of Wildlife*, 9(4), pp.279–286.

Hill, C.M., Osborn, F. & Plumptre, A.J., 2002. *Human-Wildlife Conflict: Identifying the problem and possible solutions. Albertine Rift Technical Report Series Vol.1*, New York: Wildlife Conservation Society.

IUCN, 2005. *Benefits Beyond Boundaries. Proceedings of the Vth IUCN World Parks Congress*, IUCN, Gland, Switzerland and Cambridge, UK.

Jonker, S.A., Parkhurst, J.A., Field, R. & Fuller, T.K., 1998. Black bear depredation on agricultural commodities in Massachusetts. *Wildlife Society Bulletin*, 26(2), pp.318–324.

Knight, J., 2001. *Natural Enemies: People-Wildlife Conflicts in Anthropological Perspective*, London: Routledge.

Kumba Urban Council (2005). The Map of Kumba Urban Council

Lamarque, F., Anderson, J., Chardonnet, P., Fergusson, R., Lagrange, M., Osei-Owusu, Y., Bakker, L., Belemsobgo, U., Beytell, B., Boulet, H., Soto, B. & Tabi Tako-Eta, P., 2008. *Human-wildlife conflict in Africa. An overview of causes, consequences and management strategies*, Rome: International Foundation for the Conservation of Wildlife, Food and Agriculture Organisation of the United Nations.

Manfredo, M.J., 2009. *Who Cares About Wildlife?: Social Science Concepts for Exploring Human- Wildlife Relationships and Conservation Issues*, Springer Science & Business Media.

Marchal, V. & Hill, C.M., 2009. Primate crop-raiding: a study of local perceptions in four villages in North Sumatra, Indonesia. *Primate Conservation*, 24, pp.107–116.

Vol. 3, No. 03; 2018

ISSN: 2456-8643

Melle, E. M.and Ewane H. N. (2015). The evaluation of bush-meat consumption in Matoh Butu, Kumba, Southwest Region, Cameroon, pp. 23-24

Messmer, T.A., 2000. The emergence of human-wildlife conflict management: turning challenges into opportunities. *International Biodeterioration & Biodegradation*, 45, pp.97–102.

Meyer, W.B. & Turner II, B.L., 1992. Human population growth and global land-use/cover change. *Annual Review of Ecology and Systematics*, 23, pp.39–61.

Mishra, C., 1997. Livestock depredation by large carnivores in the Indian trans-Himalaya: conflict perceptions and conservation prospects. *Environmental Conservation*, 24(4), pp.338–343.

Nahallage, C.A.D., Huffman, M.A., Kuruppu, N. & Weerasingha, T., 2008. Diurnal primates in Sri Lanka and people's perception of them. *Primate Conservation*, (23), pp.81–87.

Ndam, N.; 1998. Tree regeneration. Vegetation dynamics and maintenance of biodiversity on Mount Cameroon: the relative impact of natural and human disturbance. Ph.D. Dissertation. University of Wales

Ndam, N., Healey, H. J., Cheek, M., Fraser, P. (2002). Plant recovery on the 1922 and 1959 Lava flows on the on the Mount Cameroon, Cameroon. *Syst. Geogr. Pl*., 71: 1023-1032

Nkeng. Philip, (2009). Assessment of Prunus africana bark exploitation methods and sustainable exploitation in the South west, North-West and Adamaoua regions of Cameroon

Osborn, F. V. & Hill, C.M., 2005. Techniques to reduce crop loss: human and technical dimensions in Africa. In Woodroffe, R., Thirgood, S. & Rabinowitz, A., eds. *People and Wildlife: Conflict or Coexistence?*. Cambridge University Press, New York, pp. 72–85.

Ottichilo, W.K., De Leeuw, J. & Prins, H.H.T., 2001. Population trends of resident wildebeest [*Connochaetes taurinus hecki (Neumann)*] and factors influencing them in the Masai Mara ecosystem, Kenya. *Biological Conservation*, 97(3), pp.271–282.

Rajpurohit, K.S. & Krausman, P.R., 2000. Human-sloth-bear conflicts in Madhya Pradesh, India.*Wildlife Society Bulletin*, 28(2), pp.393–399.

Riley, E.P. & Priston, N.E.C., 2010. Macaques in farms and folklore: exploring the human- nonhuman primate interface in Sulawesi, Indonesia. *American journal of primatology*,72(10), pp.848–54.

Robinson, J.G., 2005. Forward. In Woodroffe, R., Thirgood, S., & Rabinowitz, A., eds. *People and Wildlife: Conflict or Coexistence?* Cambridge University Press, Cambridge, UK, pp. xiii–xv.

Scherr, S.J. & McNeely, J.A., 2002. Common ground, common future: using ecoagriculture to raise food production and conserve wild biodiversity. Paper presented to *Symposium on Managing Biodiversity in Agricultural Ecosystems*, pp.5–22.

Terborgh, J., Lopez, L., Nuñez V., P., Rao, M., Shahabuddin, G., Orihuela, G., Riveros, M., Ascanio, R, Adler, G.H., Lambert, T.D. & Balbas, L., 2001. Ecological meltdown in predator-free forest fragments. *Science*, 294(5548), pp.1923–1926.

Thirgood, S., Woodroffe, R. & Rabinowitz, A., 2005. The impact of human-wildlife conflict on human lives and livelihoods. In Woodroffe, R., Thirgood, S. & Rabinowitz, A., eds. *People and Wildlife: Conflict or Coexistence?* Cambridge University Press, Cambridge, UK, pp. 13–26.

Torres, S.G., Mansfield, T.M., Foley, J.E., Lupo, T. & Brinkhaus, A., 1996. Mountain lion and human activity in California: testing speculations. *Wildlife Society Bulletin*, 24(3), pp.451–460.

Treves, A. & Karanth, K.U., 2003. Human-carnivore conflict and perspectives on carnivore management worldwide. *Conservation Biology*, 17(6), pp.1491–1499.

Tweheyo, M., Hill, C.M. & Obua, J., 2005. Patterns of crop raiding by primates around the Budongo Forest Reserve, Uganda. *Wildlife Biology*, 11(3), pp.237–247.

Wang, S.W., Curtis, P.D. & Lassoie, J.P., 2006. Farmer perceptions of crop damage by wildlife in Jigme Singye Wangchuck National Park, Bhutan. *Wildlife Society Bulletin*, 34(2), pp.359

Webber, A.D., 2006. *Primate crop raiding in Uganda: actual and perceived risks around BudongoForest Reserve*. PhD, Oxford Brookes University.

Woodroffe, R., 2000. Predators and people: using human densities to interpret declines of large carnivores. *Animal Conservation*, 3, pp.165–173.

Woodroffe, R., Thirgood, S. & Rabinowitz, A., 2005. The impact of human-wildlife conflict on natural systems. In Woodroffe, R., Thirgood, S. & Rabinowitz, A., eds. *People and Wildlife: Conflict or Coexistence?* Cambridge University Press, Cambridge, UK, pp. 1–12.

World Bank, 2013a. Agricultural land (% of land area). Available at: http://data.worldbank.org/indicator/AG.LND.AGRI.ZS/countries?display=graph [Accessed

Vol. 3, No. 03; 2018

ISSN: 2456-8643

March 4, 2016].

World Bank, 2015. *The Little Data Book 2015*, Washington, DC: World Bank.