MAN AND BEAST AT CROSSROADS: AN ANALYSIS OF HUMAN–WILDLIFE CONFLICTS IN WESTERN SERENGETI, TANZANIA

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Abstract

The study was designed to fathom the magnitude of the problem of destructive wild animals in Western Serengeti. Information was collected through literature reviews and fieldwork. A sample of five villages was investigated. The area suffers from wildlife crop damage valued at US$ 484,000 annually. Problem animals are elephants and wildebeests. Elephants have increased since 2000 due to increased anti-poaching activities. Food insecurity has increased as livelihood strategies are changing.

Wildlife has not seriously threatened human life. Attacks on livestock have been relatively low. Farmers have been unsuccessfully chasing animals by tin noises, hot chillies and fencing with tobacco and chilly shrubs. Game scouts have used blank cartridges and live ammunition. Culling of elephants, allowing for controlled ivory trade, paying compensation, and empowering game scouts were frequently mentioned strategies for solving the problem. Establishment of a Wildlife Management Area is arguably an alternative economic enterprise to agriculture. Existence of skewed power relations in villages needs to be adjusted to enhance blossoming of democratic processes that are a prerequisite for sustainable development.

Key words: problem animals, protected areas, Wildlife Management Areas, sustainable wildlife utilization, Western Serengeti, Tanzania

1.0 Introduction

Communities living adjacent to the Serengeti National Park (SNP) and the Ikorongo and Grumeti Game Reserves (IGGRs) live close to some of the largest herbivore and carnivore populations in the world (Kaltenborn et al, 2003:18). Increasing human population density, increasing land scarcity, and increasing land based economic activities in areas surrounding these protected areas (PAs) have led to a sharp demarcation of wildlife habitat and other land uses. Rapidly increasing wildlife populations in the PAs and the proximity of man and beast to each other have both heightened human-wildlife conflicts in the area.

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Complaints recently reaching the District Commissioner's Office in Mugumu from some of the affected villages have described the problem as serious both to crop damage and to human life (DC Sabaya, pers. comm.). However, the type of problem animals involved, the type and extent of crop damage done, and the impacts of problem animals on human and livestock life were not quite clear. This study was designed to fathom the magnitude of the problem and get answers to these issues.

2.0 Materials and Methods

The area under investigation comprises 3,500 square kilometres of land inhabited by communities adjacent to the SNP and the IGGRs in Western Serengeti. A sample of five villages was selected to represent communities suffering from problem animals. The villages selected were from three wards in Serengeti District. (Map).

Relevant information on the economy and social conditions of Western Serengeti was collected through literature review of existing documents and earlier research work done in the area. Yanda and Majule (2004), Mayengo (2004), Holmern et al (2004), Kaltenborn et al (2003), Looibooki et al (2002), Hill et al. (2002), Emmerton and Mfunda (1999) and Iwai (1997), among others, were reviewed and their data used together with those from the present study in writing this paper.

In the field quantitative data were collected through household interviews that were conducted using a structured questionnaire. The questions asked concerned household demography, household economy, land use problems and how these were being resolved at the household level. Other questions addressed the status of social services, housing and living conditions, and access and use of natural resources in the villages.

Qualitative data was acquired through focus group discussions (FGDs), interviews with key informants and individual farmers, and identification of the location and observation of the nature of the affected farm plots. The resulting data set contains information on household economics, types and trends of human-wildlife conflicts and measures taken by individual households in combating the problem.

3.0 Analysis of results

3.1 Socio-Economic Conditions

Emmerton and Mfunda (1999) describe the human population in Western Serengeti as diverse in ethnic terms. It comprises over 25 ethnic groups, including the Maasai. The human population of the area has grown from 158,984 people in 1967 to 176,609 in 2002, with an annual average growth rate of 3.3 percent. The average household size has been calculated as 5.5 members against the national average of 4.9 people.

Meanwhile, the population density has increased from 28 people per square kilometre in 1988 to 45 people per square kilometre in 2002. This is projected to rise to 69 people per square kilometre by 2007 (Yanda and Majule, 2004).

URT (2003) characterizes the residents of Western Serengeti as predominantly smallholder agriculturists, growing food crops such as cassava, maize, millet, sorghum, vegetables and beans. Cotton and rice are grown as cash crops.

While farm sizes in the area range widely (from an acre to 26 and above acres), 83 per cent of the agricultural households in the area own between an acre and 10 acres of land (Mayengo, 2004; Holmern et al, 2004). On average, a household owns only 2.5 acres of arable land.

Productivity of land in this mainly semi arid area is relatively low, largely depending on the weather and soil fertility. In a good year, one acre may produce between 5 and 160 bags of cassava, and between 14 and 30 bags of maize for farms without or with manure, respectively.

Almost 31,000 ha are under crops, yielding an average gross income of between US$ 555 and US$ 679 per household per year (URT, 2003). The household distribution of this income is, however, very skewed with a majority (68.1%) getting less than US$ 100 per year (Table 1).

Table 1: Household Distribution of Annual Income From Crop Production for Serengeti District, 2003

Household Income (US$)[1]	**Frequency (N)**	**%**
< 25	178	36.1
26 - 50	65	13.2
51 - 100	93	18.8
110 - 500	143	28.9
> 501	15	3.0
Total	494	100.0

Source: Adapted from Ma yengo, 2004:26

* Exchange rate was 1 US $ = Tsh 1,000

Livestock keeping is the second important contributor to the economy of Western Serengeti. Major types of livestock kept include cattle, goats, sheep, donkeys and poultry. It is estimated that 50 per cent of the agricultural households in the area keep cattle (Yanda and Majule, 2004; Holmern et al, 2004). The size of the herd per household ranges between 5 and 60 cattle. About 23 per cent of the households keeping cattle, own more than 20 herds of cattle.

However, due to land scarcity, it is impossible for one household to keep a large number of livestock in the homestead. A household can manage a maximum of 50 cattle only. Over and above that number, one has to distribute them to friends and relatives for keeping under the understanding that the latter will use the milk and manure.

Livestock determine the wealth of a person and are used as traditional banks. They are also important to the livelihood of the people in terms of food, ploughing and income generation through sale of milk, meat and skins. In 2003 some 61.5 per cent of the households in the area earned income from livestock and poultry keeping (Holmern et al, 2004). Cattle are also important for social cultural obligations such as payment of dowry and court fines (Yanda and Majule, 2004:10).

The livestock carrying capacity of the area has been calculated at around 90kg/ha. With the current stocking rate biomass of around 53kg/ha, that capacity may already have been exceeded in some areas, leading to overgrazing and localized soil erosion (Yanda and Majule, 2004: ibid). These ecological, demographic and livelihood characteristics provide the context for the wildlife-human interaction in Western Serengeti.

3.2 Problem Animals

From the interviews and FGDs it is clear that the whole study area suffers from problems caused by wild animals. The most notorious problem animals mentioned included elephants (Loxodonta africana), wildebeests (Connochaetes taurinus), zebras (Equus burchelli), lions (Panthera leo), hyenas (Crocuta crocuta), jackals (Canis sp.), and other smaller vermin.

In Nyamburi village, each of these animals harassed the village in different seasons. Lions invaded the village during the wet season from January to May. This is the time when lions have cubs and tend to avoid wet areas in the national park. From June to August, the most troublesome animals were migrant wildebeests and zebras moving from Ngorongoro and southern Serengeti to Maasai Mara National Reserve in Kenya. They tend to move in huge herds of more than a million animals at a time (Holmern et al, 2004:9). In the process, they destroy farms by eating the crops and trampling the farms.

Elephants were said to be the most notoriously destructive animals between November and December. Ostensibly because the Serengeti had increasingly become ecologically safer for wildlife and more robust than Maasai Mara in Kenya. Many elephants may be crossing over into the Serengeti and surrounding areas following their traditional migration routes and historic foraging areas, as noted by Bell (1984). During this time, elephants tended to move across this area in herds of up to 200 individuals, eating crops and trampling the farms. The most vulnerable crops to elephants were sorghum, finger millet, cassava, maize and sweet potatoes (Table 2).

Hyenas and jackals had no particular season. They tended to invade the villages throughout the year. Hyenas were dangerous mostly to dogs, goats and sheep, while mongooses were dangerous to poultry. This information is well corroborated by Holmern et al, 2004 and Kaltenborn et al, 2003.

3.2.1 Extent of the Problem

Villagers in Robanda were not consistent in discussing the human-wildlife conflict issue. The villagers' response to the issue was divided between those who said the problem was very serious, and those who said the problem was non-existent. The former were normal villagers who appeared to have been impacted and vulnerable to the problem, while the latter were mostly village government leaders who apparently had personal interests to guard.

Villagers who thought there was a human-wildlife interface problem reported that elephants had become such a problem that some people went and harvested nothing and thus faced food shortages. It was reported by one FGD participant that the problem was increasing to the extent that if measures were not taken soon enough villagers would be forced to move out of the village because of hunger.

However, the village leaders shouted down the person who gave this statement and his statement was qualified by saying that although the elephants were destroying farms, still villagers harvested good crops. One leader went as far as telling him to keep quiet, as after all he was not an Ikoma by origin. Hence he could not speak for the Ikoma people.

This situation is interesting from a sociological view point in that, much as the leadership was probably suspicious that the researchers were there to find ways and means to justify the relocation of the village as it sits on a wildlife migration corridor, it also suggests the existence of very skewed power relations in the village, whereby the leaders no longer represent the interests of their people.

Generally though, they were all agreed that elephants had increasingly become a menace in the village in the last four years. This data is corroborated by Iwai (1997)

who showed that even in the mid-1990s only 16 per cent of the households in Robanda village harvested sufficient amounts of food to feed themselves the whole year. The rest had to purchase food from sale of livestock and/or participation in off-farm income generation activities such as wage employment and petty business. Holmern et al. (2004) have further highlighted the importance of illegal hunting as an alternative livelihood strategy in the village.

In Nyamburi village the problem seems to have been increasing substantially between 2000 and 2005. The reasons for such an unprecedented increase were not quite clear from the FGDs. However, data from Park Nyigoti village interviews seem to throw some light onto this paradox. Villagers at Park Nyigoti reported that in the 1940s there was no wildlife problem at all in the area. This is because both human and animal populations were low in number. The area for wild animals was far from that of human settlements.

With the passing of time both populations have increased substantially. The reasons for the increase in animal populations are purportedly the increased efforts against illegal hunting and the impact of international moratorium against ivory trade. The government has also been expanding the area for wildlife conservation with the PA boundaries moving closer to human settlements. The villagers pointed out that currently the settlement area for the Park Nyigoti village was only 20 metres from the boundary of the Ikorongo Game Reserve.

3.2.2 Impacts on Crops

Table 2 illustrates the acres cultivated and those destroyed by wild animals in three of the sample villages. Although data for most crops is disjointed, those for maize, sorghum and finger millet show that crop damage by wild animals is quite extensive, with villages bordering the PAs bearing the brunt of the burden. Finger millet is the most vulnerable crop to elephants, followed by maize and sorghum. It was said that two elephants could sweep away an acre of sorghum in two hours. One old man told the meeting that in 2004 alone, he lost a total of five acres of maize, finger millet and sorghum to rouge elephants.

Table 2: Acres Cultivated and Destroyed by Wild Animals in Three sample villages in the 2004 Season

Crops Destroyed	Sample Villages											
	Park Nyigoti			Nyakitono			Robanda			Total Sample		
	AC	AD	%	AC	AD	%	AC	AD	%	AC	AD	%
Maize	298	119	40	206	30	15	47	20	43	551	169	31
Sorghum	461	35	8	361	60	17	218	84	39	1,040	179	17
Finger millet	38	23	61	161	48	30	13	0.5	4	212	72	34
Cassava	204	16	8	402	53	13	4	n.a.	n.a.	n.a.	n.a.	n.a.
Sweet potatoes	77	n.a.	n.a.	202	42	21	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cotton	n.a.	66	n.a.	1,314	24	2	n.a.	56	n.a.	n.a.	n.a.	n.a.
Beans	27	n.a.	n.a.	214	n.a.		15	n.a.	n.a.	n.a.	n.a.	n.a.

Key:

AC = Acres cultivated
AD = A cres destroyed
n.a. = D ata not available

Source: Field D ata, 2005.

Due to the magnitude of this problem, most farmers had reduced land under crop production, resulting in serious food shortages in villages like Robanda and Park Nyigoti. Foodstuffs in Nyakitono and Nattambiso villages were currently selling at twice the price of similar products in the district headquarters at Mugumu town.

Generally, the economic costs of crop damage by wildlife and agricultural opportunity costs incurred by the local communities because of wildlife conservation are very high. Based on crop values calculated by Emmerton and Mfunda (1999), wildlife crop damage is valued at US$ 484,000, or US$ 84 per household, while agricultural opportunity costs incurred are around US$ 540,000.

3.2.3 Impacts on Human Life

According to the interviews in 2004, lions attacked and badly injured four people in Nyamburi village, while elephants killed one person within the same year. Early in 2005, a lion killed one person in the same village.

In Park Nyigoti, the villagers remembered only two instances where wildlife had threatened human life. One was in 1999 when an elephant killed one person, and the other was in April 2005, when an elephant injured one old man.

In Nyakitono and Nattambiso villages (660 households and 2,172 people) wild animals were not a serious threat to human life. During the FGDs, people could remember only one incident in April 2005, when hyenas killed one old man.

So was the case for Robanda village (345 households and 2,365 people), where in early 2005 an elephant killed a person and a hyaena killed a child. Ironically, the elephant is

believed to be an incarnation of Machaba - the god of the Ikoma people residing in the village.

Generally, therefore, marauding wildlife seem not to have provided a serious threat to human life in the study area. This conclusion is corroborated by Kaltenborn et al., 2003 who showed that attacking, injuring and killing of people by wildlife accounted for only 5.2 per cent of the total human-wildlife conflicts in the area.

3.2.4 Impacts on Livestock

In Nyamburi village, it was estimated that the village lost at least three goats every day or around 50 heads of livestock every year. One old man said within three years he lost 30 goats.

Village statistics at Park Nyigoti showed that livestock had been affected by wildlife interaction in two ways. Firstly, they had been affected through contagious diseases such as wildlife trypanosomiasis (*ndigana*) and dysentery. According to the FGDs, there was a type of tick that is common to elephants which was contagious to cattle, causing animal dysentery. Also goats were prone to a lethal antelope disease. Wildebeests were reported to bring to livestock malignant cattharr. Also there was a problem of rabid dogs, which the villagers associated with livestock-wildlife interaction.

Secondly, livestock were also prone to being killed and eaten by carnivores. From last year, livestock keepers in Park Nyigoti lost more than 200 cattle and 17 goats to such diseases as well as being eaten by lions and hyenas in the village.

The village data in Nattambiso showed that last year the village lost 21 cattle, 4 goats, 14 sheep, and 54 dogs to wild animals. In Nyakitono village it was reported that 56 cattle, 32 goats, 10 sheep and more that 100 dogs were lost to marauding animals during the same period.

The loss figures given by the villagers should, however, be taken with a pinch of salt, as many livestock keepers tended to inflate damage reports to heighten their vulnerability to dangerous carnivores and possibly also to highlight the need for compensation from the government for the losses.

During the FGDs in Robanda the village, government officials reported that there had never been any livestock problem associated with wild animals. However, the village statistics showed that between January and June 2005, 30 cattle and 60 goats died due to animal attacks and disease.

Wildlife attacks on livestock seem generally to have been relatively low, probably due to the availability of enough prey for the carnivores within the PAs (Kaltenborn et al., 2003). Data from other sources corroborates this conclusion, showing that on average

1.9 livestock units had been killed or injured by wildlife predators in the area per household per year (Holmern et al, 2004). Applying the animal values developed by Looibooki et al (2002), this figure would correspond to a value of only US$ 48 per livestock keeping household per year.

3.2.5 Measures Taken to Combat the Problem

Apart from staying indoors after 6.00 pm in fear of elephants, people have taken various other measures to discourage animals from attacking their farms. Measures mentioned were mostly standard and commonly used elsewhere (Epimack and Kabigumila, 2002; Nahonyo, 2001; Kabigumila, 1992).

Table 3 shows the most common measures taken to combat the problem. Farmers in all sample villages have been chasing away the animals, especially elephants, by making tin noises, setting of fire and adding chillies into the fire hoping to choke the elephants. They also grew non-palatable crops for elephants, such as tobacco and chillies, as fences to their farms. Some villagers have also used torches at night for the same purpose.

In villages close to a Game Station scouts have been called in to scare away the animals using blank cartridges. At the worst, some problem animals have been killed. For example, between 2003 and 2004, four rouge elephants and two lions were killed at Nyamburi village by the game scouts.

Table 3: The Most Common Measures Taken by Villages to Combat Destructive Animals

Measures used	Sample Villages			
	Nyamburi	Park Nyigoti	Nyakitono & Nattambiso	Robanda
Making of tin noises	√	√	√	√
Lighting of fires	√	√	√	√
"Fencing" farms with tobacco and chilly plants	√	√	√	√
Scaring by blank cartridges	√			
Killing of animals	√			
Using scarecrows and effigies		√		
Building of strong kraals within compounds		√		
Painting surrounding trees with smelly oil			√	
Special fund to mitigate				√

Source: Field Data, 2005

Although in Robanda the village leadership denied of any problem with wild animals they reported that the village had put aside a special fund to mitigate the problem. For the year 2005, the village government had set aside Tsh. 4 million[2] that would be used to compensate those who would face shortage of food because of the problem of wild animals.

[2] About US$ 3,640

It was also reported that the village government had advised the people to cultivate during the short rains, between June and September, when the Great Migration had passed.

Unfortunately, all these measures had proved a failure. Not only were the measures tedious, time-consuming and labour demanding, the elephants specifically no longer feared the tin noises nor the fire. Somehow the elephants had got used to these noises. They also seemed not to be any longer physically affected by tobacco or chillies, as they passed through the tobacco and chilly fences with impunity; sometimes even uprooting them to allow their young to pass through safely. The available game scouts were very few in the field, had few bullets and no transport.

3.2.6 Suggested Strategies

During the FGDs, the villagers were also asked to propose strategies that could be used to solve the perceived human-wildlife conflict in the area. The villagers felt that the government needed to be more serious on this problem. Table 4 summarizes the frequently proposed strategies that could be used to combat the problem.

Table 4: Suggested Strategies to Combat the Problem of Wild Animals

Proposed solutions	Sample Villages			
	Nyamburi	Park Nyigoti	Nyakitono & Nattambiso	Robanda
Culling of elephants	√	√	√	√
Revive controlled ivory trade		√	√	
Train, employ and empower more game scouts	√	√		√
Compensate for loss of property and life	√	√	√	√
Supply relief food to affected households	√			
Fencing of PAs			√	
Establish an elephant monitoring programme				√

Source: Field Data, 2005

Respondents in all the sample villages thought time had come for the government to allow for culling of elephants in order to control their mushrooming population. The villagers believed that once elephants saw their fellows being killed in one area they would never stay in such an area for long.

The second major strategy mentioned was compensation. Respondents in all the sample villages were of the opinion that the government should compensate the affected people. The villagers were aware of the policy and legal implications of this solution. Hence, they recommended the amendment of the Wildlife Conservation Act No. 12 of 1974 to allow and reinforce compensation to people who in one way or another lost life and/or property as a result of problem animals.

Thirdly, the villagers recommended that the government should train and employ more scouts. It should also empower these scouts through providing them with the necessary resources, such as weapons, transport and radios. The scouts should live within the boundary of the national park and game reserves so that they can patrol and make sure that the wild animals did not cross into the village lands.

And fourthly, the villagers in two villages thought it was high time the government allowed controlled ivory trade so that the money that would be collected through the revived trade would be used to compensate the villagers as already discussed.

Other minor strategies included the government supplying relief food and other social amenities so that the villagers could stop cultivating crops and keeping livestock in areas adjacent to PAs. The government should also provide funds that would be used to fence the farms cultivated close to migratory routes/corridors. In one village it was recommended that there should be a special monitoring programme to deal with the elephants problem. The programme should involve other stakeholders such as the Grumeti Reserves, Serengeti Region Conservation Programme, and Frankfurt Zoological Society.

In another village, a retired Game Officer advised farmers not to cultivate close to the boundary of PAs, as experience had shown that fields farther than 2 km from the village and surrounded by secondary forest were more prone to wildlife depredation than those closer to the village. The other villagers opposed this proposal and argued that they had serious shortage of land in the village. Instead they proposed that PA boundaries such as those of the Ikorongo Game Reserve be moved backwards to allow more space between the village and wild animals, indicating a very negative tolerance level for PAs in the study area (Nahonyo, 2001).

4.0 Discussion

4.1 Overview

The impact of wildlife on crops is very high in all the sample villages. The problem, especially with elephants, seems to have substantially increased from 2000 to the present. The reasons for such an increase probably include increased anti-poaching activities within the SNP and in the two contiguous PAs that seem to have made this area ecologically safer for wildlife than Masai Mara in Kenya.

Although generally the threat of wildlife to livestock was not seen to be a major problem in the study area, the impact of hyenas and jackals to small stock has been mentioned to be considerable; needing some attention by wildlife managers. Furthermore, there have also been reports of livestock diseases associated with

interactions with wildlife, such as the wildebeests, that need to be investigated further. Kaltenborn et al. (2003) demonstrated the magnitude of these problems by showing that 20.6 per cent and 11.0 per cent of the respondents asked, respectively, found the problems serious enough.

Planting chillies and tobacco around farms, making of tin noises and fires to frighten the elephants have been some of the strategies used by farmers in all the four sample villages. Although chillies and tobacco have elsewhere been used in combination to reduce the impact of crop raiding elephants and provide alternative cash crops (Osborne and Parker, 2002), elephants seem to have become immune to these strategies.

In some villages farmers have decided to cultivate collectively in order to enhance security to their farms, while other farmers have reduced land under agricultural production and intensified engagement in non-farm income earning activities, including illegal hunting.

Reduction of land area under cultivation and seeking of farmland in other villages have also been observed by earlier studies as common strategies adopted by farmers in the area to combat crop damage by destructive animals (Lowasa and Maghimbi, n.d.; Kauzeni and Kiwasila, 1994). What is different this time around is the increased magnitude of the problem. Hence, food has not only become more expensive now in some of these villages than in the district urban centres, the very rural livelihoods of the people are rapidly changing in characteristics.

4.2 Synthesizing the Robanda Situation

Although the village government leaders clearly intended to minimize the human-wildlife conflict in the village during this study for personal reasons, the problem is obviously serious and growing bigger as time passes by. The fact is that the village stands on an important migration corridor. Every year, from June to July/August, migratory herds of wildebeest, zebra and Thomson gazelles (*Gazella thomsoni*) from Ngorongoro and SNP pass through this village and the two nearby reserves to Masai Mara in Kenya. Unless the land use system in the village changes, the problem of destructive animals will prevail and will even increase with the success of wildlife conservation initiatives in the Serengeti Ecosystem.

Change in land use will include abandonment of cultivation, selective resettlement of some of the village population to a new settlement site supplied with the necessary infrastructure such as a school, dispensary, offices, and so on. The present village can then be rehabilitated into a cultural village by the establishment of cultural and eco-tourism facilities. The establishment of a modern Ikoma Shrine at the present holy site and providing proper worship premises for the High Priests will greatly enhance the historical value of the village and that of the Ikoma people.

5.0 Conclusion and Recommendations

5.1 Conclusion

In conclusion, it is clear that anthropogenic activities that have historically taken place in Western Serengeti have made communities living adjacent to PAs relate to the environment in a true ecological sense. Rapid increase of human population densities and the resulting increased demand on land-based resources for development, have made it necessary for the communities to change their land use systems and livelihood strategies.

However, as noted by Holmern et al. (2004); Kaltenborn et al. (2003); Emerton and Mfunda (1999) and other earlier observers of farming communities such as those of the sample villages, wildlife is still perceived as an economic burden rather than an asset. This is because it causes significant losses at the farm level in terms of the opportunity costs of cropland reserved in PAs and direct damage caused to crops and livestock as demonstrated in this study.

Furthermore, as pointed out by Emerton and Mfunda (1999) the attitude of wildlife managers towards local communities has strongly been antagonistic due to measures taken against illegal hunting, unplanned fires, illegal tree cutting and exploitation of other natural resources, so much so that communities have come to view conservation laws and regulations as contrary to people's needs, and that wildlife is valued more than human beings (Mr. Jumanne, Nyakitono Village Chairman, pers. comm.). As fervently argued elsewhere, there is urgent need within conservation policy to put more effort and emphasis on a more participatory approach, taking account of local people's needs, perspectives and interests (Hill, 2002).

But how does one begin to do that under the present circumstances? As illustrated in the case of Nyakitono and Nattambiso villages, agriculture is increasingly becoming unsustainable in Western Serengeti. Instead the rate of illegal hunting is increasing in villages like Robanda (Holmern et al. 2004). The process of livelihood strategy optimization will have to look into sustainable wildlife utilization as an alternative economic niche for the area.

5.2 Recommendations and Policy Implications

Many of the recommendations given by the villagers during the village FGDs have been outlined under the relevant sections of study. The major one has been compensations to the villagers for crop damages, livestock and human life losses. Nevertheless, given the current government's weak economic base and that the PAs are just too many and far widespread all over the country, compensations by themselves cannot presently work. There is need to look for more innovative strategies as suggested below. The recommendations are all centred around government policy change.

First of all, the government should look into the possibility of halting, albeit for a while, the moratorium on elephant hunting and ivory trade so that the money that will be collected can be used to compensate the villagers for crop damages, livestock and human life losses.

Secondly, much of the areas adjacent to populated communities in the SNP are under the category of "wilderness areas," where, according to the General Management Plan, no development should take place. With the increasing incidences of crop damage it is recommended that the status of these areas be changed into Low or High Intensity Use Zones to be used for investment, such as establishment of tented camps. Some of the funds realized from these investments should then be pooled into a General Fund to cater for the much awaited compensations.

Thirdly, the government in collaboration with other stakeholders, such as hunting concessionaires, should employ more game scouts and empower them by providing training and all necessary equipment such as guns, transport and radio communications. This will not only improve anti-poaching activities it will also bring closer game scout services to communities currently suffering from harassment by problem animals.

Fourthly, there should be established a special research/monitoring programme on the elephant problem in Western Serengeti, similar to the already existing rhino and lion projects. If the existing moratorium is to be reviewed there is need for putting in place a scientific framework to inform decision-makers on the status of the elephant problem.

Fifthly, there is need for involvement of local communities in the establishment of a properly functioning Wildlife Management Area (WMA) at the Ikoma Open Area, so as to optimize alternative and truly participatory livelihood strategies in Western Serengeti. The 1998 Conservation Legislation and relevant Policy reviews allow for the establishment of WMA under the Community Based Natural Resources Management paradigm. Seen as possible means of distributing more direct benefits to local communities, the WMA concept has variously been experimented and found to be quite workable elsewhere in Tanzania (Baldus, et al 2004).

However, the situation at Rufunda village suggests the existence of very skewed power relations in some villages with the leaders no longer representing the interests of their people. There is need for the district authorities to do an administrative auditing of this and other villages' political environment, so that the democratic processes that are necessary for sustainable development are facilitated and allowed to blossom in these villages.

The problems of remoteness and poor accessibility of the hunting grounds in Western Serengeti observed by Holmern et al. (2004) have considerably been lessened by the building of a five-star hotel in the area at Sasakwa Hill, by Grumeti Reserves Ltd., the establishment of a regional aerodrome at Mugumu by the Serengeti District Council,

and the up-grading of the Musoma – Mto wa Mbu road by TANROADS. The Grumeti Reserves Ltd., which has a hunting concession in the IGGRs, should be taken on board to serve as a substitute for the lack of organized hunting associations in the area (Grumeti Reserves, 2005).

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