
The conflict continues: Human wildlife conflict and livelihoods in Caprivi

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Acronyms

CBNRM	Community-based Natural Resource Management
CRs	Community Rangers
GPTF	Game Product Trust Fund
ha	hectares
HWC	human wildlife conflict
LSU	livestock unit equivalent
MAWRD	Ministry of Agriculture, Water and Rural Development
MET	Ministry of Environment and Tourism
NEWFIU	Namibian Early Warning and Food Information Unit (MAWRD)
PAC	problem animal control

EXECUTIVE SUMMARY

Human wildlife conflict in Caprivi Region

The Caprivi Region is one region in Namibia where the community-based natural resource management (CBNRM) programme has achieved considerable success, in terms of capacity building and natural resource management. However, the conflict between people and wildlife is perceived by local residents to have worsened since the advent of the CBNRM programme. This may be due, in part, to the success of the CBNRM programme in increasing wildlife numbers, but is also likely to be due to the increasing number of elephants in neighbouring areas such as the Chobe National Park (in Botswana), which cross the river into Namibia in search of food.

Human wildlife conflict (HWC) in Caprivi is a complex issue. The data and its use in analysis of the issue has limitations. HWC incidents are widespread but not evenly distributed, since they are dependent on the proximity of wildlife. In addition, different species cause different types of damage at different times of the year. Elephants are responsible for three quarters of crop damage incidents and predators such as crocodiles, lions and hyena kill livestock (mainly cattle). HWC management actions (both traditional and those of the MET and conservancies) have limited success.

Impact of human wildlife conflict on livelihoods

The damage caused has different effects on households' livelihoods, depending on their level of livelihood security prior to the incident. The research for this paper attempted to target poor households which have experienced damage to crops by wildlife. For poor households, HWC can deepen poverty. It is particularly problematic when combined with external factors such as the current drought. More than half of the interviewees reported that HWC affected their livelihoods severely. The majority of those interviewed stated that they could not sell any surplus grain this year – though given that the interviews were conducted in a drought year, low harvests were probably largely due to the drought in the region and were exacerbated by HWC (i.e. elephants damaging the remaining standing maize). The impact is two-fold – reduced harvests mean reduced food supplies, as well as reduced options for earning cash (the primary source of which is selling surplus maize).

Threat to the CBNRM programme and the way forward

HWC may hinder some of the CBNRM goals and objectives if it is not addressed more effectively, because some communal farmers, at whom the programme is aimed, incur frequent losses. The Game Product Trust Fund (GPTF) could be used to try and curb the conflict by funding the testing of new deterrent techniques, as used in other countries. Another option may be to use GPTF resources to employ young, unemployed men who could help chase wild animals away – especially between March and May when the crop damage is highest. Hope, at present, lies with the proposed conservancy compensation scheme, which aims to pay out for individual losses incurred as a result of wild animals. However, the conflicts occurring with people living with wildlife is an age-old problem. Bar separating people and wildlife with hard boundaries (fences), which is undesirable in the Caprivi Region, there is no final solution and the conflict continues. Yet, there is great merit in MET, NGOs, local communities and researchers trying to find solutions to offset this problem. It is hoped that this paper will contribute to this process.

1. HUMAN WILDLIFE CONFLICT IN CAPRIVI

This paper forms part of the WILD Project research. WILD is a Ministry of Environment and Tourism (MET) participatory research project investigating the change that the Namibian CBNRM programme has brought to people's livelihoods. The present HWC situation in Caprivi is examined by looking at the Ministry of Environment and Tourism (MET) incident records between 1996 and 2001 and incidents recorded by conservancy staff in Event Books for 2001 (Section 2). In addition, 21 people in three conservancies were interviewed about the impact of HWC on their livelihoods (Section 3). Finally, in Section 4, some conclusions and recommendations are made.

The Caprivi Region is one of the few areas in Namibia where people practise both cropping and livestock keeping, and which has experienced heavy losses to crops and livestock due to HWC. Human wildlife conflict is well documented in Caprivi (O'Connell, 1995; Murphy, 2001; Sutton, 2001; Odendaal and Diggle, 2002). Species identified as causing damage to crops include elephants, hippos and other herbivores. Lion, hyena and crocodiles inflict damage to or losses of livestock. These predators, along with elephants, also sometimes attack people and cause fatalities.

Monetary damage caused by crop-raiding elephants in 1995 was estimated at N\$21,560 for just the Kwandu River region (O'Connell, 1995). Sutton estimated the value of damage to crops (caused by livestock, elephants and other wild herbivores) in six villages in 1998 at N\$216,097; and to livestock at N\$82,410 (2001). His figures only cover 165 households in six villages across Caprivi. With data for the whole region and other animal species all of these figures would increase substantially. Using official MET HWC data on reported incidents, this paper estimates the combined damage to crops and livestock in 2001 at N\$300,000 (N\$240,000 for livestock and N\$60,000 for crops)¹. Due to the difficulty of reporting HWC incidents in remote rural areas, the number of HWC incidents reported to MET is less than the actual number occurring². This figure is therefore likely to be a significant underestimation of the actual cost of damage occurred.

Game species populations are recovering in areas where they have not been seen in a long time – partly due to the formation of conservancies. This has resulted in animals such as elephants reclaiming historical distribution areas. The lack of fences surrounding the Caprivi's national parks (West Caprivi (Bwabwata), Mudumu and Mamili) and international borders (Angola, Botswana³, Zambia, Zimbabwe) mean wildlife can roam freely.

Although the focus of this investigation into HWC is on crops, livestock and people, conflict with hippos and crocodiles on the water is often felt by fisher-men and women. Although it is not well documented or researched, anecdotal evidence suggests that this conflict could also be important. When crocodiles and hippos move through a channel or stream they may damage or destroy nets. Buffalo and elephant are also quite capable of destroying nets as they move through the water⁴.

¹ Sections 2.3.1 and 2.4.1 provide details of the derivation of this figure.

² Refer to 2.1 and 2.5 for further discussion on this issue.

³ There is a fence between Namibia and Botswana across the south of Bwabwata, which was built to prevent the spread of cattle disease in 1996. However, some of it has been removed near the Golden Triangle, so animals can now move through.

⁴ It is hoped that in 2003 or later, some aspects of this conflict will be included in the conservancies' Event Books, so that such damage can also be monitored (J. Purvis, pers. comm.).

1.1 Legislation relating to HWC

In life-threatening situations, government legislation does not prohibit people from protecting themselves or their livestock from harm by all wild animals, including specially protected species such as elephants. Examples where wild animals may be killed if they actively threaten livestock include lions breaking into kraals or crocodiles threatening livestock at watering points along rivers (S. Kaseba and C. Masialike, pers. comm.).

With regard to specially protected species, the legislation stipulates that ‘no provision contained in this section shall prohibit the owner or lessee of land or the occupier of communal land from killing specially protected game on such land in defence of human life or to prevent human life from being injured or to protect the life of any livestock, poultry or domestic animal of such owner, lessee or occupier while the life of such livestock, poultry or domestic animal is actually being threatened’ (GRN, 1975a). Any person killing a specially protected species in defence of life must report the incident in writing to the nearest MET office or police station within 10 days, or they shall be guilty of an offence (GRN, 1975b).

Apart from life-threatening situations, Subsection 37 of the *Nature Conservation Ordinance (No. 4 of 1975)* allows communal area residents to hunt any game, except specially protected species, which are ‘destroying or damaging crops or plants’, on the condition that ‘such cultivated land is enclosed with a fence approved by the Director’⁵ (GRN, 1975c).

Jones (2002) highlights some practical difficulties with the existing situation and the impact this has on rural livelihoods. He notes that many rural households cannot afford firearms and ammunition to protect themselves and their property against wildlife. Regarding elephant damage to crops, Jones reports that ‘although conservancies can use armed game guards to try to scare elephants away, they are unable to take the ultimate sanction against a problem elephant and kill it’. He goes on to describe the MET’s ‘lengthy process of decision-making before an elephant can be declared a problem animal and shot by the government or a trophy hunter’. The MET Minister needs to give his or her approval but, before this, ‘a villager in Caprivi might have to find transport to travel up to 100km to report the elephant problem in Katima Mulilo. The head of the MET office in Katima Mulilo has to contact the regional head in Rundu. The regional head has to find a deputy director or director in Windhoek, who then channels the request via the Permanent Secretary to the Minister’. If approval is obtained, the decision has to be relayed back through the same chain of command, by which time the elephant may have left the area or even moved to a neighbouring country (Jones, 2002). The time-consuming nature of this approval process was also noted at a national workshop held to find ways to reduce the conflict between people and wildlife (Murphy, 2001)

1.2 HWC incident recording and reporting

In Caprivi, Community Rangers⁶ (CRs, previously known as community game guards), resident both in conservancies and in some areas outside conservancies, have been collecting information on HWC incidents as part of their work, since the inauguration of the community game guard project in 1991 (Rice, 1997; Murphy and Mulonga, 2002). To date, the early information from CRs has not been systematically collated, analysed and reported. However, the CRs’ recording procedure was customised in the Event Book system in 1999/2000 by the CRs, with the facilitation of staff from IRDNC and the Natural Resource Working Group of the Namibia Association of Conservancy

⁵ In practice, communal area residents are not allowed to enclose land and this reference is interpreted to include fences built, for example, from thorn branches or wooden poles (Ben Beytell, pers. comm.)

⁶ CRs provided input into this paper through a workshop (Murphy and Mulonga, 2003) and discussions held at the Annual Event Book Audit in January 2003.

Support Organisations (previously known as the WWF–LIFE Natural Resources Team), as the existing recording system was not satisfactory and information was not readily accessible to conservancies (Stuart-Hill, 2003 and Stuart-Hill et al., 2003). Since 2001, CRs in all conservancies in Caprivi have used the Event Book system. The simple, graphic recording systems have allowed them to feed back information to their communities and other interested parties⁷ and have a strong sense of ownership over the data. In addition, annual audits were undertaken in 2001 and 2002. The 2001 data was computerised by WWF staff for analysis and summaries were produced.

As well as recording HWC incidents, CRs are very active in HWC prevention. They conduct ‘PAC (problem animal control) awareness programmes’ within the conservancies (which include, for example, helping to build strong kraals to prevent livestock losses); warn farmers of the presence of wild animals; assist with chasing animals out of fields and hunt identified ‘problem animal’ species. In the Kwandu River area, the Mashi District Conservancies Anti-poaching Joint Venture use their vehicle to deploy CRs in crop fields at night to chase away elephants known to be in the area, particularly during the harvest period. They also track down and destroy ‘problem’ lions which threaten human life and destroy livestock. IRDNC have a dedicated staff member to assist with ‘problem animal control’.

MET staff in Caprivi have collected information on incidents of HWC since 1991. A separate pro forma record sheet is completed by field staff for each reported incident⁸. These sheets are retained at the Caprivi Region head office (Katima Mulilo) and are used by senior staff when writing reports about HWC. They are not captured electronically. MET staff members have recently done some initial training in a system similar to the CFR Event Books, which should improve the use and quality of HWC records (R. Diggle, pers. comm.).

1.3 HWC and livelihoods

A livelihoods⁹ approach has been adopted in this research in order to measure the livelihood impact of HWC and to attempt to determine the extent of possible negative linkages between poverty and human wildlife conflict, as described by Elliot (2001).

Most rural residents in Caprivi grow their own supply of food to eat and to sell the surplus, and keep livestock as an investment. Thus, any damage to crops or livestock by wildlife has the potential to threaten key livelihood strategies for household food security and investments (Murphy and Mulonga, 2002). Crop damage is a particular risk to less resourced households, who do not have access to livestock or any cash income (i.e. to purchase basic food items).

⁷ For example, in July 2002 at the official launching ceremony of Kwandu Conservancy, CRs gave a presentation of the wildlife monitoring to invited dignitaries, including the Deputy Minister of MET.

⁸ These ‘incidents’ correspond to the incidents reported in the graphs and tables in Section 2.

⁹ A livelihood is made up of the capabilities, assets and activities required for a means of living (DFID, 1999).

2. ANALYSIS OF HUMAN WILDLIFE CONFLICT DATA

2.1 *Limitations of data*

Official HWC data from January 1993 to December 2001, as reported to the MET Caprivi office, was collected and analysed. MET data was used because it is the only information available that covers the whole of the Caprivi Region. However, there are a number of problems with this data, with the result that the following analysis severely underestimates the problem and costs of HWC in Caprivi. The first problem is that the data covers only HWC incidents reported to the MET. This is believed to be lower than the actual number of incidents – partly due to the costs associated with travelling to Katima Mulilo to report them. In particular, ‘nuisance animals’ tend not to be reported, or those causing only minor damage to fields. (In contrast, as discussed in section 3.3, HWC incidents are more likely to be reported to CRs within conservancies, due to their proximity and the ease of reporting such incidents to them.) In addition, a number of the forms were not filled out correctly or completely by MET staff. However, this was noted to improve over time.¹⁰ As a result of these problems, it can be assumed that the data underestimates the severity of HWC in the Caprivi Region, though it is not possible to tell by how much. The data is useful to indicate trends in the nature of HWC over time and to describe the composition of species causing damage. Unless stated otherwise, all data reported is from the MET incident sheets.

CR data is also used in this analysis (in Section 2.4). This also has some problems. Event Books record only the number of incidents involving each species of wild animal, but tend not to record the extent of damage in the case of crop damage. In addition, poor numeracy does occasionally lead to incorrect reporting of annual statistics.

In addition to the analysis of data records, 21 individuals were interviewed to try to determine the extent of HWC impact on livelihoods¹¹. The interviews took place in a severe drought year, which had reduced harvests. In the case of crop damage, it is impossible to separate out the impact of crop failure due to drought and damage to remaining crops by wildlife. It has been observed in the past that households tend to exaggerate the impact of damage caused by wildlife (G. Owen-Smith, pers. comm.). That ‘people may deliberately or accidentally not tell the truth or omit information’ is a concern when using participatory tools for impact assessment (Roche, 1999:147). This is particularly a risk when interviewing people individually. A reflection on why respondents would exaggerate provides important indicators to the respondents’ interests (Roche, 1999). In this case, exaggeration may have taken place because the survey provided an opportunity for people to express anger and frustration about the regular occurrence of damage caused by wildlife and the limited measures to deal with it.

2.2 *HWC incidents*

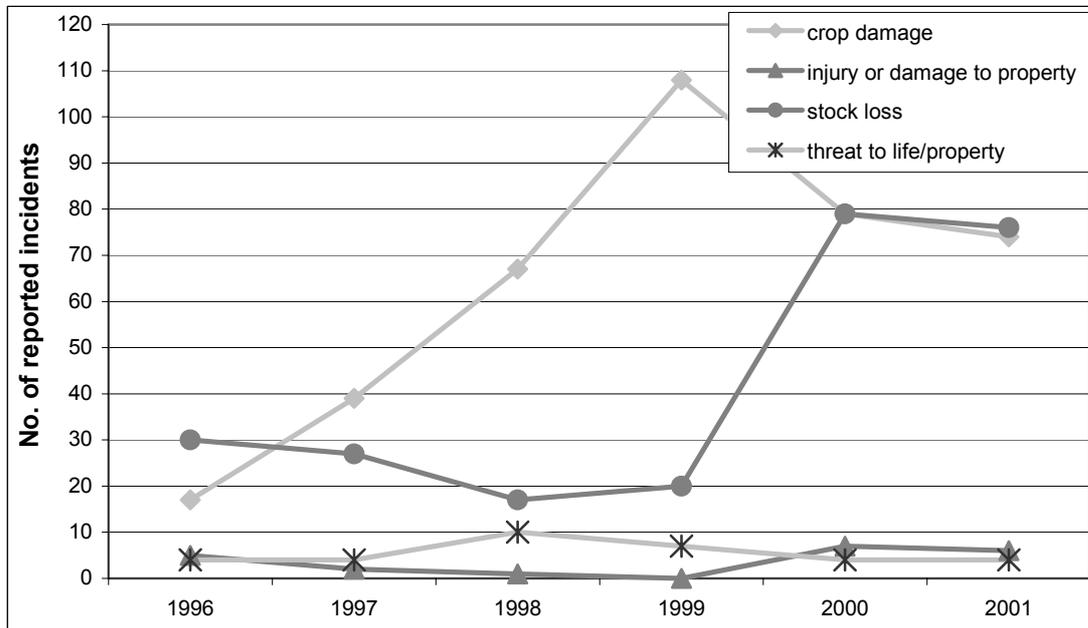
Several different categories of HWC were recorded by the MET – damage to crops and/or gardens; death of stock; threat to human life and property; damage to property and injury (both to humans and stock); and loss of human life.

¹⁰ Due to the lack of reliability in the way it was recorded, data from 1993 to 1995 is excluded from the analysis below. However, accuracy improved over time and the analysis looks at data from 1996 to 2001. The accuracy of this data could be improved.

¹¹ This small sample aimed to provide qualitative data as a snapshot of individual perspectives on HWC.

Table 1 below outlines the number of each type of incident, by year¹². The detailed analysis below considers only damage to crops and loss of stock – due to the difficulty associated with valuing threats to life and/or property, and more particularly valuing the loss of human life.

Graph 1 Incidents of HWC by category, by year



Elephant and lion caused the most consistent problems – both being reported at least 10 times a year in each of the six years¹³. Hippo and crocodile were both reported more than 10 times in three of the six years; hyena in two years; and buffalo in only one year (see Tables 1 and 4).

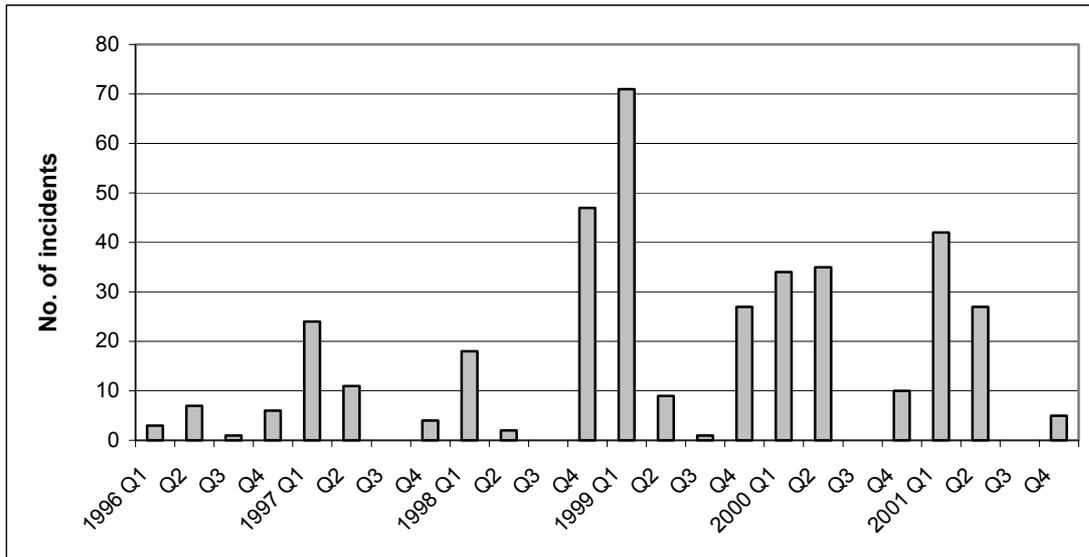
2.3 Damage to crops and gardens

Between 1996 and 2001, 384 incidents of damage to crops by wildlife were reported to the MET, with an estimated 764 hectares (ha) damaged in these incidents. As can be seen from Graph 2, most incidents occur in the second quarter of the year (around the time of harvest), although damage to fields is incurred throughout the growing season. O’Connell (1995) also found that most damage was caused during the end of the season. This contrasts with Sutton (2001), who found that farmers reported most damage during the fourth quarter (i.e. during planting). Prior to 1999, most damage to fields was incurred between March and May, but from the start of the 1999 growing season, damage was incurred over a longer period – from as early as October through to June.

¹² Loss of human life has been excluded.

¹³ The problem with the reliability of MET data, as noted in 2.1, is illustrated by the report that losses of livestock to lions along the Kwando River peaked in 1997/1998 with at least 184 cattle killed (Garth Owen-Smith and Lyster Mutabemezi, pers. comm.), and not only 10 lion attacks a year as reported by the MET. After this, the MET apparently made a concerted effort to improve their reporting system.

Graph 2 Crop damage incidents by quarter, 1996–2001



There is a trend of an increase in the number of incidents reported per year (although the number of incidents reported peaked in 1999 – 108 incidents, damaging over 300ha of fields). This may partly be the result of increase in the accuracy of the records and, although elephant numbers do not increase significantly on an annual basis, it may also be due in part to the increasing numbers of wildlife in the region inflicting more damage.

Table 1 Damage to crops/gardens by species

Year	Species	Incidents	Total damage (ha)
1996	Bush pig	1	
	Elephant	15	6
	Hippo	1	
1997	Buffalo	3	2
	Elephant	33	132
	Hippo	2	1
	Waterbuck	1	1
1998	Buffalo	9	22
	Bush pig	2	
	Elephant	29	75
	Hippo	27	15
1999	Buffalo	3	3
	Elephant	78	266
	Hippo	27	41
2000	Buffalo	7	10
	Bush pig	2	0
	Elephant	67	97
	Hippo	3	6
2001	Elephant	67	71
	Hippo	7	16
Total		384	764

As can be seen in Table 1, elephants were responsible for approximately 75 per cent of the reported incidents of crop damage and 86 per cent of the damage inflicted to fields. On average, each time an incident involving elephants was reported, the damage covered just over two hectares (ha) of fields¹⁴.

Hippos also caused significant damage to crops – being responsible for approximately 17 per cent of reported incidents and approximately 10 per cent of the damage to fields. The average damage caused per hippo incident was approximately 1.2ha.

Buffalo inflicted relatively minor damage¹⁵ to crops (when compared with elephant damage), accounting for almost six per cent of crop damage reports and approximately five per cent of damage to fields. Other wildlife responsible for crop damage were bush pig and waterbuck, which caused comparatively little damage.

2.3.1 Value of damage to crops

The following section provides an estimate of the value of damage to crops over time. These estimates are calculated by estimating the yield per hectare lost multiplied by the relevant farm gate price for that crop. Sutton (2001) identified the following as some of the problems of using this method: accurately estimating the yield of a field without damage (e.g. uneven yields across a field; the case of drought after damage); and where and when the crops would be sold, including the quality of the produce and the price received. In addition, these estimates also exclude the cost of deterrence (e.g. staying in the fields at night) and do not consider the time of year that the damage occurred – it is possible to replant a crop if it is damaged early in the season.

Prices used are farm gate prices (MAWRD, n.d.). Since almost no sorghum is traded, there is effectively no price, so millet prices are used as a proxy (B. Bennett, pers. comm.). Crop yields (kilograms per hectare) for each crop type are used (NEWFIU, n.d.). Estimates of damage include only cereal crops – there is currently a serious lack of information regarding yield and farm gate prices for other crops.

Table 2 outlines the value of damage by crop type, by year (see Appendix 3 for information used regarding yield and farm gate prices). These values appear to be relatively low in total, but cost per household can be quite significant (livelihood impacts are discussed in Section 3). It should also be noted that while these total values appear relatively low, the severe underestimation in the official incident numbers means that the value of damage is also substantially underestimated.

13 As one elephant cannot cause 2ha of damage, this figure indicates that multiple elephants are involved in the reported incidents.

15 However buffalo damage is severe in areas where they occur.

Table 2 Estimated total cost of crop damage

Year	Crop type	Estimated tonnage destroyed	Cost (N\$)	Total annual cost (N\$)
1996	Maize	0.9	765	1,881
	Sorghum	1.3	1,116	
1997	Maize	27.8	25,641	62,335
	Sorghum	39.8	36,694	
1998	Maize	11.3	11,293	12,124
	Sorghum	0.8	830	
1999	Maize	30.5	35,129	41,415
	Millet	2.1	2,157	
	Sorghum	4.0	4,129	
2000	Maize	62.8	79,097	87,956
	Millet	0.7	723	
	Sorghum	7.5	8,136	
2001	Maize	32.8	41,052	43,043
	Millet	0.2	245	
	Sorghum	1.4	1,746	

2.4 Stock losses

Between 1996 and 2001, 246 predator incidents were reported, resulting in the death of 694 livestock equivalents. Livestock unit equivalents (LSU) are used in these calculations because it is difficult to obtain accurate historical price information for different stock types – so each stock type is converted, using average body mass to the equivalent of an ‘average cow’.¹⁶ Between 1996 and 1999, the number of incidents per year was relatively low, but it rose dramatically in 2000 and 2001¹⁷.

¹⁶ LSU conversions used were: breeding cows=1.00; heifers=0.7; bulls=1.33; calves=0.31; oxen=1.25; goats/sheep=0.14 (Barnes, n.d.).

¹⁷ This is likely to be due to better reporting by MET.

Table 3 Loss of stock resulting from HWC, by species

Year	Species	Incidents	LSU killed
1996	Crocodile	13	65
	Leopard	3	4
	Lion	10	34
	Wild dog	1	1
1997	Crocodile	8	16
	Elephant	2	6
	Jackal	1	0.4
	Lion	16	35
1998	Crocodile	1	2
	Hyena	1	10
	Lion	15	32
1999	Crocodile	5	23
	Hyena	1	1
	Lion	13	48
2000	Crocodile	15	32
	Hyena	9	17
	Leopard	3	2
	Lion	51	134
2001	Crocodile	9	64
	Hyena	16	18
	Lion	49	111

There is a seasonal distribution of stock losses, though not as marked as that of crop damage, with most reported incidents occurring in the first and last quarters of each year (see Graph 3). As can be seen in Table 4, lions were responsible for 64 per cent of the reported incidents involving stock deaths – and 60 per cent of the LSU loss¹⁸. Crocodiles were the next most problematic, accounting for 20 per cent of reports and 30 per cent of stock losses. From the data, it appears that hyena have become significant predators only recently. They account for 11 per cent of the reports and six per cent of livestock equivalents, although no incident was reported to the MET prior to 1998. CRs report that hyenas used to be poisoned and were therefore scarce, but now they are as much a problem as lions – where once they were scavengers, now they are predators. Additionally, there is the perception that where hyena were once a problem only in winter, they now cause conflict year round (S. Siloka, pers. comm.).

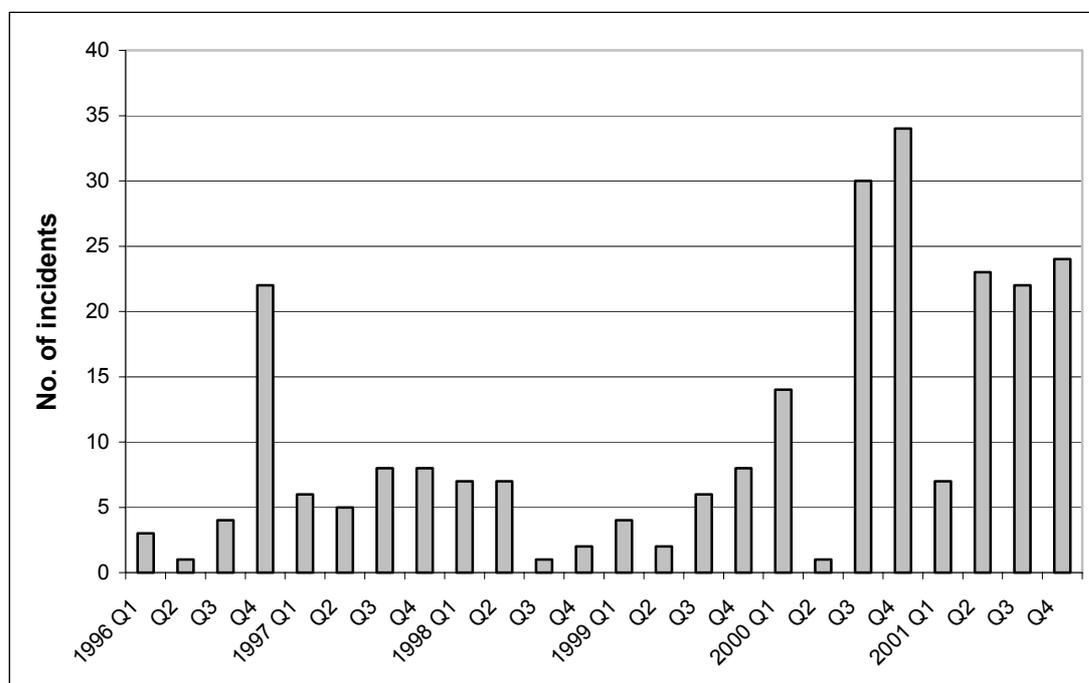
Other species reported to kill livestock in the region include leopard, jackal, elephant and snakes.¹⁹ Together they account for only five per cent of reports and fewer than two per cent of stock losses. This low incidence of reporting is likely to be influenced by people not reporting losses caused by smaller predators.

¹⁸ Stock losses to lion show a seasonal pattern, with a higher incidence in summer when wild prey is dispersed over a larger area and more difficult to find. As lions have difficulty finding wild prey, they turn to livestock (Garth Owen-Smith, pers. comm.).

¹⁹ Two incidents of elephants killing cattle were reported.

On average, more than two LSUs are lost per incident²⁰. Given the relatively small average livestock holdings in Caprivi, the livelihood effects of such losses can be considerable (see Section 3.6 for further details).

Graph 3 Stock loss incidents per quarter, 1996–2001



2.4.1 Value of stock losses

Table 4 shows the estimated value of damage caused by predators. Once again, this estimate is simply the value of the loss. Stock was valued at the average price for slaughter cattle in communal areas each year (see Appendix 3). As can be seen in this table, in recent years the value of stock damage has been significant, but perhaps more importantly in terms impact on livelihoods, the cost per incident is also very high.

Table 4 Estimated total value of stock losses

Year	Incidents	LSU killed	Total cost per year (N\$)	Average LSU per incident	Cost/incident (N\$)
1996	27	103	126,690	3.8	4,674
1997	27	58	72,384	2.2	2,746
1998	17	44	47,916	2.6	2,831
1999	19	72	68,688	3.8	3,625
2000	78	185	247,345	2.4	3,209
2001	75	196	261,072	2.6	3,463

2.5 Comparison with Event Book data

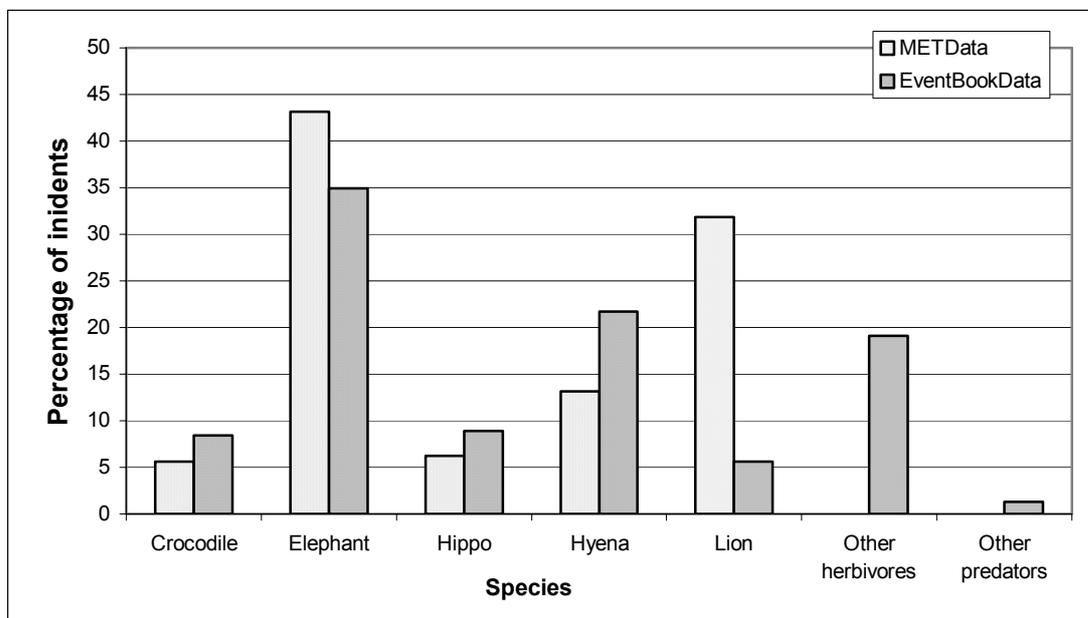
Event Books are used by CRs within conservancies in Caprivi to record and monitor wildlife, including incidents of conflict with people. The first annual Event Book data audit available was for 2001, for a number of registered and emerging conservancies in Caprivi – Impalila, Kwandu,

²⁰ Each incident refers to the single event reported on an individual MET pro forma record sheet completed by investigating MET field staff (refer to 1.3).

Mashi, Mayuni, Salambala and Wuparo. Although the area covered in these conservancies is relatively small, it is interesting to note that the number of incidents reported to CRs in 2001 in these conservancies is over five times greater than the number reported to MET over the same time (despite the MET data covering the whole of the Caprivi Region). This is probably due to the proximity of the CRs to those affected, making it considerably easier for individuals to report incidents to the CRs than the MET. Incidents reported to CRs are reported to the MET generally only when MET staff and CRs meet in the field. IRDNC (the local CBNRM support agency) receives the CR reports (S. Siloka, pers. comm.; CRs, pers. comm.).

Unsurprisingly, given the difficulty and cost associated with reporting HWC incidents to MET, few people bother to report ‘minor’ or ‘nuisance animals’ (generally herbivores such as antelope, bush pig and baboon) damaging fields or gardens, though they may do significant cumulative damage. However, the location of CRs in the conservancies means that the Event Books record vastly higher numbers of incidents involving such animals, as it is relatively easy to report incidents to them (see Table 5).

Graph 4 MET and Event Book data, by species responsible, for HWC reports 1996–2001



Graph 4 shows that MET and Event Book data are broadly in agreement regarding the relative importance of the main species causing HWC. As mentioned above, the Event Book data includes a relatively large proportion of ‘other herbivores’, which are rarely reported to the MET. There is also a large discrepancy between the relative importance of lion and hyena as HWC species. This is said to be because people are less afraid of hyenas and find them easier to kill without assistance from MET officials (CRs, pers. comm.). Lions, however, are much more difficult to kill and the assistance of the MET is usually required (to provide transport and guns) (S. Siloka, pers. comm.). In addition, to get a permit to sell a lion skin (which is valuable compensation for stock lost), the killing of a lion must be reported within 10 days to MET. Hyena skins have no value (Garth Owen-Smith, pers. comm.)

The comparison between data available from the conservancy Event Books and the MET data serves to suggest that the costs of HWC in Caprivi in terms of stock losses and crop damage, as outlined in Tables 2 and 4, are grossly underestimated. For example, the Event Books record a loss of 369 livestock in 2001 alone in a very much reduced area, whereas the MET reports 196 livestock

equivalents (Event Book data does not specify livestock type). Event Book data suggests that average stock losses per reported incident are 1.03, in contrast to 2.6 calculated from the MET data (for 2001). Though some of these incidents may be reported in both the MET and Event Book statistics, it could only be assumed that the MET data is fully comprehensive if both the numbers of reported incidents and livestock killed were higher than those recorded by the CRs – as the MET covers a significantly larger area than the CRs in these six conservancies. As this is not the case, it must be assumed that the number of incidents recorded in the Event Books are a better reflection of HWC in Caprivi.²¹

3. CASE STUDIES

3.1 Case study sites

In order to determine the livelihood impact of HWC on individuals, a number of residents who had suffered from HWC during late 2001/early 2002 were interviewed. The interviews were conducted in Mayuni, Kwandu and Salambala Conservancies. Focus group discussions were held in two villages at Linyanti (a non-conservancy area) to discuss the HWC they experience, but no individual interviews were conducted. In addition to interviews, the research team visited the crop fields damaged by wild animals. A number of the interviewed households (14 out of 21) were revisited two months after the initial interviews to follow up the effect of the livelihood impact into the winter months (see Appendix 2 for details of interviewees and questions asked).

3.2 Case study individuals interviewed

Study sites were selected in areas where the WILD project had been active and either employed or knew people who could assist with the selection and interviewing of households experiencing HWC. Households who had recently experienced HWC were targeted. Individuals interviewed from Kwandu Conservancy were selected from a list of households supplied by the Conservancy Manager on request. Those interviewed in Salambala were selected by a Salambala Community Resource Monitor; and in Mayuni Conservancy, a part-time employee of the WILD project selected households in Choi.

The sample of 21 individuals interviewed comprised 11 men and 10 women. The age of interviewees ranged between 26 and 73 years, though the majority of the respondents were over 30 years old. Thirty eight per cent of respondents interviewed (8 out of 21) were known to be from insecure households, according to wealth group categories previously identified at a workshop with Mayuni Conservancy (Murphy, 2002).²² These eight respondents do not own livestock and are likely to have a greater dependency on cropping to meet food and cash needs than more secure households. In the second round of interviews, 14 people from the original 21 were interviewed in Mayuni and Kwandu Conservancies. This sample included seven of the eight respondents in the insecure wealth group.

3.3 HWC species

Respondents identified 13 wild animals (including birds and insects) causing conflict in their areas and one domestic animal (cattle). Elephants were identified in all four areas (Salambala, Mayuni,

²¹ It can also be assumed that if the MET data underestimates the number of incidents and livestock lost in HWC incidents each year, then it is probable that this data also underestimates the extent of crop damage caused by wildlife.

²² The selection of households attempted to target poorer households in order to document the impact of HWC on the households with the least resources.

Kwandu and Linyanti) as the species causing most conflict – damaging fields and attacking people. Other animals mentioned included lions, hyenas, hippos, crocodiles, bush pigs²³, kudu, monkeys, baboons, porcupines, duikers, birds and locusts. The severity of damage varies. Among the herbivores, elephants are said to cause the most damage overall – due to the high frequency of elephant damage and the fact that they often move in large herds.

In a recent survey of households in conservancies in Caprivi, damage was attributed to elephants 47 per cent of the time, bush pigs/warthog 19 per cent, monkeys nine per cent, as well as porcupines, spring hares, antelope, baboons, hippos, buffalo and birds. Of those households growing cereal crops, around two thirds stated that their cereal crops had been damaged by wild animals over the previous year. Around half the respondents also stated that their non-cereal crops (e.g. melons, pumpkins, beans, etc.) had also been damaged by wild animals in the previous year (Suich, 2003).

3.3.1 Cattle

Interviewees were also asked about damage to fields caused by cattle, in an attempt to compare the extent of damage to crops attributed to domestic stock and wild animals. Sutton (2001) found almost 85 per cent of households suffer from damage to fields by livestock, which means that livestock causes the greatest damage, when examining the cost of damage of HWC, compared with elephants and other wild herbivores. Suich (2003) reports that 30 per cent of households reported that their cereal fields had been damaged by livestock in the previous year and that livestock had also damaged up to one third of non-cereal crops. The reasons given in this series of interviews for livestock inflicting less damage were that livestock could be removed easily if they invaded a field and that they were usually attended by herd boys who prevented them from entering cultivated fields. Although all respondents indicated that wild animals cause more damage to crops than livestock, management strategies to reduce damage to fields would be vastly different (and much simpler) when dealing with domestic stock rather than wildlife. There is also a traditional method for compensation for cattle damage to crops. Cattle owners are fined (either using cattle or a cash equivalent) through the Traditional Authorities for damage caused by their cattle to other people's crops.

3.4 Comparisons between study sites

Table 5 outlines the species causing conflict in each of the areas in which interviews were held. The highest number of species involved in conflicts with people was found to be in the Mayuni Conservancy where a total of 12 species were found to have damaged peoples' crops or livestock. In Linyanti, six species were mentioned and in Kwandu Conservancy three were mentioned. In Salambala, only two HWC species were mentioned. More than three quarters of respondents stated that they experienced HWC every year, mostly by elephants.

²³ Note: the same word (which is *ngili*) is used in siLozi for both bush pig and warthog.

Table 5 Animals mentioned as causing damage to crops and livestock in different study sites

Animals mentioned	Linyanti	Mayuni	Kwandu	Salambala
Elephants	✓	✓	✓	✓
Lions	✓	✓	×	×
Hyenas	✓	×	×	✓
Birds	✓	✓	✓	×
Crocodiles	✓	✓	×	×
Hippos	✓	×	✓	×
Bush pigs/Warthog	×	✓	✓	×
Duikers	×	✓	×	×
Kudu	×	✓	×	×
Monkeys	×	✓	×	×
Baboons	×	✓	×	×
Antelope	×	✓	×	×
Locusts	×	✓	×	×
Porcupines	×	✓	×	×
Cattle*	×	✓	×	×

✓ = the animal is causing some damage

× = the animal may be present, but does not cause any damage

* see Section 3.3.1 above

Crocodiles and hippo caused problems in villages close to rivers in Kwandu Conservancy (Kwandu River) and at Linyanti (Linyanti River). In all areas, respondents indicated that animals came very close to villages. Hyenas have killed cattle enclosed in kraals at Kazauli, in Salambala and at Sabelo, near Linyanti. At Mashesho, in Mayuni, one respondent reported that elephants had eaten maize in storage huts in the village.

3.5 Deterrents and reporting of HWC

When asked what action was taken to try to reduce the incidents of HWC, respondents mentioned cracking whips, beating drums, burning fires, and, if they have access to guns, shooting in the air. Sutton (2001) stated that deterrents were likely to be more effective against ‘problem animals’ other than elephants and that only just over half of farmers believed that such deterrents were effective. O’Connell (1995) noted that many elephants have habituated to these methods and they are no longer effective deterrents.

The majority of respondents (19 of 21) said they reported wildlife damage incidences to either MET or conservancy staff, with slightly more people reporting to the conservancy than MET (10 to conservancy; 7 to MET; and 2 to both).²⁴ Just under half the respondents reporting incidents mentioned that nothing happens after the incident has been reported. One respondent said she had stopped reporting because nothing happens and so it is a waste of time and money (people pay up to N\$30 in transport fares to report incidents to MET in Katima Mulilo). Another stated that conservancy staff ‘came to help by shooting and whipping to frighten the animals away. It does

²⁴ This would seem to explain why incidents reported to MET are lower than those reported in the conservancies’ Event Books. As noted above, conservancy staff tend to report to MET only when they meet MET staff in the field, otherwise they report only to IRDNC.

help but does not prevent the problem and there is no other help from anywhere else'. Both MET and conservancy staff (especially CRs) are active in trying to assist farmers in protecting their crops and livestock. However, these management measures have limited success in prevention and do not address the issue of compensation after damage.

Most of those interviewed said they would appreciate compensation from the government either in the form of money or food. (Interviewers informed respondents that the Namibian Government has declared that compensation is not an option.) Another suggestion from respondents was the use of electric fencing around fields, while others said the MET should give permission to people to kill the animals. Some suggested that conservancy and MET rangers be sent to fields during the time when the crops are ripening to frighten animals away. One elderly woman from Malengelenga (Kwandu) believed that, despite monitoring wild animals, the conservancies so far appeared to have had limited success in preventing damage from occurring: 'In some incidences, it is the Conservancy Rangers who come to tell me in the morning that my field has been destroyed. They are aware of what is going on but are not doing anything about it.'

3.6 Implications for livelihoods

Crop production is generally the most important activity in rural households in Caprivi. It contributes to the livelihoods of almost two thirds of households. Crop production for sale was the most important source of cash income to 15 per cent of households and was important as a secondary and tertiary source of cash income for many other households. Livestock production (both for own use and sale) is important to livelihoods and livestock sales also provide important contributions to household cash income (MAWRD, 1999; Suich, 2003). Given the households' reliance on crop and livestock production, reduced yields have negative impacts on livelihoods and households' ability to cope with shocks such as drought and HWC. This reliance – particularly on cropping – to provide household food supplies leads to hunger within households when crops fail, with children hit particularly hard.

The interview period coincided with a drought year, which caused widespread crop failure. The government distributed drought aid during the year. The effects of the drought, worsened by HWC, led to widespread problems of food insecurity. These problems were particularly devastating for families depending solely on cropping, who own no cattle and have no household member in paid work. It is impossible to separate the impacts on livelihoods of crop failures caused by drought and HWC. The combination of the two events has almost certainly caused more severe food security problems and eliminated a source of cash that would be available in a 'normal' year²⁵.

In Malengelenga (Kwandu), a young mother and her husband do not own any cattle and do not have paid work. In a 'normal' year, she would sell half her maize for cash and eat the other half. In April 2001, her crops (maize and pumpkins) were eaten by elephants and she and her husband did not have anything to eat. As a result, they said they would have to do without relish, cooking oil and new clothes and by August they had not paid their child's school fees. Their strategy to survive until the next harvest will be by her husband catching fish to eat and sell.

One of the Kwandu Conservancy respondents was a widower with 11 children and no livestock. His hand-hoed maize and pumpkin crop was destroyed by elephants. He stated that he had not figured out yet how he and his children will survive this year: 'My old age pension is too little as it is used

²⁵ In the context of conservancies, it is appropriate to mention that the same wildlife that causes damage to farmers' livelihoods has the potential to earn income through trophy hunting and tourism. In doing so, it also has the potential to mitigate the cost of living with wildlife.

for both school fees and clinic fees thus cannot be used to feed my big family.’ He reported the elephants to the MET rangers who came to chase the elephants away, but it was too late to stop the damage. This man attended the Kwandu Conservancy AGM on 28 and 29 May and complained about elephant damage to his crops.

Many households had harvested early, without the crops being properly ripe, for fear of further damage.

Some households, who were unable to sell surplus maize during the year, undertook a number of different strategies to obtain cash and food. Fish and water lilies were used by households both for own consumption and sale, while other households did piece work or blacksmithing, sold building poles, thatch grass, traditional beer, craft, vetkoek or scones. A number of households received remittances or pensions, though few households had members in salaried employment, and some households had no means of making extra income. In years of poor rainfall, some of these other options are also negatively affected, such as selling reeds and thatch grass. One Mayuni Conservancy respondent commented that the strategies he relies on for income are unreliable and his income is very low compared to previous years, when he was able to sell surplus harvest.

Households’ reduced yields and inability to earn income from maize sales affected not only food supply, but were also the cause of a number of families having to withdraw children from school, as they were unable to pay fees and associated costs.

3.7 Impacts on the CBNRM programme

Lack of government compensation for losses and a limited response in most cases by conservancies²⁶ and/or the MET increases frustration amongst rural people and can lead to a negative attitude towards wildlife. When combined with natural disasters such as floods, fires and droughts, this problem worsens. In a recent survey in three conservancies in Caprivi, two of the most commonly cited disadvantages regarding conservancies were that livestock are killed by wild animals and that elephants damage water points and gardens (Suich, 2003). If high levels of HWC continue in the future, with few or no management options to reduce the conflict, this may impact negatively on the success of the CBNRM programme currently underway in the region. However, at present the protection of wildlife was one of the most commonly cited advantages in conservancy areas (Suich, 2003).

The poor security situation in Caprivi between the end of 1999 and mid 2002 resulted in the poor financial performance of community-based tourism enterprises in the region (Halstead, 2003). This has meant that potential revenues which could have helped offset some of the costs associated with HWC losses, have not been realised.²⁷ With the improved security situation, tourism potential in the Caprivi Region is looking much healthier.

²⁶ Section 1.2 details the activities of conservancy staff in trying to combat HWC.

²⁷ Salambala Conservancy did earn about N\$300,000 through their trophy hunting contract in 2001. Although this is a significant sum, benefit distribution was modest with only N\$2,000 being allocated to each of the 19 member villages in 2001.

4. CONCLUSIONS AND RECOMMENDATIONS

HWC in Caprivi can contribute to poverty by reducing household food security and options for generating cash. This is particularly problematic for households who have very little security even prior to an HWC incident. Most of the respondents interviewed are subsistence farmers whose lives depend on their cropping and livestock. While it seems that no farmers have yet given up planting crops because of HWC, some have moved their fields in the hope that they will be less affected in the future. In particular, it has been noted that people tend to move their fields away from rivers towards forests, in order to leave the rivers as corridors for wildlife such as elephants and hippos (CRs, pers. comm.). Given that the problem affects such a large number of households, improved management strategies are necessary.

As illustrated above, people do use a range of traditional methods to deter ‘problem animals’. In addition, both conservancy (particularly the CRs) and MET staff are active in trying to assist farmers in the protection of their crops and livestock. However, these management measures have had limited success. Some recommendations are discussed below.

4.1 Potential role of GPTF

At the time of writing, the MET’s Game Product Trust Fund (GPTF), which aims to address HWC through funding projects, had not sponsored a single project in Caprivi. The GPTF funding process has been initiated in Caprivi but has made limited progress (Odendaal and Diggle, 2001). Proposals have been submitted but as yet have not been funded. Suggestions for new proposals have included using funds to hire unemployed youth to protect fields during harvest. If possible, initiatives should be pursued prior to next harvest.

Trials of new deterrent techniques – currently being tested elsewhere in the region – could also be pursued. In Zimbabwe, for example, Dr Ferrel Osborn, a conservation biologist working on the Mid-Zambezi Elephant Project, has field-tested the use of capsicum spray as an elephant repellent (Osborn, 2002). Other methods include growing paprika and sisal around food crops as a deterrent (with the added benefit that these are also potential cash crops). Such projects would enable communities to feel that something was being done to help them in their quest to balance conservation and farming.

4.2 Wildlife hazard management compensation

‘Problem animal’ management including ‘the need to balance individual farmers’ losses with compensation or conservancy benefits’ was identified by IRDNC staff in Caprivi and Kunene, as one of the main challenges they face in the implementation of CBNRM (IRDNC, 2001; Flintan, 2001). Staff members have developed the concept of a conservancy compensation scheme to compensate losses incurred as a result of HWC (Murphy, 2001). From a livelihoods perspective, this scheme has great merit, as it aims to provide direct financial compensation to individual households that have borne the direct cost of HWC. It is crucial, particularly for conservancies, to achieve a balance between the costs and benefits of wildlife to avoid people becoming disillusioned with conservation.

When they were asked how they felt about this compensation scheme, most of the respondents expressed gratification that something was being done to address HWC and were optimistic that this might help in some way. However, the effectiveness of the compensation scheme remains to be seen. A pilot phase is currently underway in four conservancies (two in Kunene and two in Caprivi).

It is effective as of 1 April 2003 and will pay compensation of up to N\$800 for legitimate livestock claims and N\$5000 for funeral expenses in cases of loss of human life. Strict control on the verification of claims will be needed, as well as implementation of the necessary precautions to reduce the threat of HWC (e.g. kraaling cattle at night).

As insecure households in Caprivi tend not to own livestock and depend on their crops for food, the pilot scheme in Caprivi would have greater impact if crop damage were included. At present, the pilot scheme covers loss of livestock only and unfortunately does not cover loss of, or damage to, crops.

Additionally, as HWC is neither a new problem, nor one that is restricted to conservancies, when management strategies are being implemented, the effects of HWC on households outside of conservancies must also be considered.

4.3 Transboundary implications of HWC in Caprivi

HWC in Caprivi has a strong transboundary component due to the migratory nature of animals causing HWC (especially elephants) and lack of international boundary fences. Botswana derives considerable benefit from wildlife through tourism. Elephants (particularly around the Chobe River) use Namibia as a nocturnal feeding ground and return to the safety of protected areas in Botswana during the day. In this context there could be potential for consideration of transboundary negotiations regarding management of HWC. Recent resources provided for transboundary conservation and development by international conservation organisations, such as African Wildlife Foundation and Conservation International, could provide a fertile environment for this negotiation.

4.4 Recording HWC in Caprivi and Namibia

The conservancy data for HWC is a very valuable tool to track incidents over time and to record the amount of effort that goes into reducing conflict. Continued support should be provided for this process. Current MET data recording would be more useful if a system was developed to electronically record incidents to facilitate access, analysis and updating. The Caprivi office now has the necessary resources. The WILD database could be used to begin this process. Even more useful would be for MET to develop a system to collect uniform data nationwide, which would be regularly updated, accessible and utilised.

4.5 A 'Problem Animal' Policy for MET

In order to provide clarity and consistency within the MET, and with others dealing with incidents of HWC, it is strongly recommended that the MET draft an official government policy on HWC. The policy should include guidelines for implementation where appropriate. The proceedings of the MET workshop on 'Reducing conflict between wildlife and people' should be consulted (Murphy, 2001). The policy should facilitate the inclusion of 'problem animals' in trophy hunting quotas to optimise community benefit to offset the cost of living with wildlife. The policy also needs to include the work of conservancy staff.

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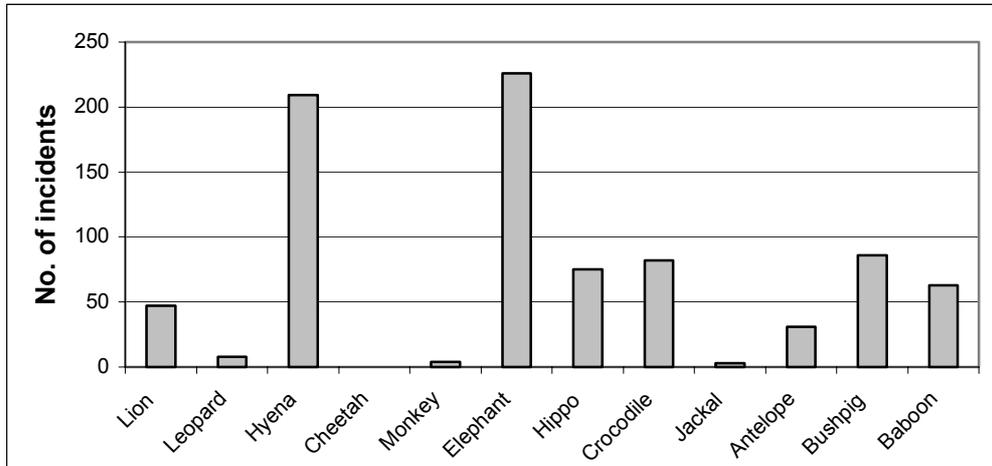
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Masale; George Sikopo; Martin Mushabati; Albius Nsudaou; David Lukolwe; Timothy Sikwany;

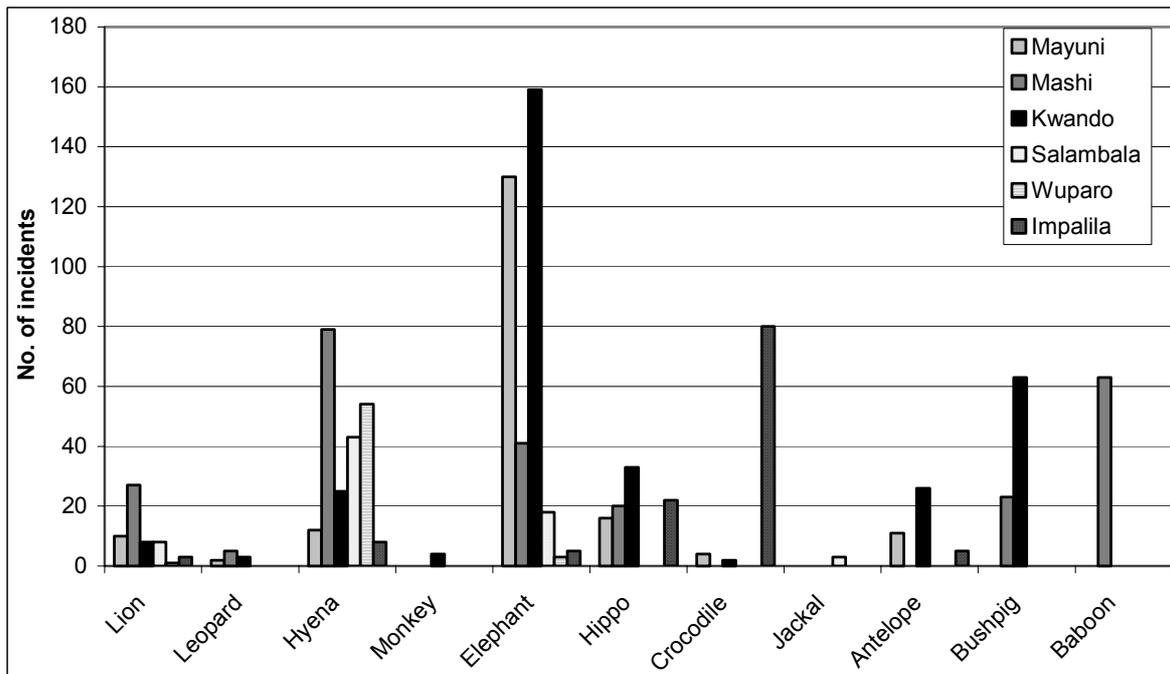
Clement Wanolo; Fabian Mukwasi; and Lister Maani.

APPENDIX 1 SELECTED EVENT BOOK DATA, 2001

Graph A1.1 Number of incidents, by species, 2001



Graph A1.2 Number of incidents, by species, by conservancy, 2001



APPENDIX 2 EVENT BOOK DATA, 2002

'Problem animal' incidents: East Caprivi - 2002 (taken from East Caprivi Event Book audit)

Elephant incidents: 698 (mostly in conservancies along Kwandu River)

Lion incidents: 118 (mostly in conservancies along Kwandu River)

Hyena incidents: 245

Crocodile incidents: 78 (with 66 incidents in Kasika)

Hippo incidents: 150

Monkey and baboon incidents: 33

Duiker, kudu and buffalo incidents: 31

TOTAL 'PROBLEM ANIMAL' INCIDENTS: 1,355

Human attacks: 8 (resulting in 4 deaths)

Cattle taken by lions: 648

Incidents of crop damage: 1,004

Poaching incidents: 6

Source: IRDNC, WWF UK (NA0015): Caprivi support programme biannual report, July to December 2002

APPENDIX 3 PRICE INFORMATION FOR CROPS AND STOCK, 1996–2001

Table A3.1 Maize

Year	Yield (kg/ha) ¹	Price (N\$/kg) ²
1996	400	0.85
1997	670	0.92
1998	100	1.0
1999	130	1.03
2000	660	1.08
2001	400	1.28

Table A3.2 Millet/Mahangu

Year	Yield (kg/ha) ¹	Price (N\$/kg) ²
1996	320	0.85
1997	450	0.92
1998	210	1.0
1999	90	1.15
2000	450	1.26
2001	370	1.25

Table A3.3 Sorghum

Year	Yield (kg/ha) ¹	Price (N\$/kg) ²
1996	320	0.85
1997	450	0.92
1998	210	1.0
1999	90	1.15
2000	480	1.26
2001	320	1.25

¹ NEWFIU, n.d.

² MAWRD, n.d.

Table A3.4 Average cattle slaughter prices (per head)¹

Year	N\$/hd
1996	1,230
1997	1,248
1998	1,089
1999	954
2000	1,337
2001	1,332

¹ MAWRD, 2002. Agricultural statistics bulletin, November 2002. Windhoek: MAWRD.

APPENDIX 4 CASE STUDY INTERVIEWS

Table A4.1 First visit

Village	Interviewee
Mayuni Conservancy	
2 May	
Kandiana Village	John Lubinda
Sikwekwe Village	Munyanywa Mafati Chester Mazungu Mr DL Liembani
Maunga Village	Mrs Lukonga
Kayuo Village	John Mbonafu Munyinda Mulilankole
Masheshe Village	Phillips Malando Inessy Siyamo Mirinah Kuputa Jane Sikwanyani
Kwandu Conservancy	
3 May	
Kongola Village	Jonah Swalelo Doreen Silimiso
Malengelenga Village	Joyce Kwando Visco Sibeso
Sisheke Village	Mr Sambandala
Salambala Conservancy	
6 May	
Kazauli Village	Margaret Mwita
Limai Village	Rosemary Mbala
Ikumwe Village	Maureen
Katounyana Village (near Ngoma)	Albius Mudala Kabuku Sitale

Questions:

Name, age, and village.

Can you tell us about the damage caused by wildlife which you experience?

(What animals? What damage? Where? When did it last happen? Did it happen last year? Does it happen every year? What time of day? How? Where do animals come from/go to?)

Can you tell us what the damage meant to your family? (Less food? Did food have to be bought? Less money (how much)? Did people have to go without? Less savings?)

Threat to human life?

What did you do (if anything)? Does it help? What does it cost?

Does anyone else help? (MET, conservancy, Khuta)

What else do you think should be done?

Source of income?

Do you think cattle or wildlife cause the most damage to people's crops?

Do you have any cattle (if so, how many approximately)?

Table A4.2 Second visit

Village	Interviewee
Mayuni Conservancy	
6 August	
Sikwekwe Village	Munyanywa Mafati Mr DL Liembani
Kapako Village	Esther Sipiho
Maunga Village	Mrs Lukonga
Kayuo Village	John Mbonafu Munyinda Mulilankole
Masheshe Village	Phillips Malando Inessy Siyamo Mirinah Kuputa Jane Sikwany
Kwandu Conservancy	
7 August	
Kongola Village	Jonah Swalelo Doreen Silimiso
Malengelenga Village	Visco Sibeso Mr Sambandala

Questions:

Name. Location.

Have there been any further problems with wildlife damage since we visited at the start of May this year?

Do you have any maize left in your grain store? How long will it last (months)?

What have you been doing for food this winter?

Where has your food been coming from?

If food is bought, how did you earn the money to buy food?

What will you do for food until next harvest?

Will you plant this year? If not, why not?

Have you had to go without anything because you could not sell maize this year? If so, what?

Have any of your children had to leave school this year because you could not pay the fees?

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