

**Table 28: HWC species, damage caused, livelihood impacts and management options**

Species	Damage	Livelihood impact	Management options
Elephant			
Elephant	Break dams, pipes, fences, water points, windmills, engines and fences; drink water from dams and damage crops; kill and scare livestock and people	Loss of time and cost of buying new pipes, more time spent for labour, water shortage for consumption for both wildlife, livestock and human use; loss of food means wealth decreases and poverty increases; food shortage	Alternative water points bury and concrete pipes; reinforce existing water points; electric fences; protective stone walls; trenches; compensation; planting tobacco and pepper crops that elephants do not like to eat
Predators			
Jackal, caracal and hyena	Kill small and large livestock	Reduced income; food shortage; increased poverty; loss of stock for reproduction; increased vulnerability	Herd dog and kraal; employ herders; jackal-proof fence; use of traps, shoot or poison
Lion and cheetah	Lion – kill cows, goats, sheep and people Cheetah – small stock	Less income and time lost to recover from damage; loss of money for school and food; loss of life; creates tensions; reduces livestock reproduction potential	Trophy hunting; kraal livestock at night; herd cattle during the day; compensation scheme; obtain permit to shoot; live capture; issue quota from MET; improve livestock management; donkey grazes with livestock
Other			
Baboon, porcupine	Crop damage	Loss of food, time and money	Compensation; electric fencing
Snakes	Kill people and livestock	Loss of life, money, time and food	Compensation and kill use snake deterrent
Birds, eagles etc.	Small stock, lambs and kids and crop damage	Loss of food, money, meat and time	Compensation and cash; seeds and chicken cages; obtain permit to shoot; live capture; foot traps
Grazing species, antelopes	Grazing and water pressure	Affects other livestock health and availability of water and grazing	Hunt and off-take; specific zones for grazing cattle versus wildlife

Source: Vaughan *et al.* 2003c

To assess the impact on household livelihoods of damage caused by wildlife to crops, it is useful to compare different data sets from the same conservancies in Caprivi. A comparison of data is provided in Table 29. The data sets refer to damage caused to maize, sorghum and millet grain crops by all wildlife. The following presentation of data and discussion requires a caveat about the HWC problem. The variation in the extent and impact of losses from one season to another can be significant, it is therefore difficult to generalise about losses. The year to which Evans' data refers (the 2002-2003 agricultural season) there was less than adequate rainfall, and this puts additional pressure on households experiencing loss due to the fact that they already suffered from reduced yields through a lack of rain. The data presented may, therefore, represent worse than average losses than that which we might expect over a longer period that included both good years and bad. A similar caution can be raised in respect to the WILD/EEU survey data and that presented by MAWRD.

Key differences between the data sets relate to the ways in which the figures were arrived at, although in essence they both used the same approach. The losses for standing crops were calculated by Evans on the basis of the difference between the expected yields per hectare minus the damage as estimated by the households themselves. The resulting hectares that were affected were then multiplied by the yield forecasts and the farm gate prices. In the case of the WILD data, the estimates of loss were made by households themselves and were not calculated in terms of the difference between areas planted, expected yields and hectares damaged. In the latter case the financial losses were calculated by multiplying households' estimates of percentage of hectares lost by the yield per hectare and the farm gate price. Despite these differences, the findings are comparable. This is particularly so in the case of data from Mayuni. In Chapter 5 estimates of the annual average income of households were provided for Caprivi. Based on an average from the figures presented below, in Mayuni and Kwandu Conservancies the value of the crops lost to wildlife represents 18% (N\$1,170) and 22% (N\$1,430) of average annual household incomes for the region.



Table 29: Crop production and loss data for Kwandu and Mayuni Conservancies

Mayuni	Hh est. WILD⁸ data	Hh est. Evans data	Hh est. MAWRD data	Ave. across samples
Ave. area/hh of damage (ha)	1.55	1.74	1.74	1.67
Ave. % of total crop lost by hh	55	79	67	67
Ave. cost/hh of damage (N\$)	1,281	928	1,306	1,172
Loss as % of ave. hh income for region (N\$)	20	14	20	18
Kwandu	Hh est WILD data	Hh est Evans data	Hh est MAWRD data	Ave. across samples
Ave. area/hh of damage (ha)	2.6	2.86	2.44	2.6
Ave. % of total crop lost by hh	39	71	57	56
Ave. cost/hh of damage (N\$)	1,032	2,027	1,290	1,450
Loss as % of ave. hh income for region (N\$)	16	31	20	22

Source: Based on data from Evans 2003 and Suich 2003

While this provides a useful estimate of the value of crops lost, not all the crops would be sold and when they are they may in fact be sold at well below the farm gate price. In addition since some of the smaller producers may lose all their crops to wildlife, their losses would constitute a much more severe negative impact on livelihood security. Many producers are focused on production primarily for consumption purposes; therefore the impact of crop losses on food security is more severe. Data from Sutton (2001) supports this fact: he found that in 61.2% of cases farmers did not sell any of their maize, millet, sorghum and bean harvests. Such losses push producers to seek alternative means of generating income or securing food. This may have the effect of putting additional pressure on the natural resources as people shift their strategies (see Chapter 5 and 6). There may also be further strain put on people's social networks, as cash or in-kind remittances may be sought from urban relatives or those in the area who are better off.

One Kwandu Conservancy respondent to interviews on HWC in Caprivi, in May 2002, was a widower with 11 children and no livestock. Elephants destroyed his hand-hoed maize and pumpkin crop. He stated that he had not figured out yet how he and his children would survive the year. Despite this farmer's comments, case study material relating to the plight of a similar farmer in Caprivi indicated that support could come from relatives in employment as a remittance in cash or kind. This is a common characteristic of livelihoods in Caprivi (see for example Næraa *et al.* 1993).

The same farmer reported the incident to the MET Rangers who came to chase the elephants away, but it was too late to stop the damage (Mulonga *et al.* 2003). Whilst stock loss incidences often involve higher costs to farmers than crop-raiding incidences, it is the crop-raiding and damage to water points that presents a greater threat to livelihoods. Crop-

raiding in fields in Caprivi intensifies around February to May when the crops are harvested. During these times elephants raid fields of maize, sorghum and millet, which are the three main crops grown in Caprivi. Vegetable gardens are also damaged.

HWC 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 from the outset⁹. HWC that leads to reduced crop yields at harvest time and the loss of stock that might otherwise have been sold compounds the negative impacts on livelihoods by reducing a household's ability to cope with other shocks, such as drought. Poorer households with fewer livelihood assets are more risk prone as a result of HWC, as they have fewer resources to address vulnerability and livelihood security (see case studies for Caprivi in Chapter 5). There are also opportunity costs borne by rural people living in proximity to wildlife. These are harder to quantify, but examples include loss of sleep or reduced school attendance while guarding crops, and restrictions on people's movements due to the presence of dangerous wildlife.

A variety of wildlife species cause different types of livelihood impacts that stem from the damage inflicted and losses incurred. HWC impacts have a ripple affect. The resulting losses in terms of cash incomes may in turn lead to reduced ability to pay school expenses. So far the options for HWC mitigation are limited and conservancies, whilst often seen to have the responsibility by local communities and MET, actually lack the legal authority to address the problems directly.

The livelihood impacts arising from HWC for both Caprivi and Kunene can be summarised as follows:

⁸ WILD data was collected during 2002, and refers to the 2001-2002 agricultural season; Evans data was collected in 2003, and refers to the 2002-2003 agricultural season. This may account for the disparity in terms of the average areas damaged, particularly in Kwandu Conservancy.

⁹ The problem of food insecurity is particularly devastating for families depending solely on cropping, who own no cattle, and have no household members in paid work. Indications are that these families comprise around 50% of households in Caprivi.



- Increased livelihood vulnerability – due to reduction in crop yields and livestock numbers (with associated decreased availability of assets, including potential source of incomes, subsistence foodstuffs, transport, milk and hides).
- Temporarily decreased access to water and sometimes grazing.
- Increased expenditure on pumping water to replace that consumed by elephants.
- Lost time, labour, income and investment, e.g. money spent on draught power or time spent guarding crops at night and not sleeping.
- People experiencing wildlife conflict become frustrated with conservancy and MET responses, leading to increased conflict and hostility.
- Increased reliance on social networks and safety nets, e.g. at damaged water points people reported that they rely on family and friends to assist.

HWC Impact on the Conservancy Programme

Lack of government compensation for losses and a limited response in most cases by conservancies and/or 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). Although HWC was a problem before the establishment of the conservancies, and any increases are difficult to attribute solely to the activities of the conservancies, local perceptions were that the conservancies bore some responsibility for the problem since one of the conservancies' primary objectives is to protect wildlife. In the same survey, the protection of wildlife was also cited as one of the advantages of conservancies (Suich 2003). It has been recorded elsewhere that 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 (see for example, Odendaal and Diggle 2002, Murphy 2002, Jones and Butterfield 2001).

The financial costs to the population as a whole within the conservancies can be measured by using sample household data as a representation of damage in each conservancy (see above on impact of HWC at household levels). Evans (2003) provides estimates for Kwandu and Mayuni. For Kwandu the estimated cost to the population was between N\$278,540

and N\$437,729 (for estimates based on household sample data and that provided by MAWRD respectively). For Mayuni the costs were between N\$66,586 and N\$103,595 (household and MAWRD data respectively). These costs or losses are not strictly speaking a loss to the conservancy, since the income that could be derived from the crop sales accrues to the individual household. Economic analysis considers that the cost to the conservancy would involve offsetting these individual costs in some way from collective incomes earned.

Collective income (i.e. not including wages and other income accruing to individuals) for Kwandu Conservancy for 2003 was reported to be N\$246,420 (WWF-LIFE figures 2003). Based on Evans 2003 the average losses (i.e. the mean of household estimates and MAWRD data) incurred by the conservancy (N\$358,134) would represent 145% of their income for 2003! Following the same approach for Mayuni the losses represent 24% of the income earned by Mayuni for the same period.

In Kunene, the impacts at conservancy level cannot be measured in the same ways as for Caprivi due to a lack of data. However, in the areas of concern relating to water point damage one issue relates to the apparent lack of clarity in respect to who has responsibility between Rural Water Supply, MET, the conservancies and local residents for repairing water points damaged by elephants. In ≠Khoadi //Hôas Conservancy four water points dedicated to elephants have been installed with financial support from the GPTF. The decision on where to locate the dams would have been better served if there had been wider consultation and if domestic water priorities had been met first (Vaughan and Kuvare 2002). It is likely that people have a reluctance to pump water for elephants when returns from living with elephants are not clear and when elephants continue to use existing domestic water points. A key factor relating to the maintenance of elephant water points is the willingness of individual households or water point committees to pay the costs of cleaning elephant dams and pumping water. This is especially the case with new elephant dams where residents cannot also use the water for human or livestock consumption.

In a small sample survey conducted in Caprivi (n=21) (see Mulonga *et al.* 2003), 90% of respondents said that they reported wildlife damage incidences to either MET or conservancy staff. Slightly more people reported to the conservancy than to MET (10 to conservancy, seven to MET, and two to both).¹⁰ Just under half of the respondents reporting incidents stated that they were concerned that there was a lack of any adequate response from the MET or

¹⁰ This would seem to explain why incidents reported to MET are fewer than those of 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.



conservancy representatives. Responding to incidents would go some way to offsetting the costs (travel and time) associated with reporting. People continue to use a range of traditional methods to deter 'problem animals'. In addition, both conservancy (particularly the CCGs) 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.

What are MET and Conservancies Doing to Address the Conflict Between Humans and Wildlife?¹¹

Table 30 summarises the attempts by both MET and the conservancies to address the negative livelihood impact of wildlife damage to local people.

Impact of problem animal policy and procedure for communities

Some of the implications for household livelihoods and the conservancies of current policy positions were discussed in Chapter 3. Here the discussion focuses on those issues specific to dealing with HWC. Data from Salambala and ≠Khoadi //Hôas illustrates these issues.

"There should be clarity on rights, devolution and exclusivity... are all rights given to the conservancy and the rest are MET, how far do they want to take this devolution? I think somehow it is

true we do have difference in our views, but true as much as we love to give rights to our communities, sometimes shooting an elephant is a big issue, and maybe what these people need is to get our advice." (Tsukhoe //Garoës, Head, MET CSD, cited in Vaughan *et al.* (2003b))

The existence of conservancy institutions raises expectations among residents that the conservancy will deal with predators that kill livestock, large herbivores that damage crops and elephants water installations. Increasingly community members in Caprivi are starting to view wildlife as belonging to conservancies rather than to the State (Jones and Butterfield 2001, G. Mutwa pers. comm.)¹³. They are turning to the conservancies for assistance in dealing with problem animals. Although conservancies can use armed game guards to try to scare away elephants, they are unable to take the ultimate sanction against a problem elephant and kill it (see below).

The current situation means that the conservancy is being ascribed responsibility by residents for dealing with problem animals, but has little authority to take action that really counts in the minds of residents. The support for conservancies by members in Caprivi is being eroded because of these problems (G. Mutwa pers. comm.). At the same time, the lengthy procedure used by the MET to declare that a problem elephant can be shot means that the official channels are normally inadequate to deal with a problem.

Table 30: MET and conservancy attempts to address HWC

MET activities	Conservancy activities
Enabling legislation to destroy certain species of wildlife that is threatening human life or property	
Strategic workshop held in 2001 to look for ways to address the HWC ¹²	Active participation in this workshop
Provision of free diesel to pump water for elephants; protection of water points	≠Khoadi //Hôas provide diesel to pump water to farmers
Giving permission for identified individual animals to be shot by professional hunters	Asking for permission for identified individual animals to be shot by professional hunters
Recording incidences reported by complaints	Recording incidences reported by complaint (event books)
Helping to chase animals out of fields	Helping to chase animals out of fields
Destroying identified individual animals	Destroying identified individual animals
Administering the GPTF	Accessing GPTF monies for projects e.g. elephant water points
	'Problem Animal Control awareness programmes' in conservancies
	Conservancy staff warning farmers of the presence of potentially damaging wildlife
	Exploring the option of zonation and use of a spatial dimension, to reduce the likelihood of conflict using the spatial dimension
	Piloting a formal compensation scheme, with IRDNC assistance
	Compensation for HWC paid as a conservancy initiative e.g. in Mayuni Conservancy or planned for ≠Khoadi //Hôas Conservancy (in benefit distribution plan)

¹¹ Refer to Mulonga *et al.* 2003 for more details in the context of Caprivi.

¹² Refer to Murphy 2001 for workshop proceedings. Unfortunately there has been little follow up from this workshop to date.

¹³ WILD research indicates that this is the case in Kunene as well. Residents are beginning to view elephants as belonging to the conservancies and expecting the conservancy to deal with them.